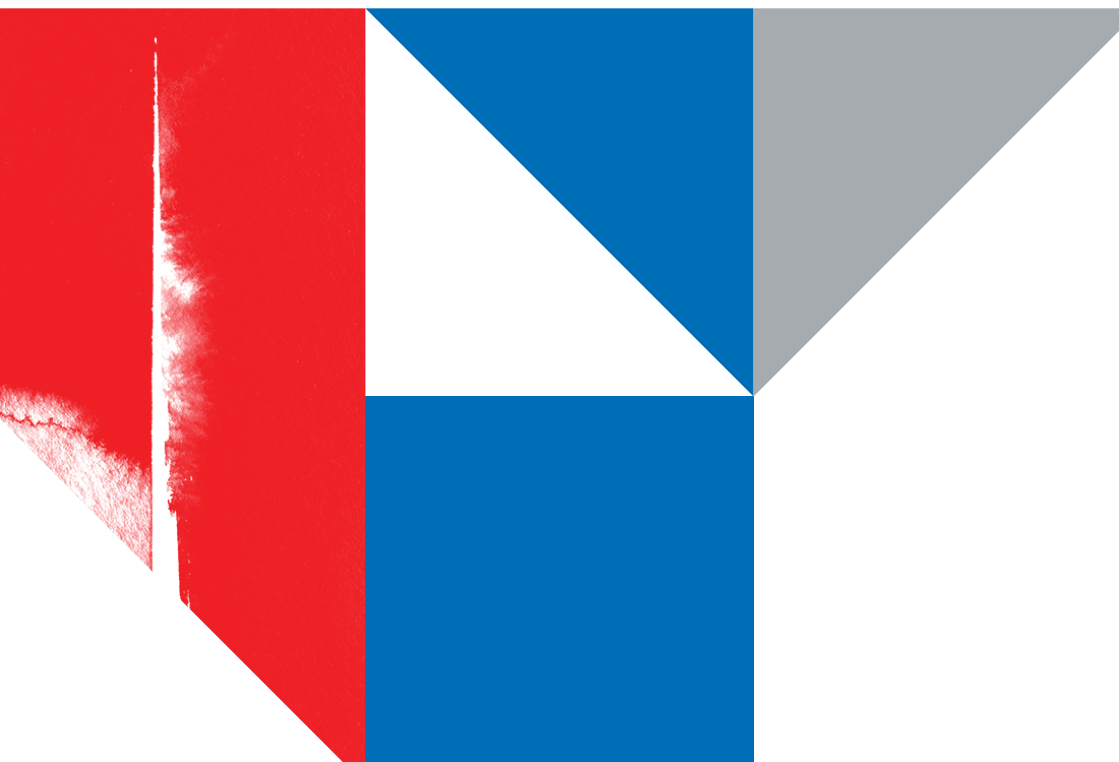


TOSHIBA

Small Signal and Logic Devices

Selection Guide 2021



Contents

1. MOSFETs	3-12
■ Over 500mA Series MOSFETs (Semi-Power Type)	
■ Less than 500mA Series MOSFETs (Standard Type)	
■ MOSFET with Diode	
■ Part Naming Conventions	
2. Bipolar Transistors	13-17
■ General-Purpose Transistors	
■ Bias Resistor Built-in Transistors (BRTs)	
3. Diodes	18-28
■ Schottky Barrier Diodes (SBDs)	
■ Switching Diodes	
■ TVS Diodes (ESD Protection Diodes)	
■ Zener Diodes for Over Voltage Protection	
■ Part Naming Conventions	
4. Power Management ICs	29-32
■ Low Dropout Regulators (LDO)	
■ Load Switch ICs	
■ N-ch MOSFET Gate driver ICs with OVP function	
■ Power Multiplexer ICs	
■ eFuse ICs	
5. Linear ICs	33
■ Operational Amplifiers, Comparators	
6. Sensors	34
■ Magnetic Sensors	
7. Logic Devices	35-48
7-1 One-Gate Logic ICs (L-MOS)	
7-2 CMOS Logic ICs	
■ Standard Logic 74VHC Series (TSSOP14B/16B/20B Package Products)	
■ Standard Logic 74HC Series, 74LCX Series (TSSOP14B/16B/20B Package Products)	
■ Standard Logic 74VHC Series (US14/16/20 Package Products)	
■ Standard Logic 74LCX Series, 74VCX Series (US14/16/20 Package Products)	
■ Standard Logic 74HC Series, TC4000B Series (SOIC14/16/20, SOP14/16/20 Package Products)	
■ Standard Logic TC74VCX Series, TC74LCX Series (TSSOP14/16/20/48 Package Products)	
7-3 Bus Switches	
■ High-Speed Transmission Type	
■ General Purpose Bus Switches	
7-4 Level Shifters	
7-5 Part Naming Conventions	
8. Radio-Frequency Devices	49-53
■ RF Diodes	
■ RF MOSFETs	
■ RF Transistors	
■ Part Naming Conventions	
9. Device Packages	54-62

1. MOSFETs

Over 500mA Series MOSFETs (Semi-Power Type)

Package Dimensions (unit: mm)

CST3C	CST3 (SOT-883)	CST3B	VESM (SOT-723)	UFM (SOT-323F)	ES6 (SOT-563)	UF6 (SOT-363F)	WCSP6C
Bottom View 	Bottom View 	Bottom View 					Bottom View 
0.8x0.6	1.0x0.6	1.2x0.8	1.2x1.2	2.0x2.1	1.6x1.6	2.0x2.1	1.5x1.0

P-Channel Single MOSFET

Package	Part Number	V _{DSS} (V)	V _{GSS} (V)	I _O (A)	R _{DS(ON)} max (mΩ)							Q _g typ. (nC)	C _{iss} typ. (pF)	Note
					V _{GS} = -1.2V	V _{GS} = -1.5V	V _{GS} = -1.8V	V _{GS} = -2.5V	V _{GS} = -4V	V _{GS} = -4.5V	V _{GS} = -10V			
CST3C	SSM3J64CTC	\$ -12	+/-10	-1.0	11300	1310	890	560	-	370	-	-	50	
	SSM3J65CTC	\$ -20	+/-10	-0.7	11300	1550	1070	700	-	500	-	-	48	
CST3	SSM3J56ACT	\$ -20	+/-8	-1.4	4000	900	660	480	-	390	-	1.6	100	
CST3B	SSM3J46CTB	\$ -20	+/-8	-2.0	-	250	178	133	-	103	-	4.7	290	⇒ SSM6J213FE
VESM	SSM3J66MFV	# \$ -20	+6/-8	-0.8	4000	900	660	480	-	390	-	1.6	100	
	SSM3J56MFV	\$ -20	+/-8	-0.8	4000	900	660	480	-	390	-	1.6	100	
WCSP6C	SSM6J771G	\$ -20	+/-12	-5.0	-	-	-	47.5	-	35	34.7(@-8V) 31(@-8.5V)	9.8	870	
ES6	SSM6J216FE	\$ -12	+/-8	-4.8	-	88.1	56	39.3	-	32	-	12.7	1040	
	SSM6J213FE	\$ -20	+/-8	-2.6	-	250	178	133	-	103	-	4.7	290	
	SSM6J215FE	\$ -20	+/-8	-3.4	-	154	104	79	-	59	-	10.4	630	
	SSM6J212FE	\$ -20	+/-8	-4.0	-	94	65.4	49	-	40.7	-	14.1	970	
	SSM6J207FE	\$ -30	+/-20	-1.4	-	-	-	491	-	251	-	137		
	SSM6J214FE	\$ -30	+/-12	-3.6	-	-	149.6	77.6	-	57	50	7.9	560	
UFM	SSM3J132TU	\$ -12	+/-6	-5.4	94	39	29	21	-	17	-	33	2700	
	SSM3J135TU	\$ -20	+/-8	-3.0	-	260	180	132	-	103	-	4.6	270	
	SSM3J145TU	# \$ -20	+6/-8	-3.0	-	260	180	132	-	103	-	4.6	270	
	SSM3J134TU	\$ -20	+/-8	-3.2	-	240	168	123	-	93	-	4.7	290	
	SSM3J144TU	# \$ -20	+6/-8	-3.2	-	240	168	123	-	93	-	4.7	290	
	SSM3J120TU	● \$ -20	+/-8	-4.0	-	140	78	49	38	-	-	22.3	1484	⇒ SSM3J133TU
	SSM3J130TU	\$ -20	+/-8	-4.4	-	63.2	41.1	31	-	25.8	-	24.8	1800	
	SSM3J140TU	# \$ -20	+6/-8	-4.4	-	63.2	41.1	31	-	25.8	-	24.8	1800	
	SSM3J133TU	\$ -20	+/-8	-5.5	-	88.4	56	39.7	-	29.8	-	12.8	840	
	SSM3J143TU	# \$ -20	+6/-8	-5.5	-	88.4	56	39.7	-	29.8	-	12.8	840	
	SSM3J112TU	# \$ -30	+/-20	-1.1	-	-	-	790	-	390	-	86		
	SSM3J118TU	# \$ -30	+/-20	-1.4	-	-	-	480	-	240	-	137		
	SSM3J117TU	# \$ -30	+/-20	-2.0	-	-	-	225	-	117	-	280		
UF6	SSM6J50TU	\$ -20	+/-10	-2.5	-	-	205 (@-2V)	100	-	64	-	-	800	
	SSM6J422TU	# \$ -20	+6/-8	-4.0	-	99.6	67.8	51.4	-	42.7	-	12.8	840	
	SSM6J412TU	\$ -20	+/-8	-4.0	-	99.6	67.8	51.4	-	42.7	-	12.8	840	
	SSM6J424TU	# \$ -20	+6/-8	-6.0	-	54	36	26	-	22.5	-	23.1	1650	
	SSM6J414TU	\$ -20	+/-8	-6.0	-	54	36	26	-	22.5	-	23.1	1650	
	SSM6J402TU	# \$ -30	+/-20	-2.0	-	-	-	225	-	117	5.3	280		
	SSM6J410TU	# \$ -30	+/-20	-2.1	-	-	-	393	-	216	2.9	120		
	SSM6J401TU	# \$ -30	+/-20	-2.5	-	-	-	145	-	73	16	730		

● Recommend Another New Product

AEC-Q101 qualified, \$ With protection Zener diode between gate and source

UDFN6B (SOT-1220)	SOT-23F	S-Mini (SOT-346)	TSOP6F
Bottom View 			
2.0x2.0	2.9x2.4	2.9x2.5	2.9x2.8

P-Channel Single MOSFET

Package	Part Number	V _{DS} (V)	V _{GS} (V)	I _D (A)	R _{DS(ON)} max (mΩ)							Q _g typ. (nC)	C _{iss} typ. (pF)	Note
					V _{GS} = -1.2V	V _{GS} = -1.5V	V _{GS} = -1.8V	V _{GS} = -2.5V	V _{GS} = -4V	V _{GS} = -4.5V	V _{GS} = -10V			
UDFN6B	SSM6J512NU	\$ -12	+/-10	-10.0	-	-	40.1	25.7	20.5 (@-3.6V)	18.7	16.2 (@-8V)	19.5	1400	
	SSM6J505NU	\$ -12	+/-6	-12.0	61	30	21	16	-	12	-	37.6	2700	
	SSM6J511NU	\$ -12	+/-10	-14.0	-	-	19.2	13.5	11.5 (@-3.6V)	10	9.1 (@-8V)	47	3350	
	SSM6J503NU	\$ -20	+/-8	-6.0	-	89.6	57.9	41.7	-	32.4	-	12.8	840	
	SSM6J502NU	\$ -20	+/-8	-6.0	-	60.5	38.4	28.3	-	23.1	-	24.8	1800	
	SSM6J501NU	\$ -20	+/-8	-10.0	-	43	26.5	19	-	15.3	-	29.9	2600	
	SSM6J507NU	\$ -30	+20/-25	-10.0	-	-	-	-	32	28	20	13.6	1150	
SOT-23F	SSM3J338R	\$ -12	+/-10	-6.0	-	-	45.3	27.9	21.9 (@-3.6V)	20.2	17.6 (@-8V)	19.5	1400	
	SSM3J327R	\$ -20	+/-8	-3.9	-	240	168	123	-	93	-	4.6	290	
	SSM3J377R	# \$ -20	+6/-8	-3.9	-	240	168	123	-	93	-	4.6	290	
	SSM3J331R	\$ -20	+/-8	-4.0	-	150	100	75	-	55	-	10.4	630	
	SSM3J371R	# \$ -20	+6/-8	-4.0	-	150	100	75	-	55	-	10.4	630	
	SSM3J328R	\$ -20	+/-8	-6.0	-	88.4	56	39.7	-	29.8	-	12.8	840	
	SSM3J378R	# \$ -20	+6/-8	-6.0	-	88.4	56	39.7	-	29.8	-	12.8	840	
	SSM3J355R	\$ -20	+/-10	-6.0	-	-	52.3	38.8	-	30.1	-	16.6	1030	
	SSM3J358R	\$ -20	+/-10	-6.0	-	-	49.3	32.8	27.7 (@-3.6V)	25.3	22.1 (@-8V)	38.5	1331	
	SSM3J334R	\$ -30	+/-20	-4.0	-	-	-	-	136	105	71	5.9	280	
	SSM3J374R	# \$ -30	+10/-20	-4.0	-	-	-	-	136	105	71	5.9	280	
	SSM3J340R	\$ -30	+20/-25	-4.0	-	-	-	-	86	73	45	6.2	492	
	SSM3J332R	\$ -30	+/-12	-6.0	-	-	144	72	-	50	42	8.2	560	
	SSM3J372R	# \$ -30	+6/-12	-6.0	-	-	144	72	-	50	42	8.2	560	
	SSM3J356R	# \$ -60	+10/-20	-2.0	-	-	-	-	400	360	300	8.3	330	
	SSM3J351R	# \$ -60	+10/-20	-3.5	-	-	-	-	184	164	134	15.1	660	
S-Mini	SSM3J325F	\$ -20	+/-8	-2.0	-	311	231	179	-	150	-	4.6	270	
	SSM3J375F	# \$ -20	+6/-8	-2.0	-	311	231	179	-	150	-	4.6	270	
	SSM3J352F	\$ -20	+/-12	-2.0	-	-	443	199	-	136	110	5.1	210	
	SSM3J353F	\$ -30	+20/-25	-2.0	-	-	-	-	274	232	150	3.4	159	
TSOP6F	SSM6J801R	\$ -20	+6/-8	-6.0	-	88.4	56	39.7	-	32.5	-	12.8	840	
	SSM6J808R ☆ #	-40	+10/-20	-7.0	-	-	-	-	52	48	35	24.2	1020	

☆ New Products

AEC-Q101 qualified, \$ With protection Zener diode between gate and source

CST3 (SOT-883)	CST3B	VESM (SOT-723)	SSM (SOT-416)	UFM (SOT-323F)	ES6 (SOT-563)	UF6 (SOT-363F)	UDFN6B (SOT-1220)	WCSP6C
Bottom View 	Bottom View 						Bottom View 	Bottom View 
1.0x0.6	1.2x0.8	1.2x1.2	1.6x1.6	2.0x2.1	1.6x1.6	2.0x2.1	2.0x2.0	1.5x1.0

N-Channel Single MOSFET

Package	Part Number	V _{DSS} (V)	V _{CESS} (V)	I _O (A)	R _{DS(ON)} max (mΩ)							Q _g typ. (nC)	C _{iss} typ. (pF)	Note
					V _{GS} = 1.2V	V _{GS} = 1.5V	V _{GS} = 1.8V	V _{GS} = 2.5V	V _{GS} = 4V	V _{GS} = 4.5V	V _{GS} = 10V			
CST3	SSM3K56CT	\$ 20	+/-8	0.8	-	840	480	300	-	235	-	1.0	55	
	SSM3K56ACT	\$ 20	+/-8	1.4	-	840	480	300	-	235	-	1.0	55	
CST3B	SSM3K59CTB●	\$ 40	+/-12	2.0	-	-	420	268	238 (@3.6V) 231 (@4.2V)	228	215 (@8V)	1.1	130	⇒ SSM6K217FE
VESM	SSM3K36MFV #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630 (@5V)	1.23	46	
	SSM3K56MFV	\$ 20	+/-8	0.8	-	840	480	300	-	235	-	1.0	55	
WCSP6C	SSM6K781G	12	+/-8	7.0	-	124	47.4	23.2	-	18	-	5.4	600	
SSM	SSM3K36FS #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630 (@5V)	1.23	46	
	SSM3K43FS ●	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630 (@5V)	1.23	46	⇒ SSM3K56FS
	SSM3K56FS	\$ 20	+/-8	0.8	-	840	480	300	-	235	-	1.0	55	
ES6	SSM6K204FE	\$ 20	+/-10	2.0	-	307	214	164	126	-	-	3.4	195	
	SSM6K211FE	\$ 20	+/-10	3.2	-	118	82	59	-	47	-	10.8	510	
	SSM6K24FE	\$ 30	+/-12	0.5	-	-	-	180	-	145	-	-	245	
	SSM6K208FE	\$ 30	+/-12	1.9	-	-	296	177	133	-	-	1.9	123	
	SSM6K202FE	\$ 30	+/-12	2.3	-	-	145	101	85	-	-	-	270	
	SSM6K217FE	\$ 40	+/-12	1.8	-	-	400	248	218 (@3.6V) 211 (@4.2V)	208	195 (@8V)	1.1	130	
UFM	SSM3K36TU #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630 (@5V)	1.23	46	
	SSM3K62TU #	\$ 20	+/-8	0.8	432	139	89	68	-	57	-	2.0	177	
	SSM3K122TU #	\$ 20	+/-10	2.0	-	304	211	161	123	-	-	3.4	195	
	SSM3K121TU #	\$ 20	+/-10	3.2	-	140	93	63	48	-	-	5.9	400	
	SSM3K123TU #	\$ 20	+/-10	4.2	-	66	43	32	28	-	-	13.6	1010	
	SSM3K127TU #	\$ 30	+/-12	2.0	-	-	286	167	123	-	-	1.5	123	
	SSM3K116TU #	\$ 30	+/-12	2.2	-	-	-	135	-	100	-	-	245	
	SSM3K131TU #	\$ 30	+/-20	6.0	-	-	-	-	-	41.5	27.6	10.1	450	
	SSM3H137TU #	\$ 34	+/-20	2.0	-	-	-	-	295	280	240	3.0	119	Built-in Active Clamp Zener
	SSM3K2615TU #	\$ 60	+/-20	2.0	-	-	-	580 (@3.3V)	440	-	300	6.0	150	
UF6	SSM3K341TU #	\$ 60	+/-20	6.0	-	-	-	-	69	51	36	9.3	550	Tch=175°C
	SSM3K361TU #	\$ 100	+/-20	3.5	-	-	-	-	-	92	69	3.2	430	Tch=175°C
	SSM6K405TU	\$ 20	+/-10	2.0	-	307	214	164	126	-	-	3.4	195	
	SSM6K404TU #	\$ 20	+/-10	3.0	-	147	100	70	55	-	-	5.9	400	
	SSM6K403TU #	\$ 20	+/-10	4.2	-	66	43	32	28	-	-	16.8	1050	
	SSM6K406TU #	\$ 30	+/-20	4.4	-	-	-	-	-	38.5	25	12.4	490	
UDFN6B	SSM6K407TU #	\$ 60	+/-20	2.0	-	-	-	-	440	-	300	6.0	150	
	SSM6K518NU ☆	20	+/-8	6.0	-	108	74	45	-	33	-	3.6	410	
	SSM6K517NU ☆	30	+12/-8	6.0	-	-	82	53	-	39.1	-	3.2	310	
	SSM6K504NU #	\$ 30	+/-20	9.0	-	-	-	-	-	26	19.5	4.8	620	
	SSM6K513NU	30	+/-20	15.0	-	-	-	-	-	12	8.9	7.5	1130	
	SSM6K516NU ☆	30	+20/-12	6.0	-	-	-	-	-	64	46	2.5	280	
	SSM6K514NU	40	+/-20	12.0	-	-	-	-	-	17.3	11.6	7.5	1110	
	SSM6K341NU	\$ 60	+/-20	6.0	-	-	-	-	69	51	36	9.3	550	
	SSM6K361NU	\$ 100	+/-20	3.5	-	-	-	-	-	92	69	3.2	430	

☆ New Products, ● Recommend Another New Product

AEC-Q101 qualified, \$ With protection Zener diode between gate and source

SOT-23F	TSOP6F
	
2.9x2.4	2.9x2.8

N-Channel Single MOSFET

Package	Part Number	V _{DSS} (V)	V _{GSS} (V)	I _D (A)	R _{DS(ON)} max (mΩ)							Q _g typ. (nC)	Ciss typ. (pF)	Note	
					V _{GSS} = 1.2V	V _{GSS} = 1.5V	V _{GSS} = 1.8V	V _{GSS} = 2.5V	V _{GSS} = 4V	V _{GSS} = 4.5V	V _{GSS} = 10V				
SOT-23F	SSM3K344R	\$	20	+/-8	3.0	-	232	139	91	-	71	-	2.0	153	
	SSM3K345R	\$	20	+/-8	4.0	-	108	74	45	-	33	-	3.6	410	
	SSM3K329R	\$	30	+/-12	3.5	-	-	289	170	126	-	-	1.5	123	
	SSM3K324R	\$	30	+/-12	4.0	-	-	109	72	-	56	-	2.2	200	
	SSM3K376R	# \$	30	+12/-8	4.0	-	-	109	72	-	56	-	2.2	200	
	SSM3K336R	# \$	30	+/-20	3.0	-	-	-	-	-	140	95	1.7	126	
	SSM3K333R	#	30	+/-20	6.0	-	-	-	-	-	42	28	3.4	436	
	SSM3K335R	# \$	30	+/-20	6.0	-	-	-	-	-	56	38	2.7	340	
	SSM3K347R	# \$	38	+/-20	2.0	-	-	-	-	480	410	340	2.5	86	Built-in Active Clamp Zener
	SSM3K337R	# \$	38	+/-20	2.0	-	-	-	-	200	176	150	3.0	120	Built-in Active Clamp Zener
	SSM3K339R	\$	40	+/-12	2.0	-	-	390	238	208(@3.6V) 201(@4.2V)	198	185 (@8V)	1.1	130	
	SSM3K357R	☆ # \$	60	+/-12	0.65	-	-	-	2400 (@3V)	-	1800 (@5V)	-	1.5	43	Built-in Gate- Drain Zener
	SSM3K2615R	# \$	60	+/-20	2.0	-	-	-	580 (@3.3V)	440	-	300	6.0	150	
	SSM3K318R	# \$	60	+/-20	2.5	-	-	-	-	-	145	107	7.0	235	
SSM3K341R	# \$	60	+/-20	6.0	-	-	-	-	69	51	36	9.3	550	Tch=175°C	
SSM3K361R	# \$	100	+/-20	3.5	-	-	-	-	-	92	69	3.2	430	Tch=175°C	
TSOP6F	SSM6K818R	★	30	+/-20	15.0	-	-	-	-	-	12	8.9	7.5	1130	
	SSM6K804R	★	40	+/-20	12.0	-	-	-	-	-	18	12	7.5	1110	
	SSM6K809R	☆ # \$	60	+/-20	6.0	-	-	-	-	69	51	36	9.3	550	Tch=175°C
	SSM6K810R	☆ # \$	100	+/-20	3.5	-	-	-	-	-	92	69	3.2	430	Tch=175°C
	SSM6K819R	☆ # \$	100	+/-20	10.0	-	-	-	-	-	36.4	25.8	8.5	1110	Tch=175°C

☆ New Products, ★ Under Development (The specification is subject to change without notice.)

AEC-Q101 qualified, \$ With protection Zener diode between gate and source

ES6 (SOT-563)	UF6 (SOT-363F)	US6 (SOT-363)	UDFN6 (SOT-1118)	TSOP6F	TCSP6A	TCSPAC- 153001
			Bottom View 		Bottom View 	Bottom View 
1.6x1.6	2.0x2.1	2.0x2.1	2.0x2.0	2.9x2.8	2.14x1.67	2.98x1.49

Dual MOSFET

Package	Polarity	Part Number	V _{oss} (V)	V _{ess} (V)	I _a (A)	R _{DS(ON)} max (mΩ)							Q _g typ. (nC)	Ciss typ. (pF)	Note
						V _{GS} = 1.2V	V _{GS} = 1.5V	V _{GS} = 1.8V	V _{GS} = 2.5V	V _{GS} = 4V	V _{GS} = 4.5V	V _{GS} = 10V			
ES6	P-ch x 2	SSM6P41FE	\$ -20	+/-8	-0.72	-	1040	670	440	-	300	-	1.76	110	
		SSM6P56FE ☆	\$ -20	+/-8	-0.8	4000	900	660	480	-	390	-	1.6	100	
	N-ch x 2	SSM6N36FE #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630@5V	1.23	46	
		SSM6N56FE	\$ 20	+/-8	0.8	-	840	480	300	-	235	-	1.0	55	
	N-ch + P-ch	SSM6L14FE	\$ -20	+/-10	0.8	-	600	450	330	-	240	-	2.0	90	
			\$ -20	+/-8	-0.72	-	1040	670	440	-	300	-	1.76	110	
		SSM6L36FE #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630@5V	1.23	46	
			\$ -20	+/-8	-0.33	-	3600	2700	1600 @-2.8V	-	1310	-	1.2	43	
UDFN6	P-ch x 2	SSM6L56FE ☆	\$ 20	+/-8	0.8	-	840	480	300	-	235	-	1	55	
			\$ -20	+/-8	-0.8	4000	900	660	480	-	390	-	1.6	100	
		SSM6P47NU	\$ 20	+/-8	-4.0	-	242	170	125	-	95	-	4.6	290	
	N-ch x 2	SSM6P69NU ☆ #	\$ -20	+/-12	-4.0	-	-	157	76	-	56	45	6.74	480	
		SSM6P49NU	\$ -20	+/-12	-4.0	-	-	157	76	-	56	45	6.74	480	
		SSM6N61NU #	\$ 20	+/-8	4.0	-	108	74	45	-	33	-	3.6	410	
		SSM6N55NU	\$ 30	+/-20	4.0	-	-	-	-	-	64	46	2.5	280	
		SSM6N67NU #	\$ 30	+/-12/8	4.0	-	-	82	53	-	39.1	-	3.2	310	
		SSM6N68NU #	\$ 30	+/-12/8	4.0	-	-	180	117	-	84	-	1.8	129	
		SSM6N57NU	\$ 30	+/-12	4.0	-	-	82	53	-	39.1	-	3.2	310	
		SSM6N58NU	\$ 30	+/-12	4.0	-	-	180	117	-	84	-	1.8	129	
	N-ch + P-ch	SSM6L61NU	\$ 20	+/-8	4.0	-	108	74	45	-	33	-	3.6	410	
			\$ -20	+/-12	-4.0	-	-	157	76	-	56	45	6.74	480	
UF6	P-ch x 2	SSM6P54TU	\$ -20	+/-8	-1.2	-	555	350	228	-	-	-	7.7	331	
		SSM6P39TU #	\$ -20	+/-8	-1.5	-	-	430	294	213	-	-	6.4	250	
		SSM6P40TU #	\$ -30	+/-20	-1.4	-	-	-	-	403	-	226	2.9	120	
	N-ch x 2	SSM6N36TU #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630@5V	1.23	46	
		SSM6N62TU #	\$ 20	+/-8	0.8	456	173	120	98	-	85	-	2.0	177	
		SSM6N39TU #	\$ 20	+/-10	1.6	-	247	190	139	119	-	-	7.5	260	
		SSM6N24TU #	\$ 30	+/-12	0.5	-	-	-	180	-	145	-	-	245	
		SSM6N40TU #	\$ 30	+/-20	1.6	-	-	-	-	182	-	122	5.1	180	
			\$ -30	+/-20	1.6	-	-	-	-	-	182	-	122	5.1	180
	N-ch + P-ch	SSM6L36TU #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630@5V	1.23	46	
			\$ -20	+/-8	-0.33	-	3600	2700	1600 @-2.8V	-	1310	-	1.2	43	
		SSM6L39TU #	\$ 20	+/-10	1.6	-	247	190	139	119	-	-	7.5	260	
			\$ -20	+/-8	-1.5	-	-	430	294	213	-	-	6.4	250	
		SSM6L12TU #	\$ 30	+/-12	0.5	-	-	-	180	-	145	-	-	245	
			\$ -20	+/-12	-0.5	-	-	-	430	260	-	-	-	218	
US6	N-ch x 2	SSM6L40TU #	\$ 30	+/-20	1.6	-	-	-	-	182	-	122	5.1	180	
			\$ -30	+/-20	-1.4	-	-	-	-	-	403	-	226	2.9	120
	N-ch x 2	SSM6N43FU #	\$ 20	+/-10	0.5	-	1520	1140	850	-	660	630@5V	1.23	46	
			\$ -20	+/-10	0.5	-	1520	1140	850	-	660	630@5V	1.23	46	
	N-ch x 2	SSM6N357R ☆ #	\$ 60	+/-12	0.65	-	-	-	2400 @3V	-	1800 @5V	-	1.5	43	Built-in Active Clamp Zener
		SSM6N815R	\$ 100	+/-20	2.0	-	-	-	-	180	142	103	3.1	290	
	P-ch x 2	SSM6N813R ☆ #	\$ 100	+/-20	3.5	-	-	-	-	-	154	112	3.6	242	T _J =175°C
		SSM6P816R ☆	\$ -20	+/-10	-6.0	-	-	52.3	38.8	-	30.1	-	16.6	1030	
TSOP6F	N-ch + P-ch	SSM6L807R ☆	\$ 30	+/-12	4	-	-	82	53	-	39.1	-	3.2	310	
			\$ -20	+/-12	-4	-	-	157	76	-	56	45	6.74	480	
	N-ch + P-ch	SSM6L820R ☆ #	\$ 30	+/-12/8	4	-	-	82	53	-	39.1	-	3.2	310	
			\$ -20	+/-12	-4	-	-	157	76	-	56	45	6.74	480	
TCSP6A	N-ch x 2	SSM6N951L ☆	\$ 12	+/-8	8	-	-	-	10	5.5@3.8V	5.1	-	26	-	Drain common
TCSPAC- 153001	N-ch x 2	SSM10N954L ☆	\$ 12	+/-8	13.5	-	-	-	6.1	2.85 @3.8V	2.75	-	25	-	Drain common

☆ New Products, # AEC-Q101 qualified, \$ With protection Zener diode between gate and source

■ Less than 500mA Series MOSFETs (Standard Type)

Package Dimensions (unit: mm)

CST3C	CST3 (SOT-883)	VESM (SOT-723)	SSM (SOT-416)	UFM (SOT-323F)	USM (SOT-323)	S-Mini (SOT-346)
Bottom View 	Bottom View 					
0.8x0.6	1.0x0.6	1.2x1.2	1.6x1.6	2.0x2.1	2.0x2.1	2.9x2.5

P-Channel Single MOSFET

Package	Part Number	V _{DS} (V)	V _{GS} (V)	I _D (A)	R _{DS(ON)} max (Ω)							Note
					V _{GS} = -1.2V	V _{GS} = -1.5V	V _{GS} = -1.8V	V _{GS} = -2.5V	V _{GS} = -4V	V _{GS} = -4.5V	V _{GS} = -10V	
CST3C	SSM3J35CTC	\$ -20	+/-10	-0.25	20	4	2.9	2.1	-	1.4	-	
CST3	SSM3J35CT	\$ -20	+/-10	-0.1	44	22	-	11	8	-	-	
	SSM3J16CT ●	\$ -20	+/-10	-0.1	-	45	-	12	8	-	-	⇒ SSM3J35CT
VESM	SSM3J15CT	\$ -30	+/-20	-0.1	-	-	-	32	12	-	-	
	SSM3J35MFV ● #	\$ -20	+/-10	-0.1	44	22	-	11	8	-	-	⇒ SSM3J35AMFV
	SSM3J36MFV ●	\$ -20	+/-8	-0.33	-	3.6	2.7	1.6	-	1.36	-	⇒ SSM3J56MFV
	SSM3J16FV ●	\$ -20	+/-10	-0.1	-	45	-	12	8	-	-	⇒ SSM3J35AMFV
	SSM3J35AMFV	\$ -20	+/-10	-0.25	20	4	2.9	2.1	-	1.4	-	
	SSM3J15FV #	\$ -30	+/-20	-0.1	-	-	-	32	12	-	-	
SSM	SSM3J35FS #	\$ -20	+/-10	-0.1	44	22	-	11	8	-	-	
	SSM3J35AFS	\$ -20	+/-10	-0.25	20	4	2.9	2.1	-	1.4	-	
	SSM3J36FS #	\$ -20	+/-8	-0.33	-	3.6	2.7	1.6(@-2.8V)	-	1.31	-	
	SSM3J16FS ●	\$ -20	+/-10	-0.1	-	45	-	12	8	-	-	⇒ SSM3J35FS
	SSM3J15FS #	\$ -30	+/-20	-0.1	-	-	-	32	12	-	-	
UFM	SSM3J36TU #	\$ -20	+/-8	-0.33	-	3.6	2.7	1.6(@-2.8V)	-	1.31	-	
USM	SSM3J16FU #	\$ -20	+/-10	-0.1	-	45	-	12	8	-	-	
	SSM3J15FU #	\$ -30	+/-20	-0.1	-	-	-	32	12	-	-	
	SSM3J09FU	\$ -30	+/-20	-0.2	-	-	-	6(@-3.3V)	4.2	-	2.7	
S-Mini	SSM3J15F #	\$ -30	+/-20	-0.1	-	-	-	32	12	-	-	
	2SJ305	\$ -30	+/-20	-0.2	-	-	-	4	-	-	-	
	2SJ168 ●	\$ -60	+/-20	-0.2	-	-	-	-	-	-	2	⇒ SSM3J168F
	SSM3J168F #	\$ -60	+10/-20	-0.4	-	-	-	-	2	1.9	1.55	

● Recommend Another New Product
AEC-Q101 qualified, \$ With protection Zener diode between gate and source

CST3C	CST3 (SOT-883)	VESM (SOT-723)	SSM (SOT-416)	USM (SOT-323)	SOT23 (SOT-23)	S-Mini (SOT-346)
Bottom View	Bottom View					
0.8x0.6	1.0x0.6	1.2x1.2	1.6x1.6	2.0x2.1	2.9x2.4	2.9x2.5

N-Channel Single MOSFET

Package	Part Number	V _{oss} (V)	V _{ess} (V)	I _o (A)	R _{DS(on)} max (Ω)								Note
					V _{GS} = 1.2V	V _{GS} = 1.5V	V _{GS} = 1.8V	V _{GS} = 2.5V	V _{GS} = 4V	V _{GS} = 4.5V	V _{GS} = 5V	V _{GS} = 10V	
CST3C	SSM3K16CTC	\$ 20	+/-10	0.2	-	5.6	4	3	-	2.2	-	-	
	SSM3K35CTC	\$ 20	+/-10	0.25	9	3.1	2.4	1.6	-	1.1	-	-	
	SSM3K15ACTC	\$ 30	+/-20	0.1	-	-	-	6	3.6	-	-	-	
	SSM3K72CTC	\$ 60	+/-20	0.15	-	-	-	5.7(typ.)	-	4.7	4.4	3.9	
CST3	SSM3K16CT ●	\$ 20	+/-10	0.1	-	15	-	4	3	-	-	-	⇒ SSM3K37CT
	SSM3K35CT	\$ 20	+/-10	0.18	20	8	-	4	3	-	-	-	
	SSM3K37CT	\$ 20	+/-10	0.2	-	5.6	4.05	3.02	-	2.2	-	-	
	SSM3K15CT ●	\$ 30	+/-20	0.1	-	-	-	7	4	-	-	-	⇒ SSM3K15ACT
	SSM3K15ACT	\$ 30	+/-20	0.1	-	-	-	6	3.6	-	-	-	
	SSM3K72KCT	\$ 60	+/-20	0.4	-	-	-	-	-	1.75	1.65	1.5	
VESM	SSM3K16FV	\$ 20	+/-10	0.1	-	15	-	4	3	-	-	-	
	SSM3K35MFV #	\$ 20	+/-10	0.18	20	8	-	4	3	-	-	-	
	SSM3K37MFV	\$ 20	+/-10	0.25	-	5.6	4.05	3.02	-	2.2	-	-	
	SSM3K35AMFV	\$ 20	+/-10	0.25	9	3.1	2.4	1.6	-	1.1	-	-	
	SSM3K15AMFV	\$ 30	+/-20	0.1	-	-	-	6	3.6	-	-	-	
	SSM3K44MFV #	\$ 30	+/-20	0.1	-	-	-	7	4	-	-	-	
SSM	SSM3K16FS #	\$ 20	+/-10	0.1	-	15	-	4	3	-	-	-	
	SSM3K35FS ● #	\$ 20	+/-10	0.18	20	8	-	4	3	-	-	-	⇒ SSM3K35AFS
	SSM3K37FS	\$ 20	+/-10	0.2	-	5.6	4.05	3.02	-	2.2	-	-	
	SSM3K35AFS	\$ 20	+/-10	0.25	9	3.1	2.4	1.6	-	1.1	-	-	
	SSM3K15FS ●	\$ 30	+/-20	0.1	-	-	-	7	4	-	-	-	⇒ SSM3K15AFS
	SSM3K44FS #	\$ 30	+/-20	0.1	-	-	-	7	4	-	-	-	
	SSM3K15AFS	\$ 30	+/-20	0.1	-	-	-	6	3.6	-	-	-	
	SSM3K72CFs	\$ 60	+/-20	0.17	-	-	-	-	-	4.7	4.4	3.9	
	SSM3K72KFs #	\$ 60	+/-20	0.3	-	-	-	-	-	1.75	1.65	1.5	
USM	SSM3K16FU #	\$ 20	+/-10	0.1	-	15	-	4	3	-	-	-	
	SSM3K15FU ● #	\$ 30	+/-20	0.1	-	-	-	7	4	-	-	-	⇒ SSM3K15AFU
	SSM3K15AFU	\$ 30	+/-20	0.1	-	-	-	6	3.6	-	-	-	
	SSM3K48FU	\$ 30	+/-20	0.1	-	-	-	5.4	3.2	-	-	-	
	SSM3K09FU	\$ 30	+/-20	0.4	-	-	-	1.7(@3.3V)	1.2	-	-	0.7	
	SSM3K17FU #	\$ 50	+/-7	0.1	-	-	-	40	20	-	-	-	
	SSM3K7002CFU	\$ 60	+/-20	0.17	-	-	-	-	-	4.7	4.4	3.9	
	SSM3K7002KFU #	\$ 60	+/-20	0.4	-	-	-	-	-	1.75	1.65	1.5	
SOT23	T2N7002AK	\$ 60	+/-20	0.2	-	-	-	-	-	4.7	4.4	3.9	
	T2N7002BK	\$ 60	+/-20	0.4	-	-	-	-	-	1.75	1.65	1.5	
S-Mini	SSM3K15F #	\$ 30	+/-20	0.1	-	-	-	7	4	-	-	-	
	2SK2009	\$ 30	+/-20	0.2	-	-	-	2	-	-	-	-	
	SSM3K7002KF #	\$ 60	+/-20	0.4	-	-	-	-	-	1.75	1.65	1.5	

● Recommend Another New Product
AEC-Q101 qualified, \$ With protection Zener diode between gate and source

ESV (SOT-553)	ES6 (SOT-563)	USV (SOT-353)	UF6 (SOT-363F)	US6 (SOT-363)
				
1.6x1.6	1.6x1.6	2.0x2.1	2.0x2.1	2.0x2.1

Dual MOSFET

Package	Polarity	Part Number	V _{oss} (V)	V _{gss} (V)	I _o (A)	R _{DS(ON)} max (Ω)								Note
						V _{gs} =1.2V	V _{gs} =1.5V	V _{gs} =1.8V	V _{gs} =2.5V	V _{gs} =4V	V _{gs} =4.5V	V _{gs} =5V	V _{gs} =10V	
ESV	P-ch x 2	SSM5P16FE	\$	-20	+/-10	-0.1	-	45	-	12	8	-	-	-
	N-ch x 2	SSM5N16FE	\$	20	+/-10	0.1	-	15	-	4	3	-	-	-
		SSM5N15FE	\$	30	+/-20	0.1	-	-	-	7	4	-	-	-
ES6	P-ch x 2	SSM6P35FE	# \$	-20	+/-10	-0.1	44	22	-	11	8	-	-	-
		SSM6P35AFE	\$	-20	+/-10	-0.25	20	4	2.9	2.1	-	1.4	-	-
		SSM6P36FE	# \$	-20	+/-8	-0.33	-	3.6	2.7	1.6(@2.8V)	-	1.31	-	-
		SSM6P16FE	● \$	-20	+/-10	-0.1	-	45	-	12	8	-	-	⇒ SSM6P35FE
		SSM6P15FE	# \$	-30	+/-20	-0.1	-	-	-	32	12	-	-	-
		SSM6N16FE	\$	20	+/-10	0.1	-	15	-	4	3	-	-	-
	N-ch x 2	SSM6N35FE	● # \$	20	+/-10	0.18	20	8	-	4	3	-	-	⇒ SSM6N35AFE
		SSM6N37FE	\$	20	+/-10	0.25	-	5.6	4.05	3.02	-	2.2	-	-
		SSM6N35AFE	\$	20	+/-10	0.25	9	3.1	2.4	1.6	-	1.1	-	-
		SSM6N44FE	# \$	30	+/-20	0.1	-	-	-	7	4	-	-	-
		SSM6N15AFE	\$	30	+/-20	0.1	-	-	-	6	3.6	-	-	-
		SSM6N7002BFE	\$	60	+/-20	0.2	-	-	-	-	-	3.3	2.6	2.1
	N-ch + P-ch	SSM6L35FE	# \$	20	+/-10	0.18	20	8	-	4	3	-	-	-
				-20	+/-10	-0.1	44	22	-	11	8	-	-	-
USV	P-ch x 2	SSM5P15FU	\$	-30	+/-20	-0.1	-	-	-	32	12	-	-	-
	N-ch x 2	SSM5N16FU	\$	20	+/-10	0.1	-	15	-	4	3	-	-	-
		SSM5N15FU	\$	30	+/-20	0.1	-	-	-	7	4	-	-	-
UF6	P-ch x 2	SSM6P36TU	# \$	-20	+/-8	-0.33	-	3.6	2.7	1.6(@2.8V)	-	1.31	-	-
US6	P-ch x 2	SSM6P35FU	● # \$	-20	+/-10	-0.1	44	22	-	11	8	-	-	⇒ SSM6P35AFU
		SSM6P35AFU	\$	-20	+/-10	-0.25	20	4	2.9	2.1	-	1.4	-	-
		SSM6P16FU	● \$	-20	+/-10	-0.1	-	45	-	12	8	-	-	⇒ SSM6P35AFU
		SSM6P15FU	# \$	-30	+/-20	-0.1	-	-	-	32	12	-	-	-
		SSM6N16FU	\$	20	+/-10	0.1	-	15	-	4	3	-	-	-
	N-ch x 2	SSM6N35FU	● # \$	20	+/-10	0.18	20	8	-	4	3	-	-	⇒ SSM6N35AFU
		SSM6N35AFU	\$	20	+/-10	0.25	9	3.1	2.4	1.6	-	1.1	-	-
		SSM6N37FU	\$	20	+/-10	0.25	-	5.6	4.05	3.02	-	2.2	-	-
		SSM6N48FU	\$	30	+/-20	0.1	-	-	-	5.4	3.2	-	-	-
		SSM6N44FU	# \$	30	+/-20	0.1	-	-	-	7	4	-	-	-
		SSM6N15FU	● \$	30	+/-20	0.1	-	-	-	7	4	-	-	⇒ SSM6N15AFU
		SSM6N15AFU	\$	30	+/-20	0.1	-	-	-	6	3.6	-	-	-
		SSM6N09FU	\$	30	+/-20	0.4	-	-	-	1.7(@3.3V)	1.2	-	-	0.7
		SSM6N17FU	# \$	50	+/-7	0.1	-	-	-	40	20	-	-	-
		SSM6N7002CFU	\$	60	+/-20	0.17	-	-	-	-	-	4.7	4.4	3.9
		SSM6N7002KFU	# \$	60	+/-20	0.3	-	-	-	-	-	1.75	1.65	1.5
	N-ch + P-ch	SSM6L35FU	# \$	20	+/-10	0.18	20	8	-	4	3	-	-	-
				-20	+/-10	-0.1	44	22	-	11	8	-	-	-
		SSM6L09FU	\$	30	+/-20	0.4	-	-	-	1.7(@3.3V)	1.2	-	-	0.7
				-30	+/-20	-0.2	-	-	-	6(@-3.3V)	4.2	-	-	2.7

● Recommend Another New Product

AEC-Q101 qualified, \$ With protection Zener diode between gate and source

MOSFET with Diode

Package Dimensions (unit: mm)

ESV (SOT-553)	UFV (SOT-353F)	UDFN6 (SOT-1118)
		
1.6x1.6	2.0x2.1	2.0x2.0

Package	Polarity	Part Number	V _{DSS} (V)	V _{GSS} (V)	I _O (A)	MOSFET							Diode				Note	
						R _{DS(ON)} max (mΩ)							C _{iss} typ. (pF)	V _r (V)	I _O (A)	V _f max (V)		
						V _{GS} = 1.5V	V _{GS} = 1.8V	V _{GS} = 2.5V	V _{GS} = 4V	V _{GS} = 4.5V	V _{GS} = 5V	V _{GS} = 10V				@I _F (A)		
ESV	P-ch + SBD	SSM5G06FE	\$ -20	+/-10	-0.1	45000	-	12000	8000	-	-	-	11	12	0.1	0.5	0.1	
	N-ch + SBD	SSM5H06FE	\$ 20	+/-10	0.1	15000	-	4000	3000	-	-	-	9.3	12	0.1	0.5	0.1	
UFV	P-ch + SBD	SSM5G02TU	\$ -12	+/-12	-1.0	-	-	240	160	-	-	-	310	12	0.5	0.43	0.5	
		SSM5G09TU	\$ -12	+/-8	-1.5	-	-	200	130	-	-	-	550	12	0.5	0.43	0.5	
		SSM5G11TU	\$ -30	+/-20	-1.4	-	-	-	403	-	-	226	120	30(¥)	0.7(¥¥)	0.44	0.7(¥¥)	
	N-ch + SBD	SSM5H08TU	\$ 20	+/-12	1.5	-	-	220	160	-	-	-	125	20	0.5	0.43(typ.)	0.5	
		SSM5H01TU	\$ 30	+/-20	1.4	-	-	-	450	-	-	200	106	20	0.5	0.43(typ.)	0.5	
		SSM5H11TU	\$ 30	+/-20	1.6	-	-	-	182	-	-	122	180	30(¥)	0.7(¥¥)	0.44	0.7	
		SSM5H16TU	\$ 30	+/-12	1.9	-	296	177	133	-	-	-	123	30	0.8	0.55	0.8	
		N-ch + Switching Diode	SSM5H90ATU	\$ 20	+/-10	2.4	-	-	89	65	-	-	-	200	80	0.1	1.2	0.1
UDFN6	P-ch + SBD	SSM6G18NU	\$ -20	+/-8	-2.0	261	185	143	-	112	-	-	270	30	1	0.58	1	
	N-ch + SBD	SSM6H19NU	\$ 40	+/-12	2.0	-	390	238	208(@3.6V) 201(@4.2V)	198	-	185 (@8V)	130	40	0.5	0.57	0.5	

\$ With protection Zener diode between gate and source, ¥ V_{RRM}, ¥¥ I_{F(AV)}

Part Naming Conventions

Small-Signal MOSFET SSM Series

Ex) SSM 3 K 329 — R
 ① ② ③ ④ ⑤ ⑥

- ① Small-Signal MOSFET
- ② Pin count
- ③ Polarity and internal configuration
 - K: N-channel, single
 - J: P-channel, single
 - N: N-channel, dual
 - P: P-channel, dual
 - L: N-channel and P-channel (dual)
 - E: N-channel and P-channel (pre-wired as a load switch)
 - H: N-channel and SBD (or Switching diode)
 - G: P-channel and SBD
- ④ Serial number of the products
- ⑤ There may be a symbol that indicates chip change etc.
- ⑥ Package

3-pin	F: S-Mini	5-pin	F: SMV
	FU: USM		FU: USV
	FS: SSM		FE: ESV
	FV: VESM		TU: UFV
	TU: UFM	6-pin	G: WCSP6C
	CT: CST3		L: Chip LGA (TCSP6A)
	CTB: CST3B		R: TSOP6F
	CTC: CST3C		FU: US6
	R: SOT-23F		FE: ES6
			TU: UF6
			NU: UDFN6/UDFN6B
		10-pin	L: Chip LGA (TCSPAC-153001)

2. Bipolar Transistors

General-Purpose Transistors

Package Dimensions (unit: mm)

Classification	$ V_{CE0} $ (V)	$ I_C $ (mA)	CST3 (SOT-883)		VESM (SOT-723)		SSM (SOT-416)			
			Bottom View							
					1.2x1.2		1.6x1.6			
			1.0x0.6							
General Purpose	50	100	Part Number							
			NPN		PNP				NPN	PNP
			2SC6026CT	2SA2154CT						
	50	150			2SC6026MFV #	2SA2154MFV #	2SC4738 #	2SA1832 #		

Classification	$ V_{ce0} $ (V)	$ I_c $ (mA)	USM (SOT-323)	UFM (SOT-323F)	S-Mini (SOT-346)	SOT23 (SOT-23)	SOT-23F				
			 2.0x2.1	 2.0x2.1	 2.9x2.5	 2.9x2.4	 2.9x2.4				
			Part Number								
			NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	
General Purpose	30	500		2SA1588 #			2SA1182 #				
	50	150	2SC4116 #	2SA1586 #			2SC2712 #	2SA1162 #	TBC847	TBC857	
			TTC4116FU	TTA1586FU							
		200						TMBT3904	TMBT3906		
	50	500					2SC3325 # TTC1949	2SA1313 #			
45						TTA1713					
Low Noise	120	100	2SC4117 #	2SA1587 #			2SC2713 #	2SA1163 #			
Low Saturation	15	800					2SA1362 #				
Muting	20	300	2SC4213				2SC3326 #				
High Current	20	2500				2SA2215 #					TTA502 # ☆
	25	800					2SC3265 #	2SA1298 #			
	50	1000			2SC6135 #					TTC500 # ☆	TTA500 # ☆
	50	1700				2SA2195 #					
	50	2000									TTA501 # ☆
	50	2500			2SC6100 #						
	100	2500								TTC501 # ☆	
	120	1000								TTC502 ★	
High Breakdown	300	100					2SA1721				
	600	50					2SC6105				

☆ New Products, ★ Under Development (The specification is subject to change without notice.)

AEC-Q101 qualified

Classification	$ V_{CE0} $ (V)	$ I_C $ (mA)	ESV (SOT-553)	USV (SOT-353)	SMV (SOT-25)			
			 1.6x1.6	 2.0x2.1	 2.9x2.8			
			Part Number					
			Complementary	NPNx2	PNPx2	NPNx2	PNPx2	Complementary
General Purpose	50	150	HN4B01JE 	2SC4944 	2SA1873 	2SC4207 	2SA1618 	
					HN4A56JU 			
Low Noise	120	100				HN4C06J 	HN4A06J 	HN4B06J 
						HN4C51J 	HN4A51J 	

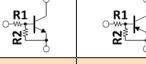
Classification	$ V_{CE0} $ (V)	$ I_C $ (mA)	ES6 (SOT-563)			US6 (SOT-363)			SM6 (SOT-26)		
			 1.6x1.6			 2.0x2.1			 2.9x2.8		
			Part Number								
			NPNx2	PNPx2	Complementary	NPNx2	PNPx2	Complementary	NPNx2	PNPx2	Complementary
General Purpose	50	150	HN1C01FE # 	HN1A01FE # 		HN1C01FU # 	HN1A01FU # 	HN1B01FU # 	HN1C01F 	HN1A01F 	HN1B01F 
					HN1B04FE # 		HN1B04FU # 				
	50	500							HN1C07F 	HN1A07F 	
High Current	15	800								HN1A02F 	
Muting	20	300				HN1C03FU # 			HN1C03F 		

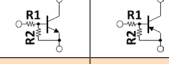
AEC-Q101 qualified

Bias Resistor Built-in Transistors (BRTs)

Package Dimensions (unit: mm)

				Resistance		VESM (SOT-723)		SSM (SOT-416)		USM (SOT-323)		S-Mini (SOT-346)	
													
						1.2x1.2		1.6x1.6		2.0x2.1		2.9x2.5	
													
				R1 (typ.) (kΩ)	R2 (typ.) (kΩ)	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
				Part Number									
50	100	4.7	4.7	RN1101MFV #	RN2101MFV #	RN1101 #	RN2101 #	RN1301 #	RN2301 #	RN1401 #	RN2401 #		
		10	10	RN1102MFV #	RN2102MFV #	RN1102 #	RN2102 #	RN1302 #	RN2302 #	RN1402 #	RN2402 #		
		22	22	RN1103MFV #	RN2103MFV #	RN1103 #	RN2103 #	RN1303 #	RN2303 #	RN1403 #	RN2403 #		
		47	47	RN1104MFV #	RN2104MFV #	RN1104 #	RN2104 #	RN1304 #	RN2304 #	RN1404 #	RN2404 #		
		2.2	47	RN1105MFV #	RN2105MFV #	RN1105 #	RN2105 #	RN1305 #	RN2305 #	RN1405 #	RN2405 #		
		4.7	47	RN1106MFV #	RN2106MFV #	RN1106 #	RN2106 #	RN1306 #	RN2306 #	RN1406 #	RN2406 #		
		10	47	RN1107MFV #	RN2107MFV #	RN1107 #	RN2107 #	RN1307 #	RN2307 #	RN1407 #	RN2407 #		
		22	47	RN1108MFV #	RN2108MFV #	RN1108 #	RN2108 #	RN1308 #	RN2308 #	RN1408 #	RN2408 #		
		47	22	RN1109MFV #	RN2109MFV #	RN1109 #	RN2109 #	RN1309 #	RN2309 #	RN1409 #	RN2409 #		
		4.7	∞	RN1110MFV #	RN2110MFV #	RN1110 #	RN2110 #	RN1310 #	RN2310 #	RN1410 #	RN2410 #		
		10	∞	RN1111MFV #	RN2111MFV #	RN1111 #	RN2111 #	RN1311 #	RN2311 #	RN1411 #	RN2411 #		
		22	∞	RN1112MFV #	RN2112MFV #	RN1112 #	RN2112 #	RN1312 #	RN2312 #	RN1412 #	RN2412 #		
		47	∞	RN1113MFV #	RN2113MFV #	RN1113 #	RN2113 #	RN1313 #	RN2313 #	RN1413 #	RN2413 #		
		1	10	RN1114MFV #	RN2114MFV #	RN1114 #	RN2114 #	RN1314 #	RN2314 #	RN1414 #	RN2414 #		
		2.2	10	RN1115MFV #	RN2115MFV #	RN1115 #	RN2115 #	RN1315 #	RN2315 #	RN1415 #	RN2415 #		
		4.7	10	RN1116MFV #	RN2116MFV #	RN1116 #	RN2116 #	RN1316 #	RN2316 #	RN1416 #	RN2416 #		
		10	4.7	RN1117MFV #	RN2117MFV #	RN1117	RN2117	RN1317	RN2317	RN1417 #	RN2417 #		
		47	10	RN1118MFV #	RN2118MFV #	RN1118	-	RN1318	RN2318	RN1418 #	RN2418 #		
		1	∞	RN1119MFV #	RN2119MFV #	-	-	-	-	-	-		
		100	100	RN1130MFV #	RN2130MFV #	-	-	-	-	-	-		
		100	∞	RN1131MFV #	RN2131MFV #	-	-	-	-	-	-		
		200	∞	RN1132MFV #	RN2132MFV #	-	-	-	-	-	-		

				Resistance		SOT23 (SOT-23)	
							
						2.9x2.4	
							
				R1 (typ.) (kΩ)	R2 (typ.) (kΩ)	NPN	PNP
				Part Number			
50	100	4.7	4.7	TDTC143E	TDTA143E		
		10	10	TDTC114E	TDTA114E		
		22	22	TDTC124E	TDTA124E		
		47	47	TDTC144E	TDTA144E		
		2.2	47	TDTC123J	TDTA123J		
		4.7	47	TDTC143Z	TDTA143Z		
		10	47	TDTC114Y	TDTA114Y		

				Resistance		S-Mini (SOT-346)	
							
						2.9x2.5	
							
				R1 (typ.) (kΩ)	R2 (typ.) (kΩ)	NPN	PNP
				Part Number			
50	800	1	1			RN1421	RN2421
		2.2	2.2			RN1422	RN2422
		4.7	4.7			RN1423	RN2423
		10	10			RN1424	RN2424
		0.47	10			RN1425	RN2425
		1	10			RN1426	RN2426
		2.2	10			RN1427	RN2427

AEC-Q101 qualified

① MOSFETs

② Tr./BRTs

③ Diodes

④ Power Management ICs

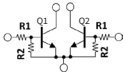
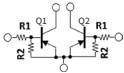
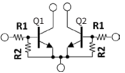
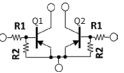
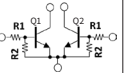
⑤ Linear ICs

⑥ Sensors

⑦ Logic Devices

⑧ RF Devices

⑨ Packages

V _{ce0} (V)	I _c (mA)	Resistance		ESV (SOT-553)		USV (SOT-353)		SMV (SOT-25)							
															
				1.6x1.6		2.0x2.1		2.9x2.8							
		R1 (typ.) (kΩ)	R2 (typ.) (kΩ)	 Common emitter		 Common emitter		 Common emitter		 Common emitter		 Common emitter		 Common emitter	
				NPNx2		PNPx2		NPNx2		PNPx2		NPNx2		PNPx2	
Part Number															
50	100	4.7	4.7	RN1701JE	RN2701JE	RN1701 #	RN2701 #	RN1501	RN2501						
		10	10	RN1702JE	RN2702JE	RN1702 #	RN2702 #	RN1502	RN2502						
		22	22	RN1703JE	RN2703JE	RN1703 #	RN2703 #	RN1503	RN2503						
		47	47	RN1704JE	RN2704JE	RN1704 #	RN2704 #	RN1504	RN2504						
		2.2	47	RN1705JE	RN2705JE	RN1705 #	RN2705 #	RN1505	RN2505						
		4.7	47	RN1706JE	RN2706JE	RN1706 #	RN2706 #	RN1506	RN2506						
		10	47	RN1707JE	RN2707JE	RN1707 #	RN2707 #	RN1507	RN2507						
		22	47	RN1708JE	RN2708JE	RN1708 #	RN2708 #	RN1508	-						
		47	22	RN1709JE	RN2709JE	RN1709 #	RN2709 #	RN1509	-						
		4.7	∞	RN1710JE	RN2710JE	RN1710 #	RN2710 #	RN1510	RN2510						
		10	∞	RN1711JE	RN2711JE	RN1711 #	RN2711 #	RN1511	RN2511						
		22	∞	-	RN2712JE	-	-	-	-						
		47	∞	-	RN2713JE	-	-	-	-						

V _{ceo} (V) I _c (mA)		ES6 (SOT-563)					
							
		1.6x1.6					
		 Point symmetrical					
Resistance		 Point symmetrical		 Point symmetrical		 Point symmetrical	
		R1 (typ.) (kΩ)	R2 (typ.) (kΩ)	NPNx2	PNPx2	PNP+NPN	NPN+PNP
		Part Number					
50	100	4.7	4.7	RN1901FE #	RN2901FE #	RN4901FE #	RN4981FE #
		10	10	RN1902FE #	RN2902FE #	RN4902FE #	RN4982FE #
		22	22	RN1903FE #	RN2903FE #	RN4903FE #	RN4983FE #
		47	47	RN1904FE #	RN2904FE #	RN4904FE #	RN4984FE #
		2.2	47	RN1905FE #	RN2905FE #	RN4905FE #	RN4985FE #
		4.7	47	RN1906FE #	RN2906FE #	RN4906FE #	RN4986FE #
		10	47	RN1907FE #	RN2907FE #	RN4907FE #	RN4987FE #
		22	47	RN1908FE #	RN2908FE #	RN4908FE #	RN4988FE #
		47	22	RN1909FE #	RN2909FE #	RN4909FE #	RN4989FE #
		4.7	∞	RN1910FE #	RN2910FE #	RN4910FE #	RN4990FE #
10	∞	RN1911FE #	RN2911FE #	RN4911FE #	RN4991FE #		

AEC-Q101 qualified

V _{ceo} (V)	I _c (mA)	Resistance		US6 (SOT-363)			
				 2.0x2.1			
				 Point symmetrical	 Point symmetrical	 Point symmetrical	 Point symmetrical
				R1 (typ.) (kΩ)	R2 (typ.) (kΩ)	Part Number	
50	100	4.7	4.7	RN1901 #	RN2901 #	RN4901 #	RN4981 #
		10	10	RN1902 #	RN2902 #	RN4902 #	RN4982 #
		22	22	RN1903 #	RN2903 #	RN4903 #	RN4983 #
		47	47	RN1904 #	RN2904 #	RN4904 #	RN4984 #
		2.2	47	RN1905 #	RN2905 #	RN4905 #	RN4985 #
		4.7	47	RN1906 #	RN2906 #	RN4906 #	RN4986 #
		10	47	RN1907 #	RN2907 #	RN4907 #	RN4987 #
		22	47	RN1908 #	RN2908 #	RN4908 #	RN4988 #
		47	22	RN1909 #	RN2909 #	RN4909 #	RN4989 #
		4.7	∞	RN1910 #	RN2910 #	RN4910 #	RN4990 #
		10	∞	RN1911 #	RN2911 #	RN4911 #	-
		47	∞	-	-	-	-
		47/2.2	47/47	-	-	-	RN49A2

V _{ceo} (V)	I _c (mA)	Resistance		SM6 (SOT-26)		
				 2.9x2.8		
				 Point symmetrical	 Point symmetrical	 Point symmetrical
				R1 (typ.) (kΩ)	R2 (typ.) (kΩ)	Part Number
50	100	4.7	4.7	RN1601	RN2601	RN4601
		10	10	RN1602	RN2602	RN4602
		22	22	RN1603	RN2603	RN4603
		47	47	RN1604	RN2604	RN4604
		2.2	47	RN1605	RN2605	RN4605
		4.7	47	RN1606	RN2606	RN4606
		10	47	RN1607	RN2607	RN4607
		22	47	RN1608	RN2608	RN4608
		47	22	RN1609	-	RN4609
		4.7	∞	RN1610	RN2610	RN4610
		10	∞	RN1611	-	RN4611
		22	∞	-	-	RN4612

AEC-Q101 qualified

3. Diodes

■ Schottky Barrier Diodes (SBDs)

Package Dimensions (unit: mm)

Features		Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)						CST2 (SOD-882)	CST2B	CST2C (SOD-963)	USC (SOD-323)	US2H (SOD-323HE)	UFV (SOT-353F)
										Bottom View	Bottom View	Bottom View			
				V _R /V _{RRM} * (V)	I _O (A)	V _F			I _R max (μA)	C _T typ. (pF)					
				typ. (V)	max (V)	@I _R (A)	@V _R (V)		1.0x0.6	1.2x0.8	1.6x0.8	2.5x1.25	2.5x1.4	2.0x2.1	
High-V _R and I _O	60	2.0	0.52	0.59	2.0	70	60	300					CUHS20F60 ☆		
			0.46	0.53	2.0	650	60	300					CUHS20S60 ☆		
		1.5	0.66	0.73	1.5	50	60	130					CUHS15F60 ☆		
			0.6	0.67	1.5	450	60	130					CUHS15S60 ☆		
	40	2.0	0.56	0.62	1.0	40	60	130					CUHS10F60 ☆		
			0.47	0.54	2.0	60	40	300					CUHS20F40 ☆		
			0.4	0.47	2.0	300	40	290					CUHS20S40 ☆		
			0.45	0.51	1.5	200	40	170					CUHS15S40 ☆		
		1.5	0.57	0.63	1.5	50	40	130					CUHS15F40 ☆		
			0.59	0.64	1.5	25	40	130			CCS15F40				
			1.0	to 0.63	to 0.70	1.0	20	40	74		CBS10F40		CUS10F40		
			0.5	0.74	0.81	0.5	15	40	28	CTS05F40			CUS05F40		
	40*	1.5	0.47	0.55	1.5	200	40	170			CCS15S40	CUS15S40			
			1.0	to 0.48	to 0.55	1.0	150	40	120		CBS10S40		CUS10S40		
		0.5	0.56	0.60	0.5	50	40	42	CTS05S40				CUS05S40		
			2.0	0.40	0.47	2.0	60	30	380					CUHS20F30 ☆	
	30	1.5	0.34	0.41	2.0	500	30	390					CUHS20S30 ☆		
			0.46	0.52	1.5	50	30	170					CUHS15F30 ☆		
			0.37	0.43	1.5	500	30	200					CUHS15S30 ☆		
		1.0	0.47	0.57	1.0	50	30	120							
			0.43	0.50	1.0	50	30	170				CUS10F30			
			0.8	0.40	0.45	0.8	50	30	170			CUS08F30			
			0.5	0.38	0.45	0.5	50	30	to 120		CBS05F30		CUS05F30		
		0.38	0.47	0.5	100	20	-					CUS551V30			
		30*	1.5	0.39	-	1.5	500	30	200			CCS15S30	CUS15S30		
	1.0		0.37	0.45	1.0	500	30	135		CBS10S30		CUS10S30			
	0.5		0.41	0.47	0.5	300	30	55	CTS05S30			CUS05S30			

☆ New Products

■ Schottky Barrier Diodes (SBDs)

Package Dimensions (unit: mm)

Features	Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)						CL2E	CST2 (SOD-882)	SOD-923	ESC (SOD-523)	USC (SOD-323)
									Bottom View	Bottom View			
	V_R / V_{RM}^* (V)	I_O (A)	V_F			I_R max (μA)	C_T typ. (pF)						
			typ. (V)	max (V)	@ I_F (A)			@ V_R (V)	1.0x0.6	1.0x0.6	1.0x0.6	1.6x0.8	2.5x1.25
Low- I_R High Speed	40	1.0	0.52	0.57	1.0	25	40	130	CLS10F40 ☆				
	20	0.05	0.50	0.55	0.05	0.5	20	3.9		1SS413CT	1SS413	1SS405 #	1SS406 #

Features	Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)						S-Mini (SOT-346)	USQ (SOT-343)	US6 (SOT-363)
											
	V _R /V _{RM} * (V)	I _O (A)	V _F			I _R max (μA)	C _T typ. (pF)				
			typ. (V)	max (V)	@I _F (A)		@V _R (V)				
Low-I _F High Speed	20	0.1	0.50	0.55	0.1	0.5	20	3.9		1SS402 	HN2S03FU 
	10	0.05	0.63	1	0.05	0.5	10	3.2	1SS321 # 		

Features	Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)						SL2 (SOD-962)	CST2 (SOD-882)	SOD-923	ESC (SOD-523)	USC (SOD-323)
									Bottom View	Bottom View			
	V _R /V _{RM} * (V)	I _O (A)	V _F			I _R		C _T typ. (pF)					
			typ. (V)	max (V)	@I _F (A)	max (μA)	@V _R (V)		0.62x0.32	1.0x0.6	1.0x0.6	1.6x0.8	2.5x1.25
Standard	40	0.1	0.54	0.60	0.1	5	40	11				CES388 #	CUS357 #
			0.56	0.62	0.1	5	40	15		1SS417CT	1SS417		
	30	0.2	0.52	0.60	0.2	5	30	to 17		CTS520		CES520 #	CUS520 #
			0.45	0.50	0.2	30	30	to 26		CTS521		CES521	CUS521 #
			0.38	0.50	0.1	50	30	15		1SS416CT	1SS416		
		0.1	0.51	0.62	0.1	0.7	30	8.2	DSR01S30SL				
			0.41	0.50	0.1	50	30	9.3	DSF01S30SL				
	20	0.3	0.38	0.45	0.3	50	20	46					1SS404
		0.2	0.42	0.50	0.2	50	20	20				1SS424	
	10	0.1	0.35	0.50	0.1	20	10	20				1SS389 #	1SS367 #

☆ New Products, # AEC-Q101 qualified

Schottky Barrier Diodes (SBDs)

Package Dimensions (unit: mm)

Features	Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)						VESM (SOT-723)	SSM (SOT-416)	USM (SOT-323)	S-Mini (SOT-346)	SOT23 (SOT-23)
													
	V _R / V _{RM} * (V)	I _O (A)	V _F			I _R max (μA)	@V _R (V)	C _T typ. (pF)					
Standard	40	0.1							1.2x1.2	1.6x1.6	2.0x2.1	2.9x2.5	2.9x2.4
			0.54	0.6	0.1	5	40	18			1SS322 	1SS294 	
											1SS393 	1SS392 	
											1SS396 # 		
		0.56	0.62	0.1	5	40	15		1SS423 				
	30	0.2											TBAT54 
													TBAT54C 
													TBAT54S 
													TBAT54A 
		0.1	0.38	0.5	0.1	50	30	15		1SS422 			
	20	0.3	0.38	0.45	0.3	50	20	46			1SS401 		
		0.2	0.36	0.42	0.2	50	20	46					
	10	0.1	0.35	0.5	0.1	20	10	20			1SS395 	1SS394 	
								1SS385FV 	1SS385 	1SS378 	1SS377 		
									1SS372 	1SS374 			

AEC-Q101 qualified

Schottky Barrier Diodes (SBDs)

Package Dimensions (unit: mm)

Features	Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)						USQ (SOT-343)	SMQ (SOT-24)	ESV (SOT-553)	US6 (SOT-363)	SM6 (SOT-26)
													
	V_R / V_{RM}^* (V)	I_O (A)	V_F			I_R max (μ A)	C_T typ. (pF)	2.0x2.1	2.9x2.9	1.6x1.6	2.0x2.1	2.9x2.8	
Standard	40	0.1	0.54	0.6	0.1	5	40	18	1SS383 	1SS319 	HN2S02JE 	HN2S02FU 	
	20	0.2	0.36	0.42	0.2	50	20	46				HN2S04FU 	
	10	0.1	0.35	0.5	0.1	20	10	20	1SS384 			HN2S01FU 	HN2S01F 

Switching Diodes

Package Dimensions (unit: mm)

Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)		CST2 (SOD-882)	SOD-923	ESC (SOD-523)	USC (SOD-323)	CST3 (SOT-883)	VESM (SOT-723)	SSM (SOT-416)	USM (SOT-323)	SOT23 (SOT-23)	
V _R (V)	I _O (mA)	C _T typ. (pF)	t _{rr} typ. (ns)	Bottom View				Bottom View					
80	80	0.5	1.6		1.0x0.6	1.0x0.6	1.6x0.8	2.5x1.25	1.0x0.6	1.2x1.2	1.6x1.6	2.0x2.1	2.9x2.4
	100	0.3	1.6			1SS427					1SS362 		
		0.5	1.6	1SS387CT		1SS387 #		1SS352 #					
		0.9	1.6					1SS361CT 	1SS361FV # 	1SS361 # 	1SS301 # 		
								1SS362FV # 		1SS302A # 	TBAV99 		
		2	-			1SS307E #							
	2.2	1.6							1SS360 # 	1SS300 # 			
	215	0.9	1.6										TBAS16 
													TBAW56 
												TBAV70 	
100	150	0.9	4 (max)								BAV99W 		
	215	0.9	4 (max)									BAV70 	
			3 (max)								BAV99 		
	250	0.35	3 (max)				BAS516	BAS316					
200	100	1.5	10				1SS403 #				1SS370 		
			60(max)				1SS403E ☆						
400	100	2.5	0.5								1SS397 		

☆ New Products, # AEC-Q101 qualified

Switching Diodes

Package Dimensions (unit: mm)

Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)		S-Mini (SOT-346)	USQ (SOT-343)	SMQ (SOT-24)	ESV (SOT-553)	USV (SOT-353)	SMV (SOT-25)	ES6 (SOT-563)	US6 (SOT-363)	SM6 (SOT-26)
V _R (V)	I _O (mA)	C _T typ. (pF)	t _{rr} typ. (ns)									
30	100	3	-	1SS307 								
80	80	0.5	1.6								HN2D01FU # 	HN2D01F 
											HN2D02FU # 	
		0.5	1.6				HN2D01JE 					
				1SS184 # 				HN4D02JU 	1SS309 			
		0.9	1.6	1SS226 # 						HN1D02FE 	HN1D02FU # 	HN1D02F 
				1SS196 # 								
				1SS193 # 								
					1SS382 	1SS272 						
		2.2	1.6	1SS190 # 				HN4D01JU 	1SS308 			
				1SS187 # 						HN1D01FE 	HN1D01FU # 	HN1D01F 
				1SS181 # 								
		3.0	-	1SS379 # 								
		Q1/2=0.9 Q3/4=2.2	1.6								HN1D03FU # 	HN1D03F 
200	100	1.5	10	1SS250 								
			30			1SS306 						
400	100	2.5	0.5	1SS398 		1SS399 						HN2D03F 

AEC-Q101 qualified

1 MOSFETs

2 Tr./BRTs

3 Diodes

4 Power Management ICs

5 Linear ICs

6 Sensors

7 Logic Devices

8 RF Devices

9 Packages

■ TVS Diodes (ESD Protection Diodes)

Package Dimensions (unit: mm)

Application		Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)			SL2 (SOD-962)	CST2 (SOD-882)	SOD-923	CST2C (SOD-963)	ESC (SOD-523)
							Bottom View	Bottom View		Bottom View	
							0.62x0.32 	1.0x0.6 	1.0x0.6 	1.6x0.8 	1.6x0.8 
		V _{ESD} IEC61000 -4-2 (kV)	I _{PP} tp=8/20μs (A)	V _{RWM} max (V)	C _T typ. (pF)	R _{DN} typ. (Ω)					
Bi-directional	USB3.1/ Thunderbolt/ RF antenna (NFC)	±20	2.5	3.3	0.3	0.5	DF2B5M5SL ☆	DF2B5M5CT ☆			
		±20	2.5	5.0	0.3	0.5	DF2B6M5SL ☆	DF2B6M5CT ☆			
		±20	2.0	3.6	0.2	0.5 to 0.8	DF2B5M4SL	DF2B5M4CT			
		±20	2.0	5.5	0.2	0.5 to 0.8	DF2B6M4SL	DF2B6M4CT			
		±16	2.0	3.6	0.15	0.7	DF2B5M4ASL ☆				
		±15	2.0	5.5	0.15	0.7	DF2B6M4ASL ☆				
		±15	1.0	11.0	0.2	0.65	DF2B12M4SL ☆				
		±15	0.5	18.5	0.2	0.2	DF2B20M4SL				
		±15	0.5	24.0	0.2	0.2	DF2B26M4SL ☆				
		±12	2.5	5.5	0.1	0.7	DF2B7M3SL				
		±12	2.0	5.0	0.2	1.0	DF2B7M2SL ●				
		±12	2.5	5.0	0.3	0.8		DF2B6.8M1ACT			
	USB2.0	±10	1.5	5.5	1.5	0.25	DF2B6USL				
	General Purpose/ Audio/ SIM Card	±30	27.0	5.5	45.0	0.10		DF2B7PCT ☆			
		±30	4.0	5.5	8.5	0.2	DF2B7ASL	DF2B7ACT	DF2B7AFS		DF2B7AE #
		±30	7.3	5.5	12	0.2	DF2B7BSL ☆				
		±30	27.0	3.6	41	0.1		DF2B5PCT ☆			
		±23	7.5	3.6	11	0.2	DF2B5BSL ☆				
		±17	3.0	5.3	6	0.3	DF2B7SL				
		±17	5.5	3.3	9	0.25	DF2B5SL ☆				
		±8	-	5.0	15	-					DF2B6.8E #
Uni-directional	USB3.1/ Thunderbolt/ RF antenna (NFC)	±20	2.0	3.6	0.35 to 0.45	0.3 to 0.35	DF2S5M4SL	DF2S5M4CT	DF2S5M4FS ☆ #		
		±20	2.0	5.5	0.35 to 0.45	0.3 to 0.35	DF2S6M4SL	DF2S6M4CT	DF2S6M4FS ☆ #		
		±20	2.5	3.3	0.6	0.3	DF2S5M5SL ☆	DF2S5M5CT ☆			
		±20	2.5	5.0	0.6	0.3	DF2S6M5SL ☆	DF2S6M5CT ☆			
	USB2.0	±12	3.0	5.0	to 0.5	0.35	DF2S7MSL ●		DF2S6.8MFS		
		±8	-	5.0	1.6	0.3		DF2S6.8UCT	DF2S6.8UFS		
		±8	-	19	1.6	0.5		DF2S24UCT			
	General Purpose/ Audio/ SIM Card	±30	2.5	1.5	45	0.2	DF2S5.1ASL				
		±30	2.5	3.5	40	0.25	DF2S5.6ASL				
		±30	2.5	5.0	32	0.3	DF2S6.2ASL				
		±30	2.5	5.0	25	0.5	DF2S6.8ASL				
		±30	2.5	6.5	20	0.8	DF2S8.2ASL				
	Power Supply USB_V _{BUS}	±30	80	5.5	600	0.08				DF2S6P2CTC ☆	
		±30	60	10	280	0.08				DF2S12P2CTC ☆	
		±30	50	12.6	270	0.08				DF2S14P2CTC ☆	
		±30	14	21	160	0.13				DF2S23P2CTC ☆	

☆ New Products, # AEC-Q101 qualified
 ● Recommend Another New Product
 DF2S7MSL → DF2S6M4SL, DF2B7M2SL → DF2B6M4SL

TVS Diodes (ESD Protection Diodes)

Package Dimensions (unit: mm)

Application		Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)			USC (SOD-323)	SSM (SOT-416)	USM (SOT-323)	UDFN6B (SOT-1220)
										Bottom View 
							2.5x1.25	1.6x1.6	2.0x2.1	2.0x2.0
Bi-directional	General Purpose/ Audio/ SIM Card	V _{ESD} IEC61000 -4~2 (kV)	I _{PP} tp=8/20μs (A)	V _{RWM} max (V)	C _T typ. (pF)	R _{DYN} typ. (Ω)				
		±30	4.0	5.5	8.5	0.2	DF2B7AFU			
Uni-directional	Automotive's CAN/LIN	±30	2.5	12	9	0.8	DF2B18FU #		DF3D18FU #	
		±25	3.0	24	9	1.1	DF2B29FU #		DF3D29FU #	
		±20	2.5	28	6.5	1.5	DF2B36FU #		DF3D36FU #	
		±8	-	5.0	0.5	-		DF3D6.8MS		
	Power Supply USB_V _{BUS}	±8	-	5.0	2.5 (max)	-			DF3A6.8UFU	
		±30	80	5.5	600	0.08	DF2S6P2FU ☆			
		±30	60	10	280	0.08	DF2S12P2FU ☆			
		±30	50	12.6	270	0.08	DF2S14P2FU ☆			
		±30	14	21	160	0.13	DF2S23P2FU ☆			
		±30	110	22	-	0.01				DF6S25P3NU ★

☆ New Products, # AEC-Q101 qualified
★ Under Development (The specification is subject to change without notice.)

■ TVS Diodes (ESD Protection Diodes)

Package Dimensions (unit: mm)

Application	Absolute Maximum Ratings	Electrical Characteristics (Ta=25°C)			CST2 (SOD-882)	SOD-923	USC (SOD-323)
					Bottom View		
							
					1.0x0.6	1.0x0.6	2.5x1.25
	V _{ESD} IEC61000 -4-2 (kV)	V _Z min (V)	C _T typ. (pF)	Z _Z max (Ω)			
Uni-directional General-Purpose/ SIM Card/ Power-Supply	±30	4.8	45	70		DF2S5.1FS	
	±30	5.3	40	30	DF2S5.6CT	DF2S5.6FS	
	±30	5.8	32	30	DF2S6.2CT	DF2S6.2FS	
	±30	6.4	25	30	DF2S6.8CT	DF2S6.8FS	
	±30	7.7	20	30	DF2S8.2CT	DF2S8.2FS	
	±30	9.4	16	30		DF2S10FS	
	±20	11.4	15	10 (typ.)			DF2S12FU
	±20	11.4	15	25		DF2S12FS	
	±12	15.3	10	35	DF2S16CT	DF2S16FS	
	±12	18.8	9	to 55	DF2S20CT	DF2S20FS	
	±10	22.8	8.5	70		DF2S24FS	
	±8	28	7.2	75	DF2S30CT		
	±8	28	7	150		DF2S30FS	

Application	Absolute Maximum Ratings	Electrical Characteristics (Ta=25°C)			CST3 (SOT-883)	VESM (SOT-723)	USM (SOT-323)	S-Mini (SOT-346)	ESV (SOT-553)	USV (SOT-353)	SMV (SOT-25)	US6 (SOT-363)
					Bottom View							
												
					1.0x0.6	1.2x1.2	2.0x2.1	2.9x2.5	1.6x1.6	2.0x2.1	2.9x2.8	2.0x2.1
	V _{ESD} IEC61000 -4-2 (kV)	V _Z min (V)	C _T typ. (pF)	Z _Z max (Ω)								
Uni-directional General-Purpose/ SIM Card/ Power-Supply	±8	5.3	8	50			DF3A5.6LFU		DF5A5.6LJE	DF5A5.6LFU		
	±8	5.3	8	3 (typ.)		DF3A5.6LFV#						
	±8	5.9	6.5	50		DF3A6.2LFV#	DF3A6.2LFU		DF5A6.2LJE	DF5A6.2LFU		
	±8	6.5	to 6	50	DF3A6.8LCT	DF3A6.8LFV#	DF3A6.8LFU		DF5A6.8LJE	DF5A6.8LFU	DF5A6.8LF	
	±30	5.3	29	40					DF5A5.6CJE	DF5A5.6CFU		
	±30	5.8	25	30					DF5A6.2CJE	DF5A6.2CFU		
	±25	6.4	23	25					DF5A6.8CJE	DF5A6.8CFU		
	±30	5.3	65	40	DF3A5.6CT	DF3A5.6FV#	DF3A5.6FU	DF3A5.6F	DF5A5.6JE	DF5A5.6FU	DF5A5.6F	
	±30	5.8	55	30	DF3A6.2CT	DF3A6.2FV#	DF3A6.2FU	DF3A6.2F	DF5A6.2JE	DF5A6.2FU	DF5A6.2F	
	±30	6.4	45	25	DF3A6.8CT	DF3A6.8FV#	DF3A6.8FU	DF3A6.8F	DF5A6.8JE	DF5A6.8FU	DF5A6.8F	DF6A6.8FU

AEC-Q101 qualified

Zener Diodes for Over Voltage Protection

Package Dimensions (unit: mm)

General type

Application	Electrical Characteristics (Ta=25°C)		ESC (SOD-523)	USC (SOD-323)	USM (SOT-323)	S-Mini (SOT-346)
			 1.6x0.8 P _D =150mW	 2.5x1.25 P _D =200mW	 2.0x2.1 P _D =150mW	 2.9x2.5 P _D =200mW
	V _Z (V)	I _Z (mA)				
Uni-directional General-Purpose/ SIM Card/ Power-Supply	5.6	5	CEZ5V6 ☆	CUZ5V6 ☆	MUZ5V6 ☆	MSZ5V6 ☆
	6.2	5	CEZ6V2 ☆	CUZ6V2 ☆	MUZ6V2 ☆	MSZ6V2 ☆
	6.8	5	CEZ6V8 ☆	CUZ6V8 ☆	MUZ6V8 ☆	MSZ6V8 ☆
	8.2	5	CEZ8V2 ☆	CUZ8V2 ☆	MUZ8V2 ☆	MSZ8V2 ☆
	12	5	CEZ12V ☆	CUZ12V ☆	MUZ12V ☆	MSZ12V ☆
	16	5	CEZ16V ☆	CUZ16V ☆	MUZ16V ☆	MSZ16V ☆
	20	5	CEZ20V ☆	CUZ20V ☆	MUZ20V ☆	MSZ20V ☆
	24	5	CEZ24V ☆	CUZ24V ☆	MUZ24V ☆	MSZ24V ☆
	30	2	CEZ30V ☆	CUZ30V ☆	MUZ30V ☆	MSZ30V ☆
	36	2	CEZ36V ☆	CUZ36V ☆	MUZ36V ☆	MSZ36V ☆

Power type

Application	Electrical Characteristics (Ta=25°C)		US2H (SOD-323HE)
			 2.5x1.4 P _D =1000mW
	V _Z (V)	I _Z (mA)	
Uni-directional General-Purpose/ SIM Card/ Power-Supply	5.6	10	CUHZ5V6 ★
	6.2	10	CUHZ6V2 ★
	6.8	10	CUHZ6V8 ★
	8.2	10	CUHZ8V2 ★
	12	10	CUHZ12V ★
	16	10	CUHZ16V ★
	20	10	CUHZ20V ★
	24	10	CUHZ24V ★
	30	10	CUHZ30V ★
	36	10	CUHZ36V ★

☆ New Products, ★ Under Development (The specification is subject to change without notice.)

① MOSFETs

② Tr./BJTs

③ Diodes

④ Power Management ICs

⑤ Linear ICs

⑥ Sensors

⑦ Logic Devices

⑧ RF Devices

⑨ Packages

Part Naming Conventions

Diode (JEITA Registration Products)

1 S S 181

Serial number : JEITA registration number.

The kind of diode

S: Diode of general-purpose use, detection use, frequency conversion use, and switching use
V: Variable capacitance and PIN diode

S stands for Semiconductor

The value that subtracted 1 from the total number of terminals

Schottky Barrier Diodes

New Naming Conventions

CU S 05 F 30 A

Revision or function category (A to Z)

Voltage rating

ex.) 30: 30V

Device type

ex.) S: Super Low forward voltage F: Low forward voltage,
R: Low leakage current

Current rating

ex.) 05: 0.5A

Pin count

ex.) S: 2pin

Package

ex.) CU: USC, CE: ESC, CB: CST2B, CE: CL2E

Old Naming Conventions

DS F 07 S 30 A U

Package style : This letter shows the package style.

Revision

Voltage rating

ex.) 30: 30V, 15: 15V

Circuit configuration and number of pins

Current rating

ex.) 07: 0.7A, 10: 1A

Device feature : This letter shows the feature of a device.

F: Low forward voltage type.

R: Low leakage current type.

Schottky barrier diode.

TVS Diodes (ESD Protection Diodes)

DF 5 A 6.2 L FU

Package suffix

Series name

ex.) L: Ultra-high-speed

Clamp voltage (V_{SR})

Internal configuration

ex.) A: Common anode

Pin count

Note) The digit 7 denotes a 6-pin package

TVS Diodes (ESD Protection Diodes)

Zener Diodes for Over Voltage Protection

CU Z 6V8

Zener voltage

ex.) 6V8: 6.8 V

The kind of diode

Z: Zener Diode (uni-directional type)

Package

CU: USC

CUH: US2H

CE: ESC

MS: S-Mini

MU: USM

4. Power Management ICs

Low Dropout Regulators (LDO)

Package Dimensions (unit: mm)

WCSP4E	WCSP4F	WCSP4	SDFN4E	DFN4E	DFN4F	DFN5B	ESV (SOT-553)	UFV (SOT-353F)	SMV (SOT-25)	WCSP6F
Bottom View  0.645x0.645	Bottom View  0.645x0.645	Bottom View  0.79x0.79	Bottom View  0.8x0.8	Bottom View  1.0x1.0	Bottom View  1.0x1.0	Bottom View  1.2x1.2	 1.6x1.6	 2.0x2.1	 2.9x2.8	Bottom View  1.2x0.8

CMOS LDO Regulators

Series Name / Part Number	Package	V _{OUT} (typ.) (V)	V _{IN} (V)	I _{OUT} (mA)	I _B (typ.) (μA)	Function							
						Over current protection	Auto discharge	Fast load transient response circuit	Thermal shutdown	Inrush current protection	Under voltage lockout	High PSRR	Control pin connection
TCR2DGxxx	WCSP4	1.2 to 3.6	2.0 to 5.5	200	45	✓		✓	✓	✓		✓	Pull down
TCR2ENxxx	SDFN4E	1.0 to 3.6	1.5 to 5.5	200	35	✓	✓	✓					Pull down
TCR2LNxxx		0.8 to 3.6	1.5 to 5.5	200	1	✓	✓						Pull down
TCR2EExxx	ESV	1.0 to 5.0	1.5 to 5.5	200	35	✓	✓	✓					Pull down
TCR2LExxx		0.8 to 3.6	1.5 to 5.5	200	1	✓	✓						Pull down
TCR2EFxxx	SMV	1.0 to 5.0	1.5 to 5.5	200	35	✓	✓	✓					Pull down
TCR2LFxxx		0.8 to 3.6	1.5 to 5.5	200	1	✓	✓						Pull down
TCR3DGxxx	WCSP4E	1.0 to 4.5	1.75 to 5.5	300	65	✓	✓	✓	✓	✓			Pull down
TCR3DMxxx	DFN4E	1.0 to 4.5	1.75 to 5.5	300	65	✓	✓	✓	✓	✓			Pull down
TCR3DFxxx	SMV	1.0 to 4.5	1.8 to 5.5	300	65	✓	✓	✓	✓	✓			Pull down
TCR3UGxxxA	WCSP4F	0.8 to 5.0	1.5 to 5.5	300	0.34	✓	✓	✓	✓	✓			Pull down
TCR3UGxxxB			1.5 to 5.5	300	0.34	✓		✓	✓	✓			Pull down
TCR3UMxxxA ☆	DFN4E	0.8 to 5.0	1.5 to 5.5	300	0.34	✓	✓	✓	✓	✓			Pull down
TCR3UFxxxA ☆	SMV	0.8 to 5.0	1.5 to 5.5	300	0.34	✓	✓	✓	✓	✓			Pull down
TCR3UFxxxB ☆			1.5 to 5.5	300	0.34	✓		✓	✓	✓			Pull down
TCR3RMxxxA ☆	DFN4F	0.9 to 4.5	1.8 to 5.5	300	7	✓	✓	✓	✓	✓		✓	Pull down
TCR5RGxxxA ☆	WCSP4F	0.9 to 5.0	1.8 to 5.5	500	10	✓	✓	✓	✓	✓		✓	Pull down
TCR4DGxxx	WCSP4E	1.0 to 4.5	V _{OUT} +V _{DO} to 5.5	420	65	✓	✓	✓	✓	✓			Pull down
TCR5BMxxxA ☆	DFN5B	0.8 to 3.6	V _{OUT} +V _{DO} to V _{BIAS}	500	19	✓	✓	✓	✓	✓	✓	✓	Pull down
TCR8BMxxxA ☆		0.8 to 3.6	V _{OUT} +V _{DO} to V _{BIAS}	800	20	✓	✓	✓	✓	✓	✓	✓	Pull down
TCR13AGADJ	WCSP6F	0.55 to 3.6 adjustable	V _{OUT} +0.1V to V _{BIAS}	1300	56	✓	✓	✓	✓	✓	✓	✓	Pull down
TCR15AGxxx ☆	WCSP6F	0.65 to 3.6	V _{OUT} +V _{DO} to V _{BIAS}	1500	25	✓	✓	✓	✓	✓	✓	✓	Pull down
TCR15AGADJ ☆	WCSP6F	0.6 to 3.6 adjustable	V _{OUT} +V _{DO} to V _{BIAS}	1500	25	✓	✓	✓	✓	✓	✓	✓	Pull down

Bipolar LDO Regulators

Series Name	Package	V _{OUT} (typ.) (V)	V _{IN} (V)	I _{OUT} (mA)	I _B (typ.) (μA)	Function				
						Over current protection	Auto discharge	Fast load transient response circuit	Thermal shutdown	Control pin connection
TAR5SxxU	UFV	1.5 to 5.0	2.4 to 15	200	170	✓			✓	
TAR5Sxx	SMV	1.5 to 5.0	2.4 to 15	200	170	✓			✓	
TAR5SBxx						✓			✓	

☆ New Products

■ Load Switch ICs

Package Dimensions (unit: mm)

WCSP4D	WCSP4C	SMV (SOT-25)	WCSP6C	WCSP6E	DFN4A	WCSP4G
Bottom View 	Bottom View 		Bottom View 	Bottom View 	Bottom View 	Bottom View 
0.79x0.79	0.9x0.9	2.9x2.8	1.5x1.0	1.2x0.8	1.2x1.2	0.645x0.645

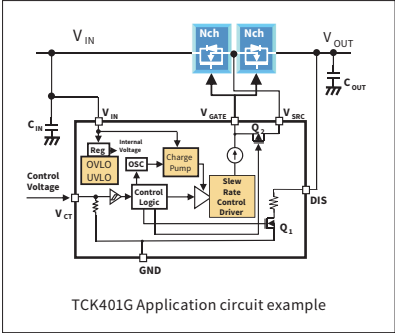
Part Number	Package	Operating voltage range (V)	Output current (A)	R _{DS(on)} (1 typ. mΩ)	R _{DS(on)} (2 typ. mΩ)	Function						Note		
						Inrush current reduction (Slew Rate control)	Thermal shutdown	Over current protection	Auto discharge	Under voltage lockout	Reverse current block		Control pin connection (Active Level)	
TCK106AG	WCSP4D	1.1 to 5.5	1	176	34	✓						Pull down (H)	Ultra small Iq 0.08nA	
TCK107AG				@1.1V, -0.2A	@5.0V, -0.5A	✓			✓		Pull down (H)			
TCK108AG						✓			✓		Open (L)			
TCK106AF	SMV		1	223	63	✓						Pull down (H)		
TCK107AF				@1.1V, -0.2A	@5.0V, -0.5A	✓			✓		Pull down (H)			
TCK108AF						✓			✓		Open (L)			
TCK111G	WCSP6C		3	8.5	8.3	✓	✓				True Reverse Current Blocking	Pull down (H)		
TCK112G				@1.1V, -1.5A	@5.0V, -1.5A	✓	✓		✓		Pull down (H)			
TCK126BG ★	WCSP4G		1.0 to 5.5	1	106	58	✓							Pull down (H)
TCK127BG ★		@1.8V, -0.5A			@3.3V, -0.5A	✓			✓		Pull down (H)			
TCK128BG ★						✓			✓		Open (L)			
TCK22921G	WCSP6E	1.1 to 5.5	2	136	25	4.5μs			✓		✓	Pull down(H)		
TCK22922G						666μs			✓		✓	Pull down(H)		
TCK22923G						1364μs			✓		✓	Pull down(H)		
TCK22925G						3380μs			✓		✓	Pull down(H)		
TCK22971G						4.5μs					✓	Pull down(H)		
TCK22972G						666μs					✓	Pull down(H)		
TCK22973G						1364μs					✓	Pull down(H)		
TCK22974G						3380μs					✓	Pull down(H)		
TCK22975G						666μs					✓	Open(L)		
TCK22910G	WCSP6E	1.1 to 5.5	2	179	31	1400μs	✓			✓	True Reverse Current Blocking	Open(L)		
TCK22911G						1400μs	✓		✓	✓		Open(L)		
TCK22912G						1400μs	✓		✓	✓		Pull down(H)		
TCK22913G						1400μs	✓		✓	✓		Pull down(H)		
TCK22946G	WCSP6E	1.1 to 5.5	0.4	179	31	50μs	✓	400mA	✓	✓	True Reverse Current Blocking	Pull down (H)		
TCK22951G			0.74			50μs	✓	740mA	✓	✓		Pull down (H)		
TCK2065G		1.4 to 5.5	1.11			50μs	✓	1110mA	✓	✓		Pull down (H)		
TCK1024G			1.54			50μs	✓	1540mA	✓	✓		Pull down (H)		
TCK22891G			0.4			50μs	✓	400mA	✓			Pull down (H)		
TCK22892G			0.74			50μs	✓	740mA	✓			Pull down (H)		
TCK22893G			1.11			50μs	✓	1110mA	✓			Pull down (H)		
TCK22894G			1.54			50μs	✓	1540mA	✓			Pull down (H)		
TCK206G	WCSP4C	0.75 to 3.6	2	18.4	18.1	✓					✓	Pull down (H)		
TCK207G				@0.75V, -1.5A	@3.3V, -1.5A	✓			✓		Pull down (H)			
TCK208G						✓			✓		Open (L)			
TCK207AN ☆	DFN4A				21.5	21.5	✓			✓		✓	Pull down (H)	

☆ New Products, ★ Under Development (The specification is subject to change without notice.)

■ N-ch MOSFET Gate driver ICs with OVP function

Package Dimensions (unit: mm)

WCSP6E	WCSP6G
Bottom View	Bottom View
	
1.2x0.8	1.2x0.8



Part Number	Package	Operating voltage range (V)	Input quiescent current (ON state)	Gate drive voltage (1)	Gate drive voltage (2)	Function							Note
						Inrush current reduction	Thermal shutdown	Over voltage protection	Auto discharge	Under voltage lockout	Reverse current block	Control pin connection (Active Level)	
TCK401G ☆	WCSP6E	2.7 to 28	121μA typ. @VIN=5V	4.0V typ. @VIN=3V	6.5V typ. @VIN=5V	✓		✓ (Over 28V)	✓	✓ (Under 2.7V)	Option (with external Back to Back MOSFET)	Pull down (H)	Common Source application
TCK402G ☆										Pull down (L)			
TCK42_G ★	WCSP6G	2.7 to 28	105μA typ. @VIN=5V	9.0V typ. @VIN=2.7V	9.0V typ. @VIN=12V	✓		✓ (Over Voltage lockout 30V)		✓ (Under 2.7V)	Option (with external Back to Back MOSFET)	Pull down (H)	Common Drain application

■ Power Multiplexer ICs

WCSP9	WCSP16C
Bottom View	Bottom View
	
1.5x1.5	1.9x1.9

Part Number	Package	Operating voltage range (V)	Output current (A)	R _{DS(on)} (mΩ) @Ta=25°C	R _{DS(on)} max (mΩ) @Ta=-40 to 85°C	Function						Control pin connection (Active Level)	Flag Operation Monitored input	Note
						Inrush current reduction	Thermal shutdown	Over voltage lockout	Auto discharge	Under voltage lockout	Reverse current block			
TCK301G	WCSP9	2.3 to 28	3	73 @4.5V, -1.0A	140 @4.5V, -1.0A	✓	✓	6.6V			✓	Pull up (H)	-	Single input Single output
TCK302G						✓	✓	10.5V			✓		-	
TCK303G						✓	✓	15.5V			✓		-	
TCK304G						✓	✓	6.6V		✓	✓	Pull down (L)	-	
TCK305G						✓	✓	10.5V		✓	✓		-	
TCK321G	WCSP16C	2.3 to 36	2	98 @4.5V, -1.0A	170 @4.5V, -1.0A	✓	✓	V _{INA} =V _{INB} =12V		✓	✓	Pull down	V _{INA}	Dual input Single output
TCK322G						✓	✓	V _{INA} =V _{INB} =15V		✓	✓		V _{INA}	
TCK323G						✓	✓	V _{INA} =V _{INB} =15V		✓	✓		V _{INB}	

☆ New Products, ★ Under Development (The specification is subject to change without notice.)

■ eFuse ICs

WSON10B	WSON10
Bottom View	Bottom View
	
3.0x3.0	3.0x3.0

Part Number	Package	Operating voltage range (V)	Output current (A)	R _{DS(on)} typ. (mΩ) @T _a =25°C	R _{DS(on)} max (mΩ) @T _a =-40 to 85°C	Function							Note	
						Inrush current reduction	Thermal shutdown	Over voltage Clamp	Auto discharge	Under voltage lockout	Reverse current blocking	Fault Response		Over current protection
TCKE712BNL ☆	WSON10	4.4 to 13.2	3.65	53 @12V, -1.0A	-	Slew rate control by External Capacitance	✓	Adjustable		✓	✓	Latched	Adjustable	FLAG Indicates
TCKE805NA ☆	WSON10B	4.4 to 18	5	28 @5V, -1.5A	38 @5V, -1.5A		✓	6.04V typ.	✓	✓	*	Auto-retry	Adjustable	
TCKE805NL ☆							✓	6.04V typ.	✓	✓	*	Latched	Adjustable	
TCKE812NA ☆							✓	15.1V typ.	✓	✓	*	Auto-retry	Adjustable	
TCKE812NL ☆							✓	15.1V typ.	✓	✓	*	Latched	Adjustable	
TCKE800NA ☆							✓	None	✓	✓	*	Auto-retry	Adjustable	
TCKE800NL ☆							✓	None	✓	✓	*	Latched	Adjustable	

☆ New Products, * This function is supported when N-ch MOSFET is attached to the external terminal.

5. Linear ICs

Operational Amplifiers, Comparators

Package Dimensions (unit: mm)

MP6C	ESV (SOT-353)	USV (SOT-353)	UFV (SOT-353F)	SMV (SOT-25)	US8 (SOT-765)	SM8 (SOT-505)
Bottom View						
1.45x1.0	1.6x1.6	2.0x2.1	2.0x2.1	2.9x2.8	2.0x3.1	2.9x4.0

Operational Amplifiers

		Bipolar	
		Standard	Low Noise Wide Band
Package	Type		
Single	SMV	TA75S01F	TA75S558F
Dual	SM8	TA75W01FU	TA75W558FU
$V_{CC}, V_{EE}/V_{DD}, V_{SS}$		±6 or 12V	±18V
$I_{CC}/I_{DD} \text{ (max)}$		0.8mA@Single 1.2mA@Dual	4.0mA@Single 6.0mA@Dual
$V_{IO} \text{ (max)}$		7mV	6mV
$I_{sink} \text{ (typ.)}$		20mA	40mA
$I_{source} \text{ (typ.)}$		40mA	40mA
$G_v \text{ (typ.)}$		100dB	100dB
$V_{NI} \text{ (typ.)}$			2.5μVrms
$SR \text{ (typ.)}$			1.0V/μs
$f_r \text{ (typ.)}$		0.3MHz	3.0MHz

	Package	Type	CMOS						
			Low Voltage Operation	Standard	Low I_{DD}	Low I_{DD} I/O Full range	Ultra Low I_{DD} I/O Full range	Low Noise	Ultra Low Noise
Single	ESV					TC75S103FE ★	TC75S102FE ★		
	USV		TC75S51FU	TC75S54FU	TC75S55FU				
	UFV					TC75S103TU ★	TC75S102TU ★	TC75S63TU	TC75S67TU
	SMV		TC75S51F	TC75S54F	TC75S55F	TC75S103F ☆	TC75S102F ☆		
Dual	US8		TC75W51FK	TC75W54FK	TC75W55FK				
	SM8		TC75W51FU	TC75W54FU	TC75W55FU				
$V_{CC}, V_{EE}/V_{DD}, V_{SS}$			7.0V	7.0V	7.0V	6.0V	6.0V	6.0V	6.0V
I_{CC}/I_{DD} (max)			200μA@Single 400μA@Dual	200μA@Single 400μA@Dual	20μA@Single 40μA@Dual	100μA (typ.)	0.27μA (typ.)	650μA	700μA
V_{IO} (max)			10mV	10mV	10mV	1.7mV	1.3mV	7mV	3mV
I_{SINK} (typ.)				700μA	450μA	10mA	0.4mA	1.5mA (min)	3.5mA
I_{SOURCE} (typ.)				200μA	20μA	10mA	0.6mA	1.5mA (min)	2.5mA
G_V (typ.)			70dB	70dB	70dB	125dB	139dB	100dB	100dB
V_{NI} (typ.)						60nV/√Hz	2700nV/√Hz	7.8nV/√Hz	6.0nV/√Hz
SR (typ.)			0.5V/μs	0.7V/μs	0.08V/μs	0.4V/μs	0.37V/ms	1.0V/μs	1.0V/μs
f_r (typ.)			0.6MHz	0.9MHz	0.16MHz	0.36MHz	0.5 kHz	3.5MHz	3.5MHz
Test condition			$V_{DD}=3.0V$	$V_{DD}=3.0V$	$V_{DD}=3.0V$	$V_{DD}=3.3V$	$V_{DD}=1.5V$	$V_{DD}=3.3V$	$V_{DD}=3.3V$

Comparators

		Bipolar		CMOS				
		Type	Standard	Push pull		Open drain		
				Package	Full-range input/output	Low I _{DD}	High speed	Low I _{DD}
Single	MP6C			TC75S70L6X				
	USV			TC75S56FU	TC75S57FU	TC75S58FU	TC75S59FU	
	SMV	TA75S393F		TC75S56F	TC75S57F	TC75S58F	TC75S59F	
Dual	US8			TC75W56FK	TC75W57FK	TC75W58FK	TC75W59FK	
	SM8	TA75W393FU		TC75W56FU	TC75W57FU	TC75W58FU	TC75W59FU	
V _{CC} , V _{EE} / V _{DD} , V _{SS}			±18 or 36V	±3 or 6V	±3.5 or 7V	±3.5 or 7V	±3.5 or 7V	±3.5 or 7V
I _{CC} / I _{DD} (max)			0.8mA@Single 2mA@Dual	35μA	22μA@Single 44μA@Dual	220μA@Single 440μA@Dual	22μA@Single 44μA@Dual	220μA@Single 440μA@Dual
I _{SINK} (typ.)			16mA	18mA	25mA	25mA	25mA	25mA
I _{SOURCE} (typ.)				15mA	21mA	21mA		
G _V (typ.)			200V/mV		94dB	94dB	94dB	94dB
t _{RESP} , t _{PLH} (typ.)			1.3μs	400ns	680ns	140ns	800ns	200ns

★ New Products, ☆ Under Development (The specification is subject to change without notice.)

6. Sensors

Magnetic Sensors

Package Dimensions (unit: mm)

UFV (SOT-353F)	SOT-23F
	
2.0x2.1	2.9x2.4

			TCS40DPR	TCS40DLR	TCS30DPU	TCS30DLU	TCS30SPU	TCS30NPU
			Push pull	Open drain	Push pull	Open drain	Push pull	
Package			SOT-23F		UFV			
Detective Polarity			S&N		S&N		S	N
Electrical Characteristics	Supply Voltage		2.3 to 5.5 V		2.3 to 3.6 V			
	Magnetic Flux Density	Operating Point (V _{CC} = 2.3to3.6 V)	B _{ON} = 3.4 mT (typ.)		B _{ON} = 1.8 mT (typ.)			
		Releasing Point (V _{CC} = 2.3to3.6 V)	B _{OFF} = 2.0 mT (typ.)		B _{OFF} = 0.8 mT (typ.)			
		Hysteresis (V _{CC} = 2.3to5.0 V)	B _H = 1.4 mT (typ.)		B _H = 1.0 mT (typ.)			
	Supply Current *	Average Current (V _{CC} = 2.3V)	7.3 μA (typ.)		8.5 μA (typ.)			
	Operating Frequency (V _{CC} = 2.3to5.0 V)		25Hz(typ.)		25Hz(typ.)			

* Supply current is pulsed periodically by internal circuit.

7. Logic Devices

7-1 One-Gate Logic ICs (L-MOS)

Package Dimensions (unit: mm)

VHS Series

General Specification	
Supply voltage range	: 2.0V to 5.5V
Output current	: $\pm 8\text{mA}$ (@ $V_{CC}=4.5\text{V}$)
Propagation delay time	: 3.7nsec typ. (@ $V_{CC}=5.0\text{V}$)
Quiescent supply current	: $2\mu\text{A}$ max (@ $V_{CC}=5.5\text{V}$, $T_a=25^\circ\text{C}$)
Operating temperature	: $T_{opr} = -40$ to 125°C

USV (SOT-353)	SMV (SOT-25)	US8 (SOT-765)	SM8 (SOT-505)
			
2.0x2.1	2.9x2.8	2.0x3.1	2.9x4.0

Function			Part Number					
			USV		SMV		US8	SM8
			-	TTL Input	-	TTL Input		
Gates/ Buffers	NAND		TC7SH00FU †	TC7SET00FU †	TC7SH00F †	TC7SET00F †	TC7WH00FK † Dual-gate	TC7WH00FU Dual-gate
	AND		TC7SH08FU †	TC7SET08FU †	TC7SH08F †	TC7SET08F †	TC7WH08FK † Dual-gate	TC7WH08FU Dual-gate
		Open-drain	TC7SH09FU †		TC7SH09F †			
	NOR		TC7SH02FU †	TC7SET02FU †	TC7SH02F †	TC7SET02F †	TC7WH02FK † Dual-gate	TC7WH02FU Dual-gate
	OR		TC7SH32FU †	TC7SET32FU †	TC7SH32F †	TC7SET32F †	TC7WH32FK † Dual-gate	TC7WH32FU Dual-gate
	Exclusive-OR		TC7SH86FU †		TC7SH86F †			
	Inverter		TC7SH04FU †	TC7SET04FU †	TC7SH04F †	TC7SET04F †	TC7WH04FK † Triple-gate	TC7WH04FU Triple-gate
		Unbuffered	TC7SHU04FU †		TC7SHU04F †		TC7WHU04FK † Triple-gate	TC7WHU04FU Triple-gate
	Schmitt		TC7SH14FU †	TC7SET14FU †	TC7SH14F †	TC7SET14F †	TC7WH14FK † Triple-gate	TC7WH14FU Triple-gate
		Buffers	TC7SH17FU †	TC7SET17FU †	TC7SH17F †	TC7SET17F †	TC7WH17FK † Triple-gate	TC7WH17FU Triple-gate
	Non-Inverter		TC7SH34FU †	TC7SET34FU †	TC7SH34F †	TC7SET34F †	TC7WH34FK † Triple-gate	TC7WH34FU Triple-gate
	3-state	Buffers	TC7SH125FU †	TC7SET125FU †	TC7SH125F †	TC7SET125F †	TC7WH125FK † Dual-gate	TC7WH125FU Dual-gate
			TC7SH126FU †	TC7SET126FU †	TC7SH126F †	TC7SET126F †	TC7WH126FK † Dual-gate	TC7WH126FU Dual-gate
D-Type Flip-Flop	Preset and Clear					TC7WH74FK †	TC7WH74FU	
Multiplexers	Digital					TC7WH157FK †	TC7WH157FU	

† This device is compliant with the reliability requirements of AEC-Q100

① MOSFETs

② Tr./BJTs

③ Diodes

④ Power Management ICs

⑤ Linear ICs

⑥ Sensors

⑦ Logic Devices

⑧ RF Devices

⑨ Packages

SHS Series

General Specification	
Supply voltage range	: 1.65V to 5.5V 1.8V to 5.5V
Output current	: $\pm 24\text{mA}$ (@ $V_{cc}=3.0\text{V}$)
Propagation delay time	: 2.4nsec typ. (@ $V_{cc}=3.3\text{V}$)
Quiescent supply current	: $1\mu\text{A}$ max (@ $V_{cc}=5.5\text{V}$, $T_a=25^\circ\text{C}$)
Operating temperature	: $T_{opr} = -40$ to 125°C

fsv (SOT-953)	ESV (SOT-553)	USV (SOT-353)	SMV (SOT-25)	US6 (SOT-363)	US8 (SOT-765)	SM8 (SOT-505)
						
1.0x1.0	1.6x1.6	2.0x2.1	2.9x2.8	2.0x2.1	2.0x3.1	2.9x4.0

Function				Part Number					
Package		fSV	ESV	USV	SMV	US6	US8	SM8	
Gates/ Buffers	NAND	TC7SZ00AFS	TC7SZ00FE †	TC7SZ00FU †	TC7SZ00F †		TC7WZ00FK † Dual-gate	TC7WZ00FU Dual-gate	
	AND	TC7SZ08AFS	TC7SZ08FE †	TC7SZ08FU †	TC7SZ08F †		TC7WZ08FK † Dual-gate	TC7WZ08FU Dual-gate	
	NOR	TC7SZ02AFS	TC7SZ02FE †	TC7SZ02FU †	TC7SZ02F †		TC7WZ02FK † Dual-gate	TC7WZ02FU Dual-gate	
	OR	TC7SZ32AFS	TC7SZ32FE †	TC7SZ32FU †	TC7SZ32F †		TC7WZ32FK † Dual-gate	TC7WZ32FU Dual-gate	
	Exclusive-OR	TC7SZ86AFS	TC7SZ86FE †	TC7SZ86FU †	TC7SZ86F †		TC7WZ86FK † Dual-gate	TC7WZ86FU Dual-gate	
	Inverter		TC7SZ04AFS	TC7SZ04FE †	TC7SZ04FU †	TC7SZ04F †	TC7PZ04FU † Dual-gate	TC7WZ04FK † Triple-gate	TC7WZ04FU Triple-gate
		Unbuffered	TC7SZU04AFS	TC7SZU04FE †	TC7SZU04FU †	TC7SZU04F †		TC7WZU04FK † Triple-gate	TC7WZU04FU Triple-gate
		Open-drain	TC7SZ05AFS	TC7SZ05FE †	TC7SZ05FU †	TC7SZ05F †	TC7PZ05FU † Dual-gate	TC7WZ05FK † Triple-gate	TC7WZ05FU Triple-gate
		Schmitt	TC7SZ14AFS	TC7SZ14FE †	TC7SZ14FU †	TC7SZ14F †	TC7PZ14FU † Dual-gate	TC7WZ14FK † Triple-gate	TC7WZ14FU Triple-gate
	Buffers	Open-drain	TC7SZ07AFS	TC7SZ07FE †	TC7SZ07FU †	TC7SZ07F †	TC7PZ07FU † Dual-gate	TC7WZ07FK † Triple-gate	TC7WZ07FU Triple-gate
		Schmitt	TC7SZ17AFS	TC7SZ17FE †	TC7SZ17FU †	TC7SZ17F †	TC7PZ17FU † Dual-gate	TC7WZ17FK † Triple-gate	TC7WZ17FU Triple-gate
	Non-Inverter		TC7SZ34AFS	TC7SZ34FE †	TC7SZ34FU †	TC7SZ34F †	TC7PZ34FU † Dual-gate	TC7WZ34FK † Triple-gate	TC7WZ34FU Triple-gate
	3-state	Buffers	TC7SZ125AFS	TC7SZ125FE †	TC7SZ125FU †	TC7SZ125F †		TC7WZ125FK † Dual-gate	TC7WZ125FU Dual-gate
			TC7SZ126AFS	TC7SZ126FE †	TC7SZ126FU †	TC7SZ126F †		TC7WZ126FK † Dual-gate	TC7WZ126FU Dual-gate
D-Type Flip-Flop	Preset and Clear						TC7WZ74FK †	TC7WZ74FU	

† This device is compliant with the reliability requirements of AEC-Q100

7UL1Gxx Series

General Specification

Supply voltage range : 0.9V to 3.6V
 Output current : $\pm 8\text{mA}$ (@ $V_{CC}=3.0\text{V}$)
 Propagation delay time : 2.5nsec typ. (@ $V_{CC}=3.3\text{V}$)
 Quiescent supply current : $1\mu\text{A}$ max (@ $V_{CC}=3.6\text{V}$, $T_a=25^\circ\text{C}$)

fsv (SOT-953)	USV (SOT-353)	US8 (SOT-765)
		
1.0x1.0	2.0x2.1	2.0x3.1

Function		Part Number		
	Package	fsv	USV	US8
Gates/ Buffers	NAND Gate	7UL1G00FS ☆	7UL1G00FU ☆	
	NOR Gate	7UL1G02FS ☆	7UL1G02FU ☆	
	Inverter	7UL1G04FS ☆	7UL1G04FU ☆	
	Unbuffered	7UL1GU04FS ☆	7UL1GU04FU ☆	
	AND Gate	7UL1G08FS ☆	7UL1G08FU ☆	
	Schmitt Inverter	7UL1G14FS ☆	7UL1G14FU ☆	
	Schmitt Buffer	7UL1G17FS ☆	7UL1G17FU ☆	
	OR Gate	7UL1G32FS ☆	7UL1G32FU ☆	
	Buffer	7UL1G34FS ☆	7UL1G34FU ☆	
	Open drain		7UL1G07FU ☆	
	Exclusive-OR	7UL1G86FS ☆	7UL1G86FU ☆	
	3-State Buffer(/G)	7UL1G125FS ☆	7UL1G125FU ☆	7UL2G125FK ☆
	3-State Buffer(G)	7UL1G126FS ☆	7UL1G126FU ☆	7UL2G126FK ☆

7UL1Txx Series

General Specification

Supply voltage range : 2.3V to 3.6V
 Output level up to supply V_{CC} CMOS level : 1.65V to 3.6V ($V_{CC} = 3.6\text{V}$)
 Output level down to supply V_{CC} CMOS level : 3.6V to 2.3V ($V_{CC} = 2.3\text{V}$)
 Quiescent supply current : $1\mu\text{A}$ max (@ $V_{CC}=3.6\text{V}$, $T_a=25^\circ\text{C}$)

fsv (SOT-953)	USV (SOT-353)	US8 (SOT-765)
		
1.0x1.0	2.0x2.1	2.0x3.1

Function		Part Number		
	Package	fsv	USV	US8
Gates/ Buffers	NAND Gate	7UL1T00FS ★	7UL1T00FU ☆	
	NOR Gate	7UL1T02FS ★	7UL1T02FU ☆	
	Inverter	7UL1T04FS ★	7UL1T04FU ☆	
	AND Gate	7UL1T08FS ★	7UL1T08FU ☆	
	OR Gate	7UL1T32FS ★	7UL1T32FU ☆	
	Buffer	7UL1T34FS ★	7UL1T34FU ☆	
	Exclusive-OR	7UL1T86FS ★	7UL1T86FU ☆	
	3-State Buffer(/G)	7UL1T125FS ★	7UL1T125FU ☆	7UL2T125FK ☆
	3-State Buffer(G)	7UL1T126FS ★	7UL1T126FU ☆	7UL2T126FK ☆

☆ New Products

★ Under Development (The specification is subject to change without notice.)

7-2 CMOS Logic ICs

■ Standard Logic 74VHC Series (TSSOP14B/16B/20B Package Products)

Package Dimensions (unit: mm)

TSSOP14B	TSSOP16B	TSSOP20B
		
5.0x6.4	5.0x6.4	6.5x6.4

Features
- Compliant with the reliability requirements of AEC-Q100 Operating temperature: Available -40 to 125°C products (‡ Operation temperature of this device is -40 to 85°C.) - Compatible standard TSSOP package

Series name				VHC		VHCT (TTL Input)		VHCV (Schmitt Input)		VHC9 (Schmitt Input)			
Characteristics and Features				Supply voltage range		2.0 to 5.5V		4.5 to 5.5V		1.8 to 5.5V		2.0 to 5.5V 4.5 to 5.5V (VHCT9)	
				Output current @V _{CC} =4.5V		±8mA				±16mA		±8mA	
				Power down protection on inputs		Yes							
				Power down protection on outputs		No				Yes			
Function				Pin		-		-		Yes		-	
Gate/ Buffer	NAND	Quad		14	74VHC00FT †		74VHCT00AFT †		-				
			Open-drain	14	74VHC03FT †								
		Dual	Schmitt	14	74VHC132FT †								
			4-input	14	74VHC20FT †								
	AND	Quad		14	74VHC08FT †		74VHCT08AFT †						
		Dual	4-input	14	74VHC21FT †								
	NOR	Quad		14	74VHC02FT †								
		Dual	4-input	14	74VHC27FT †								
	OR	Quad		14	74VHC32FT †		74VHCT32AFT †						
		Exclusive-OR	Quad		14	74VHC86FT †							
	Hex			14	74VHC04FT †		74VHCT04AFT †						
			Open-drain	14	74VHC05FT †				74VHCV05FT †				
			Schmitt	14	74VHC14FT †		74VHCT14AFT †		74VHCV14FT †				
		9-bit		20							74VHC9152FT †		
	Buffer	Hex		14					74VHCV17FT †				
			Open-drain	14					74VHCV07FT †				
		Dual 3-bit	Pull-down resistor	20							74VHC9363FT ☆		
			Pull-up resistor	20							74VHC9364FT ☆		
		9-bit		20							74VHC9151FT †		
		3-state Buffer	Quad		14	74VHC125FT †		74VHCT125AFT †					
				14	74VHC126FT †		74VHCT126AFT †						
	5-Bit Universal Schmitt Buffer			14							74VHC9125FT †		
											74VHCT9125AFT †		
				14							74VHC9126FT †		
	Octal		Inverted	20	74VHC240FT †		74VHCT240AFT †		74VHCV240FT †				
				20	74VHC540FT †		74VHCT540AFT †		74VHCV540FT †				
				20	74VHC244FT †		74VHCT244AFT †		74VHCV244FT †				
				20	74VHC541FT †		74VHCT541AFT †		74VHCV541FT †				
			Universal Schmitt Buffer	20							74VHC9541FT †		
										74VHCT9541AFT †			
	Flip-Flop	Octal		20	74VHC245FT †		74VHCT245AFT †		74VHCV245FT †				
			Dual	14	74VHC74FT †								
Hex			16	74VHC174FT †									
Octal			20	74VHC273FT †						74VHC9273FT †			
										74VHCT9273FT †			
		3-state	Octal	20	74VHC374FT †				74VHCV374FT †				
Latch	3-state	Octal	20	74VHC574FT †		74VHCT574AFT †		74VHCV574FT †					
			20	74VHC373FT †				74VHCV373FT †					
Multi-vibrator		Dual	20	74VHC573FT †		74VHCT573AFT †		74VHCV573FT †					
			16	74VHC123AFT †									
Decoder	3 to 8 line	Single	16	74VHC123AFT †									
			16	74VHC221AFT †									
	2 to 4 line	Dual	16	74VHC138FT †		74VHCT138AFT †							
			16	74VHC238FT †									
Shift Register	8bit	S-in/P-out	16	74VHC139FT †									
			14	74VHC164FT †									
		S-in/P-out, P-in/S-out	16	74VHC165FT †						74VHC9164FT †			
			16	74VHC595FT †						74VHC9595FT †			
		3-state	16	74VHC165FT †									
Counter	Binary	Single 4bit with	Async. Clear	16	74VHC161FT †								
			Sync. Clear	16	74VHC163FT †								
		Dual	4bit	14	74VHC393FT †								
		Single	14-stage	16	74VHC4020FT †								
			12-stage	16	74VHC4040FT †								
Multi-plexer	Digital	Dual-4ch.	16	74VHC153FT †									
		Quad-2ch.	16	74VHC157FT †									
	Analog	Single-8ch.	16	74VHC4051AFT †									
		Dual-4ch.	16	74VHC4052AFT †									
		Triple-2ch.	16	74VHC4053AFT †									
			16	74VHC4066AFT †									
Other	Analog switch	Quad	14	74VHC4066AFT †									

Standard Logic 74HC Series, 74LCX Series (TSSOP14B/16B/20B Package Products)

Package Dimensions (unit: mm)

TSSOP14B	TSSOP16B	TSSOP20B	Features
			- Compliant with the reliability requirements of AEC-Q100 Operating temperature: Available -40 to 125°C products (‡ Operation temperature of this device is -40 to 85°C.) - Compatible standard TSSOP package
5.0x6.4	5.0x6.4	6.5x6.4	

Series name				HC	HCT (TTL Input)	LCX
Characteristics and Features		Supply voltage range		2.0 to 6.0V	4.5 to 5.5V	1.65V to 3.6V to 5.5V (05 and 07)
		Output current @V _{CC} =4.5V (3.0V)		±4 or ±6mA		
		Power down protection on inputs		No		
		Power down protection on outputs		No		
		Function	Pin	-	-	-
Gate/ Buffer	NAND	Quad	14			74LCX00FT †
	AND	Quad	14			74LCX08FT †
	NOR	Quad	14			74LCX02FT †
	OR	Quad	14			74LCX32FT †
	Exclusive-OR	Quad	14			74LCX86FT †
	Inverter	Hex	14			74LCX04FT †
			16	TC74HC4049AFT &		
			14	TC74HCU04AFT &		
			14			74LCX05FT †
			14			74LCX14FT †
	Buffer	Hex	16	TC74HC4050AFT &		
			14			74LCX07FT †
	3-state Buffer	Quad	14			74LCX125FT †
			14			74LCX126FT †
		Octal	Inverted	20		74LCX240FT ‡
				20		74LCX540FT ‡
				20		74LCX244FT ‡
	Transceiver	Octal	20			74LCX541FT ‡
			20			74LCX245FT ‡
Flip-Flop		Dual	14			74LCX74FT †
		Octal	20			74LCX273FT †
	3-state	Octal	20			74LCX374FT ‡
			20			74LCX574FT ‡
Latch	3-state	Octal	20			74LCX373FT ‡
			20			74LCX573FT ‡
Multivi- brator		Dual	Retriggerable/ Resettable	16	74HC4538FT ☆	
Decoder	3 to 8 line	Single		16		74LCX138FT †
Multi- plexer	Digital	Quad-2ch.		16		74LCX157FT †
			3-state	16		74LCX257FT †
	Analog	Single-8ch.		16	74HC4051FT ☆	74HCT4051FT ☆
		Dual-4ch.		16	74HC4052FT ☆	74HCT4052FT ☆
		Triple-2ch.		16	74HC4053FT ☆	74HCT4053FT ☆
Other	Analog switch	Quad		14	74HC4066FT ☆	

☆ New Products

†‡ This device is compliant with the reliability requirements of AEC-Q100

‡ Operation temperature is -40 to 85°C

& The package for this product is TSSOP14/16.

■ Standard Logic 74VHC Series (US14/16/20 Package Products)

Package Dimensions (unit: mm)

US14	US16	US20	Features
			• Small mounting area and thin package
4.0x4.0	4.0x4.0	5.0x4.0	

Series name				VHC		VHCT (TTL Input)		VHCV (Schmitt Input)		VHC9 (Schmitt Input)			
Characteristics and Features		Supply voltage range		2.0 to 5.5V		4.5 to 5.5V		1.8 to 5.5V		2.0 to 5.5V 4.5 to 5.5V (VHCT9)			
		Output current @V _{cc} =4.5V		±8mA				±16mA		±8mA			
		Power down protection on inputs				Yes							
		Power down protection on outputs				No		Yes					
Function				Pin		-		-		Yes			
Gate/ Buffer	NAND	Quad		14	TC74VHC00FK	TC74VHCT00AFK							
			Open-drain Schmitt	14	TC74VHC03FK								
		Dual	4-input	14	TC74VHC132FK								
		AND	Quad		14	TC74VHC20FK							
	Dual			4-input	14	TC74VHC08FK	TC74VHCT08AFK						
	NOR	Quad		14	TC74VHC21FK								
			Dual	4-input	14	TC74VHC02FK							
	OR	Quad		14	TC74VHC02FK								
			Dual	4-input	14	TC74VHC27FK							
	Exclusive-OR Inverter	Quad		14	TC74VHC32FK	TC74VHCT32AFK							
			Hex	14	TC74VHC86FK								
				14	TC74VHC04FK	TC74VHCT04AFK							
			Open-drain Schmitt	14	TC74VHC05FK			TC74VHCV05FK					
	Buffer	9-bit		14	TC74VHC14FK	TC74VHCT14AFK		TC74VHCV14FK					
				20					TC74VHC9152FK				
		Hex		14					TC74VHCV17FK				
			Open-drain	14					TC74VHCV07FK				
	3-state Buffer	Quad		20							TC74VHC9151FK		
				14	TC74VHC125FK	TC74VHCT125AFK							
		5-Bit Universal Schmitt Buffer		14	TC74VHC126FK	TC74VHCT126AFK							
				14							TC74VHC9125FK TC74VHCT9125AFK TC74VHC9126FK TC74VHCT9126AFK		
		Octal	Inverted	20	TC74VHC240FK	TC74VHCT240AFK		TC74VHCV240FK					
				20	TC74VHC540FK	TC74VHCT540AFK		TC74VHCV540FK					
				20	TC74VHC244FK	TC74VHCT244AFK		TC74VHCV244FK					
				20	TC74VHC541FK	TC74VHCT541AFK		TC74VHCV541FK					
		Transceiver	Octal		20							TC74VHC9541FK TC74VHCT9541AFK	
					20	TC74VHC245FK	TC74VHCT245AFK		TC74VHCV245FK				
		Flip-Flop		Dual		14	TC74VHC74FK						
				Hex		16	TC74VHC174FK						
	Octal				20	TC74VHC273FK					TC74VHC9273FK TC74VHCT9273FK		
	3-state		Octal		20	TC74VHC374FK			TC74VHCV374FK				
	Latch	3-state	Octal		20	TC74VHC574FK	TC74VHCT574AFK		TC74VHCV574FK				
				20	TC74VHC373FK			TC74VHCV373FK					
				20	TC74VHC573FK	TC74VHCT573AFK		TC74VHCV573FK					
Multi-vibrator		Dual		16	TC74VHC123AFK								
				16	TC74VHC221AFK								
				16	TC74VHC138FK	TC74VHCT138AFK							
Decoder	3 to 8 line	Single		16	TC74VHC238FK								
				16	TC74VHC139FK								
				16	TC74VHC164FK								
Shift Register	2 to 4 line 8bit	Dual		16	TC74VHC139FK								
		S-in/P-out		14	TC74VHC164FK								
		S-in/P-out,P-in/S-out		16	TC74VHC165FK					TC74VHC9164FK			
		P-in/S-out		16	TC74VHC595FK					TC74VHC9595FK			
Counter	Binary	Single 4bit with	Async. Clear		16	TC74VHC161FK							
			Sync. Clear		16	TC74VHC163FK							
		Dual	4bit		14	TC74VHC393FK							
		Single	14-stage		16	TC74VHC4020FK							
			12-stage		16	TC74VHC4040FK							
		Multi-plexer	Digital	Dual-4ch.		16	TC74VHC153FK						
Quad-2ch.				16	TC74VHC157FK								
Analog	Single-8ch.			16	TC74VHC4051AFK								
			Dual-4ch.		16	TC74VHC4052AFK							
	Triple-2ch.			16	TC74VHC4053AFK								
				14	TC74VHC4066AFK								
Other	Analog switch	Quad		14	TC74VHC4066AFK								

Standard Logic 74LCX Series, 74VCX Series (US14/16/20 Package Products)

Package Dimensions (unit: mm)

US14		US16		US20		Features	
						• Small mounting area and thin package	
4.0x4.0		4.0x4.0		5.0x4.0			

Series name				LCX		VCX			
Characteristics and Features		Supply voltage range		1.65V to 3.6V to 5.5V (05 and 07)		1.2V to 3.6V			
		Output current @V _{CC} =3.0V		±24mA		±24mA			
		Power down protection on inputs		Yes		Yes			
		Power down protection on outputs		Yes		Yes			
Function			Pin						
Gate/ Buffer	NAND	Quad		14	TC74LCX00FK	TC74VCX00FK			
	AND	Quad		14	TC74LCX08FK	TC74VCX08FK			
	NOR	Quad		14	TC74LCX02FK	TC74VCX02FK			
	OR	Quad		14	TC74LCX32FK	TC74VCX32FK			
	Exclusive-OR	Quad		14	TC74LCX86FK				
	Inverter	Hex		14	TC74LCX04FK	TC74VCX04FK			
			Open-drain	14	TC74LCX05FK				
			Schmitt	14	TC74LCX14FK	TC74VCX14FK			
	Buffer	Hex	Open-drain	14	TC74LCX07FK				
	3-state Buffer	Quad		14	TC74LCX125FK	TC74VCX125FK			
				14	TC74LCX126FK				
			Serial register	14		TC74VCX125FK			
		Octal	Inverted	20	TC74LCX240FK				
				20	TC74LCX540FK				
				20	TC74LCX244FK	TC74VCX244FK			
				20	TC74LCX541FK	TC74VCX541FK			
				Serial register	20		TC74VCX2244FK		
					20		TC74VCX2541FK		
	Transceiver	Octal		20	TC74LCX245FK	TC74VCX245FK			
Flip-Flop		Dual	14	TC74LCX74FK					
		Octal	20	TC74LCX273FK					
	3-state	Octal	20	TC74LCX374FK					
			20	TC74LCX574FK	TC74VCX574FK				
			Serial register	20		TC74VCX2574FK			
Latch	3-state	Octal	20	TC74LCX373FK					
			20	TC74LCX573FK					
Decoder	3 to 8 line	Single		16	TC74LCX138FK	TC74VCX138FK			
Multi- plexer	Digital	Quad-2ch.		16	TC74LCX157FK	TC74VCX157FK			
			3-state	16	TC74LCX257FK	TC74VCX257FK			

① MOSFETs

② Tr./BRTs

③ Diodes

④ Power Management ICs

⑤ Linear ICs

⑥ Sensors

⑦ Logic Devices

⑧ RF Devices

⑨ Packages

■ Standard Logic 74HC Series, TC4000B Series (SOIC14/16/20, SOP14/16/20 Package Products)

Package Dimensions (unit: mm)

SOIC14	SOIC16	SOIC20	SOP14	SOP16	SOP20
					
8.65x6.0	9.9x6.0	12.8x10.3	10.3x7.8	10.3x7.8	12.8x7.8

Series name				SOIC Package		SOP Package		Standard series			
				HC	HCT (TTL Input)	HC	HCT (TTL Input)				
Characteristics and Features	Supply voltage range			2.0 to 6.0V	4.5 to 5.5V	2.0 to 6.0V	4.5 to 5.5V	3V to 18V			
	Output current @V _{CC} =4.5V			±4 or ±6mA	±4 or ±6mA	±4 or ±6mA	±4 or ±6mA	±0.51mA (@V _{CC} =5V)			
	Power down protection on inputs			No		No		No			
	Power down protection on outputs			No		No		No			
Function				Pin	-	-	-	-			
Gate/ Buffer	NAND	Quad		14	74HC00D †		TC74HC00AF		TC4011BF		
			Open-drain	14	74HC03D †						
			Schmitt	14	74HC132D †		TC74HC132AF			TC4093BF	
		Dual	4-input		14			TC74HC20AF		TC4081BF	
					14	74HC08D †		TC74HC08AF			
					14	74HC21D †		TC74HC21AF			
		NOR	Quad	4-input		14	74HC02D †		TC74HC02AF	TC4001BF	
						14	74HC32D †		TC74HC32AF	TC4071BF	
		OR	Quad			14	74HC86D †			TC4030BF	
						14	74HC04D †	74HCT04D †	TC74HC04AF	TC74HCT04AF	TC4069UBF
		Exclusive-OR Inverter	Hex			16	74HC4049D †		TC74HC4049AF		TC4049BF
						14	74HCU04D †		TC74HCU04AF		
	Unbuffer				14	74HC05D †		TC74HC05AF			
	Open-drain				14	74HC14D †	74HCT14D †	TC74HC14AF		TC4584BF	
	Buffer	Hex			16	74HC4050D †		TC74HC4050AF		TC4050BF	
								TC74HC07AF			
				Open-drain	14			TC74HC125AF			
					14	74HC126D †		TC74HC126AF			
		3-state Buffer	Quad			14			TC74HC125AF		
						14	74HC125D †		TC74HC126AF		
						14	74HC126D †		TC74HC365AF		
						14			TC74HC366AF		
			Hex	Universal		14				TC74HCT700TAF	
						14			TC74HCT240AF	TC74HCT240AF	
						20	74HC240D †	74HCT240D †	TC74HC240AF	TC74HCT240AF	
						20	74HC540D †	74HCT540D †	TC74HC540AF	TC74HCT540AF	
	Transceiver	Octal	Inverted		20			TC74HC7240AF			
					20	74HC244D †	74HCT244D †	TC74HC244AF	TC74HCT244AF		
					20			TC74HC7244AF			
					20	74HC541D	74HCT541D	TC74HC541AF	TC74HCT541AF		
		Octal			20			TC74HC640AF			
					20	74HC245D †	74HCT245D †	TC74HC245AF			
				14	74HC74D †		TC74HC74AF		TC4013BF		
				16	74HC175D †		TC74HC175AF				
3-state	Octal			20	74HC273D †		TC74HC273AF				
				20	74HC374D †		TC74HC374AF				
8-Bit Addressable Latch	3-state	Octal		20	74HC574D †		TC74HC574AF				
				16	74HC259D †						
Multi-vibrator	Dual Monostable			20	74HC373D †		TC74HC373AF				
				20	74HC573D †		TC74HC573AF				
Decoder	3 to 8 line	Single		16			TC74HC4538AF	TC4538BF			
				16	74HC42AF		TC74HC138AF				
Shift Register	3 to 8 line / Latch	BCD-to-Seven Segment Latch/Decoder/Driver		16				TC4511BF			
				16	74HC237D †						
Counter	8bit	S-in/P-out		14	74HC164D †			TC4021BF			
				16	74HC165D †		TC74HC165AF				
Multi-plexer	Digital	P-in/S-out		16	74HC166D †						
				16	74HC594D †						
Other	Analog	Latch (3-state)		16	74HC595D †		TC74HC595AF				
				16							
Counter	Binary	8-Stage Shift-and-Store		16				TC4094BF			
				14	74HC393D †						
Multi-plexer	Digital	Dual	4bit	16			TC74HC4020AF	TC4020BF			
			Single	14-stage	16		TC74HC4040AF	TC4040BF			
Other	Analog	Single 14-Stage/Oscillator	12-stage	16			TC74HC4060AF				
			Single Decade Counter/Divider	16				TC4017BF			
Multi-plexer	Digital	Dual Binary Up Counter		16				TC4520BF			
			Programmable Divider/Timer	16			TC74HC7292AF				
Other	Analog	Single-8ch.		16	74HC151D †		TC74HC151AF				
			Single-8ch. 13-state	16			TC74HC251AF				
Multi-plexer	Digital	Dual-4ch.	3-state		16	74HC153D †		TC74HC153AF			
					16			TC74HC253AF			
Other	Analog	Quad-2ch.		16	74HC157D †		TC74HC157AF				
			Single-8ch.	16	74HC4051D †	74HCT4051D †	TC74HC4051AF				
Other	Analog	Dual-4ch.		16	74HC4052D †		TC74HC4052AF	TC4052BF			
			Triple-2ch.	16	74HC4053D †	74HCT4053D †	TC74HC4053AF	TC4053BF			
Other	Analog switch	Quad		14	74HC4066D †		TC74HC4066AF	TC4066BF			
				14							

† Operating temperature: T_{opr} = -40 to 125°C

Standard Logic TC74VCX Series, TC74LCX Series (TSSOP14/16/20/48 Package Products)

Package Dimensions (unit: mm)

TSSOP14	TSSOP16	TSSOP20	TSSOP48
			
5.4x6.4	5.4x6.4	6.9x6.4	12.8x8.1

Series name				TSSOP Package	
				TC74VCX	TC74LCX
Characteristics and Features				Supply voltage range	1.2 to 3.6V
				Output current @V _{CC} =3.0V	1.65 to 3.6V
				±24mA	±24mA
				Power down protection on inputs	Yes
				Power down protection on outputs	Yes
Function				Pin	
Gate/ Buffer	NAND	Quad	14	TC74VCX00FT †	
	AND	Quad	14	TC74VCX08FT †	
	NOR	Quad	14	TC74VCX02FT †	
	OR	Quad	14	TC74VCX32FT †	
	Inverter	Hex	14	TC74VCX04FT †	
			Schmitt 14	TC74VCX14FT †	
	3-state Buffer	Quad	14	TC74VCX125FT †	
			Serial register 14	TC74VCX2125FT †	
		Octal	20	TC74VCX244FT †	
			20	TC74VCX541FT †	
			Serial register 20	TC74VCX2244FT †	Yes
			20	TC74VCX2541FT †	
		16bit	48		TC74LCX16244 †
	Transceiver	Octal	20	TC74VCX245FT †	
			16bit 48	TC74VCX16245 †	TC74LCX16245 †
		16bit	48	TC74VCXH16245 †	
			Serial register 48	TC74VCXR162245 †	
			48	T74VCXHR162245 †	
		Bus hold + Serial register	48		
Flip-Flop	3-state	Octal	14	TC74VCX574FT †	
			Serial register 20	TC74VCX2574FT †	
Decoder	3 to 8 line	Single	16	TC74VCX138FT †	
Multi- plexer	Digital	Quad-2ch.	16	TC74VCX157FT †	
		3-state	16	TC74VCX257FT †	

† Operating temperature: T_{opr} = -40 to 125°C

7-3 Bus Switches

■ High-Speed Transmission Type

Package Dimensions (unit: mm)

High-Speed Transmission Type

WCSP20	TQFN20
Bottom View  1.6x2.0	Bottom View  4.5x2.5

Recommended application	Interface Speed	Part Number	Package	Number of lane	Specification			Pin Assignment	Switch function
					Supply Voltage Range	Band width @-3dB (typ.)	Quiescent Supply Current (max)		
USB3.1 PCIe-Gen3	to 10Gbps	TC7PCI3212MT	TQFN20	1 lane	3.0 to 3.6V	11.5 GHz @V _{cc} =3.3V	500 μ A @V _{cc} =3.6V		SPDT
		TC7PCI3215MT							
USB3.0 PCIe-Gen2 DP1.2 SATA3.0, SAS2.0	to 6Gbps	TC7USB3212WBG	WCSP20	1 lane	1.65 to 1.95V	8 GHz @V _{cc} =1.8V	200 μ A @V _{cc} =1.95V		

for USB2.0 and others

UQFN10B	TSSOP14
Bottom View  1.8x1.4	 5.0x6.4

Recommended application	Interface Speed	Part Number	Package	Number of circuit	Specification			Pin Assignment	Switch function				
					Supply Voltage Range	Band width @-3dB (typ.)	Quiescent Supply Current (max)						
USB2.0 PCIe-Gen1 HDMI1.4 SATA2.0 SAS1.0	to 3.4Gbps	TC7USB40MU	UQFN10B	2	2.3 to 4.3V	1.5 GHz @V _{cc} =3.3V	1 μA @V _{cc} =4.3V		SPDT				
		TC7USB42MU											
		TC7USB40FT	TSSOP14										
		TC7USB42FT											

General Purpose Bus Switches

Package Dimensions (unit: mm)

USV (SOT-353)	MP6D	US6 (SOT-363)	US8 (SOT-765)	US14	US16	US20	TSSOP14	TSSOP16	TSSOP20
	Bottom View 								
2.0x2.1	1.45x1.0	2.0x2.1	2.0x3.1	4.0x4.0	4.0x4.0	5.0x4.0	5.0x6.4	5.0x6.4	6.5x6.4

5V Bus Switch

Switch function	Part Number	Package	Number of circuit	Switch type	Specification			
					Supply Voltage Range	Switch I/O Capacitance @ Switch OFF (typ.)	Switch ON Resistance @V _{cc} =4.5V, V _{is} =0V (typ.)	Quiescent Supply Current (max)
SPST	TC7SB66CFU †	USV	1	Pch+Nch	1.65 to 5.5V	5 pF @V _{cc} =5V	4 Ω @I _{is} =30mA	10 μA @V _{cc} =5.5V
	TC7SB67CFU †							
	TC7WB66CFK †	US8	2					
	TC7WB67CFK †							
SPDT	TC7SB3157CFU †	US6	1	Pch+Nch	1.65 to 5.5V	5 pF @V _{cc} =5V	4 Ω @I _{is} =30mA	10 μA @V _{cc} =5.5V
	TC7SB3157DL6X	MP6D						

Low-Voltage Bus Switch

Switch function	Part Number	Package	Number of circuit	Switch type	Specification			
					Supply Voltage Range	Switch I/O Capacitance	Switch ON Resistance @V _{cc} =3V, V _{is} =0V (typ.)	Quiescent Supply Current
SPST	TC7SBL66CFU ‡	USV	1	Pch+Nch	1.65 to 3.6V	3.5 pF @V _{cc} =3V	5.5 Ω @I _{is} =30mA	10 μA @V _{cc} =3.6V
	TC7SBL384CFU ‡							
	TC7WBL3305CFK ‡	US8	2				6 Ω @I _{is} =30mA	
	TC7WBL3306CFK ‡							
	TC7MBL3125CFK	US14	4				6.5 Ω @I _{is} =30mA	
	TC7MBL3125CFT †	TSSOP14						
	TC7MBL3126CFK	US14						
	TC7MBL3126CFT †	TSSOP14						
	TC7MBL3245CFK	US20	8					
TC7MBL3245CFT †	TSSOP20							
SPDT	TC7MBL3257CFK	US16	4	Pch+Nch	1.65 to 3.6V	5 pF @V _{cc} =3V, A-port	8.5 Ω @I _{is} =30mA	10 μA @V _{cc} =3.6V
	TC7MBL3257CFT †	TSSOP16						
SP4T	TC7MBL3253CFK	US16	2	Pch+Nch	1.65 to 3.6V	9 pF @V _{cc} =3V, A-port	9 Ω @I _{is} =30mA	10 μA @V _{cc} =3.6V
	TC7MBL3253CFT †	TSSOP16						

† This device is compliant with the reliability requirements of AEC-Q100 (Operating temperature: T_{opr} = -40 to 125°C)

‡ Operation temperature is -40 to 125°C

7-4 Level Shifters

Package Dimensions (unit: mm)

MP6C	UF6 (SOT-363F)	USV (SOT-353)	US8 (SOT-765)	US16	TSSOP16	TSSOP20	TSSOP48
Bottom View							
1.45x1.0	2.0x2.1	2.0x2.1	2.0x3.1	4.0x4.0	5.0x6.4	6.5x6.4	12.8x8.1

Bus Buffer Type

Direction	Part Number	Package	Bit Count	Control Input	Function					
					Supply Voltage Range		Gate or Buffer	Sleep Mode	Low Noise	Series Resistor
					V _{CCA} (V)	V _{CCB} (V)				
Bidirectional	TC7MP3125FK	US16	4	Active-Low(A side)	1.1 to 2.7	1.65 to 3.6	3-State Buffer	✓		
	TC7MP3125FT †	TSSOP16						✓		
	TC7MPN3125FK	US16						✓	✓	
	TC7MPN3125FT †	TSSOP16						✓	✓	
	TC74VCX163245 ‡	TSSOP48	16	Active-Low(B side)	2.3 to 3.6	1.65 to 2.7				
	TC74VCX164245 ‡				1.65 to 2.7	2.3 to 3.6				
	TC74LCX163245 ‡				4.5 to 5.5	2.3 to 3.6				✓
	TC74LCX164245 ‡				2.3 to 3.6	4.5 to 5.5				
	TC74LCXR163245 ‡									
	TC74LCXR164245 ‡									
Unidirectional	TC7SPN334L6X	MP6C	1	None	1.1 to 2.7	1.65 to 3.6	Buffer	✓	✓	
	TC7SP3125TU	UF6		Active-Low(A side)			3-State Buffer	✓		
	TC7SPN3125TU			✓				✓		
	TC7WP3125FK ☆ ‡	US8	2	Active-Low(A side)			✓	✓		
	TC7WPN3125FK ☆ ‡						✓	✓		
	74LV4T125FT ☆ †	TSSOP16	4	Active-Low	1.65 to 5.5	(Single Supply)	3-State Buffer			
	74LV4T125FK ☆ ‡	US16								
	74LV4T126FT ☆ †	TSSOP16		Active-High						
	74LV4T126FK ☆ ‡	US16								
	7UL1T00FU ☆	USV	1	None	2.3 to 3.6	(Single Supply)	NAND			
	7UL1T02FU ☆						NOR			
	7UL1T04FU ☆						Inverter			
	7UL1T08FU ☆						AND			
	7UL1T32FU ☆						OR			
7UL1T34FU ☆	Buffer									
7UL1T86FU ☆	Exclusive-OR									
7UL1T125FU ☆	3-State Buffer									
7UL1T126FU ☆										
7UL2T125FK ☆										
7UL2T126FK ☆	US8	2	Active-Low							
			Active-High							

☆ New Products
† This device is compliant with the reliability requirements of AEC-Q100 (Operating temperature: T_{opr} = -40 to 125°C)
‡ Operation temperature is -40 to 125°C

UF6 (SOT-363F)	US8 (SOT-765)	US14	US20	TSSOP14	TSSOP20
					
2.0x2.1	2.0x3.1	4.0x4.0	5.0x4.0	5.0x6.4	6.5x6.4

Bus Switch Type

Switch function	Part Number	Package	Bit Count	Control Input	Specification			
					Supply Voltage Range		Switch I/O Capacitance @ Switch OFF (typ.)	Switch ON Resistance @V _{CCA} =3 V, V _{CCB} =4.5 V, V _{IS} =0 V (max)
					V _{CCA} (V)	V _{CCB} (V)		
SPST	TC7SPB9306TU	UF6	1	Active-High(A side)	1.65 to 5.0	2.3 to 5.5	7 pF @V _{CCA/B} =3.3 V	8 mΩ @I _{IS} =30 mA
	TC7SPB9307TU			Active-Low(A side)				
	TC7WPB9306FK †	US8	2	Active-High(A side)				
	TC7WPB9307FK †			Active-Low(A side)				
	TC7QPB9306FK	US14	4	Active-High(A side)				
	TC7QPB9306FT †	TSSOP14		Active-Low(A side)				
	TC7QPB9307FK	US14						
	TC7QPB9307FT †	TSSOP14						
SPDT	TC7MPB9307FK	US20	8	Active-Low(A side)	1.65 to 5.0	2.3 to 5.5	7 pF @V _{CCA/B} =3.3 V	8 mΩ @I _{IS} =30 mA
	TC7MPB9307FT †	TSSOP20						
	TC7MPB9326FK	US14	2	Active-High(A side)				
	TC7MPB9326FT †	TSSOP14		Active-Low(A side)				
TC7MPB9327FK	US14							
	TC7MPB9327FT †	TSSOP14						

† This device is compliant with the reliability requirements of AEC-Q100 (Operating temperature: T_{opr} = -40 to 125°C)

7-5 Part Naming Conventions

Standard Logic

74VHC T 244 A FT

Package suffix

FT: TSSOP, FK: US (VSSOP), F: SOP, D: SOIC, No letter: TSSOP48

Revision code or standardized product

Standardized product function number

Circuit configuration or performance class

ex.) T: TTL-level input, U: Unbuffered

TOSHIBA CMOS family (group) name

TC: Standard CMOS logic

TC74HC, 74HC: High-speed CMOS logic

TC74VHC, 74VHC: Very-high-speed CMOS logic

TC74LCX, 74LCX: Low-voltage CMOS logic

TC74VCX, T74VCX: Low-voltage CMOS logic

One-Gate Logic

TC7SZ 00 FS

Package suffix

FS: fSV, FE: ESV/ES6, FU: USV/US6/SM8, FK: US8, F: SMV

Revision code or standardized product

Standardized product function number

TOSHIBA L-MOS (One-gate Logic) family (group) name

TC7SH, TC7WH: VHS Series

TC7SET: VHS series (TTL input level)

TC7SZ, TC7WZ: SHS series

7UL 1 G 00 FS

Package suffix

FS: fSV, FU: USV, FK: US8

Revision code or standardized product

Standardized product function number

Product Sub family (group) name

G: LVP series

T: LVP series (with signal level translation)

Number of gate

1: Single, 2: Dual, 3: Triple

TOSHIBA L-MOS (One-gate Logic) family (group) name

7UL: Ultra Low voltage Series

8. Radio-Frequency Devices

RF Diodes

Package Dimensions (unit: mm)

ESC (SOD-523)	USC (SOD-323)
	
1.6x0.8	2.5x1.25

Variable Capacitance Diodes

Application	Part Number	Structure	Package	Absolute Maximum Ratings	Electrical Characteristics(Ta=25°C)						
					V _R (V)	C _T upper (pF)	@V _R (V)	C _T lower (pF)	@V _R (V)	C _T upper/ C _T lower	r _s typ. (Ω)
VCO	1SV285	Single	ESC	10	4.5	1	2	4	2.3	0.42	1
	1SV277	Single	USC	10	4.5	1	2	4	2.3	0.42	1
	1SV311	Single	ESC	10	9.7 to 11.1	1	4.45 to 5.45	4	2.1	0.28	1
	1SV310	Single	USC	10	9.7 to 11.1	1	4.45 to 5.45	4	2.1	0.28	1
	1SV281	Single	ESC	10	16	1	8	4	2.0	0.28	1
	1SV270	Single	USC	10	16	1	8	4	2.0	0.28	1
	1SV305	Single	ESC	10	18.3	1	6.1	4	3.0	0.27	1
	1SV304	Single	USC	10	18.3	1	6.1	4	3.0	0.27	1
	1SV323	Single	ESC	10	26.5 to 29.5	1	6 to 7.1	4	4.3	0.4	4
	1SV322	Single	USC	10	26.5 to 29.5	1	6 to 7.1	4	4.3	0.4	4
	1SV325	Single	ESC	10	44 to 49.5	1	9.2 to 12	4	4.3	0.4	4
	1SV324	Single	USC	10	44 to 49.5	1	9.2 to 12	4	4.3	0.4	4
	JDV2S36E	Single	ESC	10	44 to 49.5	1	5.4 to 7.3	6	7.5	0.4	4
	1SV280	Single	ESC	15	3.8 to 4.7	2	1.5 to 2.0	10	2.4	0.44	1
	1SV239	Single	USC	15	4.25	2	1.75	10	2.4	0.44	1
	1SV279	Single	ESC	15	14 to 16	2	5.5 to 6.5	10	2.5	0.2	5
	1SV229	Single	USC	15	14 to 16	2	5.5 to 6.5	10	2.5	0.2	5

RF Diodes

Package Dimensions (unit: mm)

SL2 (SOD-962)	ESC (SOD-523)	USC (SOD-323)	VESM (SOT-723)	SSM (SOT-416)	USM (SOT-323)	S-Mini (SOT-346)
Bottom View						
						
0.62x0.32	1.6x0.8	2.5x1.25	1.2x1.2	1.6x1.6	2.0x2.1	2.9x2.5

Schottky Barrier Diodes

Feature	Part Number	Structure	Package	Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)					
				V _R (V)	I _F (mA)	V _F typ. (V)	@I _F (mA)	I _R max (μA)	@V _R (V)	C _T typ. (pF)	@V _R (V)
Low VF	JDH2S02SL	Single	SL2	10	10	0.24	1	25	0.5	0.25	0.2
Standard	1SS315	Single	USC	5	30	0.25	2	25	0.5	0.6	0.2
	1SS154	Single	S-Mini	6	30	0.5	10	0.5	5	0.8	0
	JDH3D01FV	Series	VESM	4	25	0.25	2	25	0.5	0.6	0.2
	JDH3D01S	Series	SSM	4	25	0.25	2	25	0.5	0.6	0.2
	1SS295	Series	S-Mini	4	30	0.25	2	25	0.5	0.6	0.2
	1SS271	Series	S-Mini	6	30	0.5	10	0.5	5	0.8	0

Switching Diodes

Feature	Part Number	Structure	Package	Absolute Maximum Ratings		Electrical Characteristics (Ta=25°C)					
				V _R (V)	I _F (mA)	V _F typ. (V)	@I _F (mA)	C _T typ. (pF)	@V _R (V)	r _s typ. (Ω)	@I _F (mA)
Standard PIN diode	1SV308	Single	ESC	30	50	0.95	50	0.3	1	1	10
	1SV307	Single	USC	30	50	0.95	50	0.3	1	1	10
	JDP3C02AU	Cathode com.	USM	30	50	0.89	50	0.28	1	1	10
RF switching diode	1SS381	Single	ESC	30	100	0.85 (max)	2	0.7	6	0.6	2
	1SS314	Single	USC	30	100	0.85 (max)	2	0.7	6	0.5	2
	1SS364	Cathode com.	SSM	30	50	0.85 (max)	2	0.85	6	0.6	2
	1SS312	Cathode com.	USM	30	50	0.85 (max)	2	0.8	6	0.6	2
	1SS313	Anode com.	USM	30	50	0.85 (max)	2	0.8	6	0.6	2
	1SS268	Cathode com.	S-Mini	30	50	0.85 (max)	2	0.8	6	0.6	2
	1SS269	Anode com.	S-Mini	30	50	0.85 (max)	2	0.8	6	0.6	2

RF MOSFETs

Package Dimensions (unit: mm)

USQ (SOT-343)	PW-Mini	PW-X
		
2.0x2.1	4.6x4.2	6.1x6.3

Power MOSFETs

Application	Part Number	Package	Absolute Maximum Ratings			Electrical Characteristics(Ta=25°C)			
			V _{DS} (V)	I _D (A)	P _D (W)	P _D min (W)	Test Condition		
							V _{DS} (V)	f (MHz)	P _i (W)
UHF/VHF Professional radio Amateur radio	RFM08U9X	PW-X	36	5	20	7.5	9.6	520	0.5
	2SK3075	PW-X	30	5	20	7.5	9.6	520	0.5
	2SK3074	PW-Mini	30	1	3	0.63	9.6	520	0.02
	RFM12U7X	PW-X	20	4	20	11.5	7.2	520	1
	RFM07U7X	PW-X	16	3	20	7	7.2	520	0.5
	2SK3476	PW-X	20	3	20	7	7.2	520	0.5
	RFM01U7P	PW-Mini	20	1	3	1	7.2	520	0.1
	2SK3475	PW-Mini	20	1	3	0.63	7.2	520	0.02
	RFM06U3X	PW-X	16	5	20	5	3.6	520	0.5
FRS/GMRS	RFM04U6P	PW-Mini	16	2	7	3.5	6.0	470	0.2
	2SK3078	PW-Mini	10	0.5	3	0.5	4.8	915	0.03
	2SK3078A	PW-Mini	10	0.5	3	0.63	4.5	470	0.1
	2SK3756	PW-Mini	7.5	1	3	1.26	4.5	470	0.1
	RFM03U3P	PW-Mini	16	2.5	7	2.3	3.6	470	0.1

Small Signal MOSFETs

Application	Part Number	Package	Absolute Maximum Ratings		Electrical Characteristics(Ta=25°C)					
			V _{DS} (V)	I _D (mA)	G _{PS} typ. (dB)	NF typ. (dB)	Test Condition			
							V _{DS} (V)	I _D (mA)	V _{G2S} (V)	f (MHz)
VHF RF, MIX	3SK294	USQ	12.5	30	26	1.4	6	10	4.5	500
UHF RF, MIX	3SK293	USQ	12.5	30	22.5	1.5	6	10	4.5	800

RF Transistors

Package Dimensions (unit: mm)

SSM (SOT-416)	USM (SOT-323)	UFM (SOT-323F)	S-Mini (SOT-346)	PW-Mini	USQ (SOT-343)
					
1.6x1.6	2.0x2.1	2.0x2.1	2.9x2.5	4.6x4.2	2.0x2.1

Application	Part Number	Package	Absolute Maximum Ratings		Electrical Characteristics(Ta=25°C)										
					V _{CE0} (V)	I _C (mA)	f _r typ. (GHz)	Test Condition		S ₂₁ ² typ. (dB)	Test Condition			NF typ. (dB)	Test Condition
			V _{CE} (V)	I _C (mA)				V _{CC} (V)	I _C (mA)		f (GHz)	V _{CC} (V)	I _C (mA)		f (GHz)
FM band Amplifier	2SC2714	S-Mini	30	20	0.55	6	1	23	6	1	0.1	2.5	6	1	0.1
	2SC4215	USM	30	20	0.55	6	1	23	6	1	0.1	2.0	6	1	0.1
	2SC4915	SSM	30	20	0.55	6	1	23	6	1	0.1	2.3	6	1	0.1
LNA for GPS, Satellite radio and DAB Sys.	MT4S300U	USQ	4	50	26.5	3	20	16.9	3	20	2	0.55	3	10	2
	MT4S301U	USQ	4	35	27.5	3	15	18.1	3	15	2	0.57	3	7	2
LNA for TV tuner, Automotive TV tuner, FM tuner, DAB system and Low distortion application.	MT3S111TU	UFM	6	100	10	5	30	12.5	5	30	1	0.85	5	30	1
	MT3S111	S-Mini	6	100	11.5	5	30	12	5	30	1	0.9	5	30	1
	MT3S111P	PW-Mini	6	100	8	5	30	10.5	5	30	1	0.95	5	30	1
	MT3S113TU	UFM	5.3	100	11.2	5	50	12.5	5	50	1	1.15	5	50	1
	MT3S113	S-Mini	5.3	100	12.5	5	50	11.8	5	50	1	1.15	5	50	1
	MT3S113P	PW-Mini	5.3	100	7.7	5	50	10.5	5	50	1	1.15	5	50	1

Part Naming Conventions

Radio-Frequency Diode (EIAJ registration products)

Ex) 1 S 5 181

① ② ③ ④

- ① The value that subtracted 1 from the total number of terminals
- ② S stands for Semiconductor
- ③ The kind of diode

This section shows the kind of the diode being used.
(It is omitted in certain cases.)

S: diode of general-purpose use, detection use,
frequency conversion use, and switching use
V: variable capacitance diode, PIN diode
Z: zener diode

- ④ Serial number

Radio-Frequency Diode (EIAJ un-registration products)

Ex) JD V 2 S 36 E

① ② ③ ④ ⑤ ⑥

- ① JD means High-frequency diode

- ② The kind of devices

This section shows the kind of the devices being used.

It is classified into H, P, S, and V by the devices being loaded.

H: schottky barrier diode

P: PIN diode

S: band switching diode

V: variable capacitance diode

- ③ The number of terminals

- ④ Internal connection

This section shows the kind of the internal connection of a product.

S: single

C: cathode common

P: parallel

- ⑤ Serial number

- ⑥ Package type

(No mark)	S-MINI
U	USC, USQ
E	ESC
FS	FSC
CT	CST3
SL	SL2
FV	VESM

Radio-Frequency Transistor (Microwave transistor)

Ex) MT 3 S 111 TU

① ② ③ ④ ⑤

- ① Microwave transistor
- ② The number of terminals
- ③ Internal connection

This section shows the kind of the internal connection of a product.

S: Single

C: Cascade arrangement

P: Parallel arrangement

L: Lateral arrangement

- ④ Serial number

- ⑤ Package type

(No mark)	S-MINI
P	PW-Mini
U	USM, USQ, US6
S	SSM
TU	UFM
E	ES6
FS	FS6
CT	CST3

Radio-Frequency Power Transistor (EIAJ registration products)

Ex) 2 S C 2230 A

① ② ③ ④ ⑤

- ① The value that subtracted 1 from the total number of terminals

- ② S stands for Semiconductor

- ③ The kind of circuit

This section shows the kind of the circuit of a product.

It is classified into from A to K by the circuit being used.

A: a transistor of high-frequency and PNP structure

B: a transistor of low-frequency and PNP structure

C: a transistor of high-frequency and NPN structure

D: a transistor of low-frequency and NPN structure

J: a P-ch field effective transistor (FET)

K: an N-ch field effective transistor (FET)

- ④ Serial number

EIAJ registration numbers

- ⑤ Changes

The additional symbol which shows some changes.

Radio-Frequency Transistor (EIAJ registration products)

Ex) 2 S C 3547 B

① ② ③ ④ ⑤

- ① The value that subtracted 1 from the total number of terminals

- ② S stands for Semiconductor

- ③ The kind of circuit

This section shows the kind of the circuit of a product.

It is classified into form A to K by the circuit of a product.

A: a transistor of high-frequency and PNP structure

B: a transistor of low-frequency and PNP structure

C: a transistor of high-frequency and NPN structure

D: a transistor of low-frequency and NPN structure

J: a transistor of effective transistor (FET)

K: an Nch field effective transistor (FET)

- ④ Serial number

EIAJ registration numbers.

- ⑤ Changes

The additional symbol which shows some changes.

Radio-Frequency Power Transistor (RF-MOSFET)

Ex) RFM 07 U 7 X

① ② ③ ④ ⑤

- ① RF-MOSFET.

- ② This section shows the output power(W) of a product.

00: 0.1W

07: 7.0W

12: 11.5W

- ③ This section shows the operating frequency(MHz) of a product.

U: 400 to 520MHz

- ④ This section shows the operating voltage(V) of a product.

3: 3.6V

7: 7.2V

- ⑤ Package type

U: USQ

P: PW-MINI

X: PW-X

9. Device Packages

2 Pin packages

SL2 (SOD-962) (0.62x0.32)		CL2E (1.0x0.6)		SOD-923 (1.0x0.6)	
Package dimension	unit : mm	Package dimension	unit : mm	Package dimension	unit : mm
Land pattern example	unit : mm	Land pattern example	unit : mm	Land pattern example	unit : mm
fSC (SOD-923) (1.0x0.6)		CST2 (SOD-882) (1.0x0.6)		CST2B (1.2x0.8)	
Package dimension	unit : mm	Package dimension	unit : mm	Package dimension	unit : mm
Land pattern example	unit : mm	Land pattern example	unit : mm	Land pattern example	unit : mm
CST2C (SOD-963) (1.6x0.8)		ESC (SOD-523) (1.6x0.8)		USC (SOD-323) (2.5x1.25)	
Package dimension	unit : mm	Package dimension	unit : mm	Package dimension	unit : mm
Land pattern example	unit : mm	Land pattern example	unit : mm	Land pattern example	unit : mm

3 Pin packages

US2H (SOD-323HE) (2.5x1.4)	S-FLAT™ (1.6x3.5)	CST3C (0.8x0.6)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm
Land pattern example unit : mm 	Land pattern example unit : mm 	Land pattern example unit : mm
CST3 (SOT-883) (1.0x0.6)	CST3B (1.2x0.8)	VESM (SOT-723) (1.2x1.2)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm
Land pattern example unit : mm 	Land pattern example unit : mm 	Land pattern example unit : mm
SSM (SOT-416) (1.6x1.6)	USM (SOT-323) (2.0x2.1)	UFM (SOT-323F) (2.0x2.1)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm
Land pattern example unit : mm 	Land pattern example unit : mm 	Land pattern example unit : mm

3 Pin packages

S-Mini (SOT-346) (2.9x2.5)	SOT23 (SOT-23) (2.9x2.4)	SOT-23F (2.9x2.4)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm
Land pattern example unit : mm 	Land pattern example unit : mm 	Land pattern example unit : mm

4 Pin packages

PW-Mini (4.6x4.2)	WCSP4E (0.645x0.645)	WCSP4F (0.645x0.645)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm
Land pattern example unit : mm 	Land pattern example unit : mm 	Land pattern example unit : mm
WCSP4G (0.645x0.645)	WCSP4D (0.79x0.79)	WCSP4 (0.79x0.79)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm
Land pattern example unit : mm 	Land pattern example unit : mm 	Land pattern example unit : mm

SDFN4E (0.8x0.8)	WCSP4C (0.9x0.9)	DFN4E (1.0x1.0)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm

DFN4F (1.0x1.0)	DFN4A (1.2x1.2)	USQ (SOT-343) (2.0x2.1)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm

5 Pin packages

SMQ (SOT-24) (2.9x2.9)	PW-X (6.1x6.3)	DFN5B (1.2x1.2)
Package dimension unit : mm 	Package dimension unit : mm 	Package dimension unit : mm

5 Pin packages

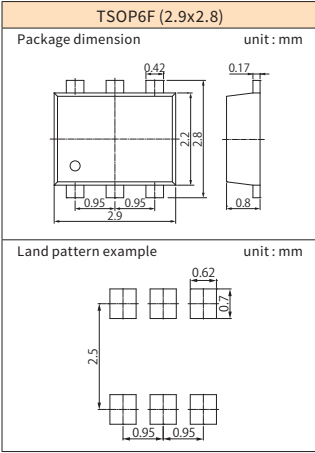
fSV (SOT-953) (1.0x1.0)	ESV (SOT-553) (1.6x1.6)	UFV (SOT-353F) (2.0x2.1)
Package dimension unit: mm 	Package dimension unit: mm 	Package dimension unit: mm
Land pattern example unit: mm 	Land pattern example unit: mm 	Land pattern example unit: mm

6 Pin packages

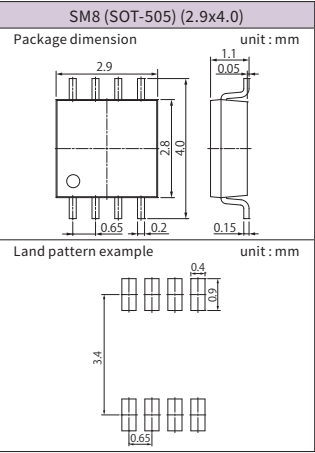
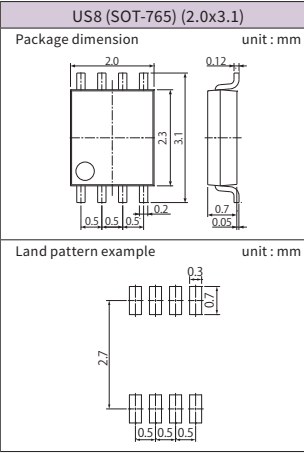
USV (SOT-353) (2.0x2.1)	SMV (SOT-25) (2.9x2.8)	WCSP6E (1.2x0.8)
Package dimension unit: mm 	Package dimension unit: mm 	Package dimension unit: mm
Land pattern example unit: mm 	Land pattern example unit: mm 	Land pattern example unit: mm
WCSP6F (1.2x0.8)	WCSP6G (1.2x0.8)	MP6C (1.45x1.0)
Package dimension unit: mm 	Package dimension unit: mm 	Package dimension unit: mm
Land pattern example unit: mm 	Land pattern example unit: mm 	Land pattern example unit: mm

MP6D (1.45x1.0) Package dimension unit : mm	WCSP6C (1.5x1.0) Package dimension unit : mm	UDFN6 (SOT-1118) (2.0x2.0) Package dimension unit : mm
Land pattern example unit : mm	Land pattern example unit : mm	Land pattern example unit : mm
UDFN6B (SOT-1220) (2.0x2.0) Package dimension unit : mm	TCSP6A (2.14x1.67) Package dimension unit : mm	ES6 (SOT-563) (1.6x1.6) Package dimension unit : mm
Land pattern example unit : mm	Land pattern example unit : mm	Land pattern example unit : mm
UF6 (SOT-363F) (2.0x2.1) Package dimension unit : mm	US6 (SOT-363) (2.0x2.1) Package dimension unit : mm	SM6 (SOT-26) (2.9x2.8) Package dimension unit : mm
Land pattern example unit : mm	Land pattern example unit : mm	Land pattern example unit : mm

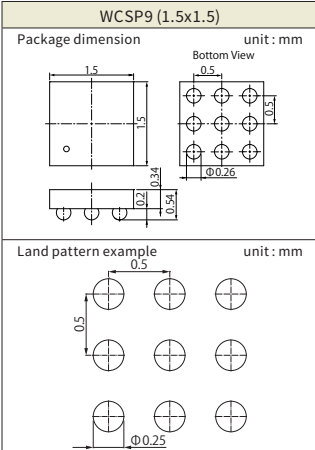
6 Pin packages



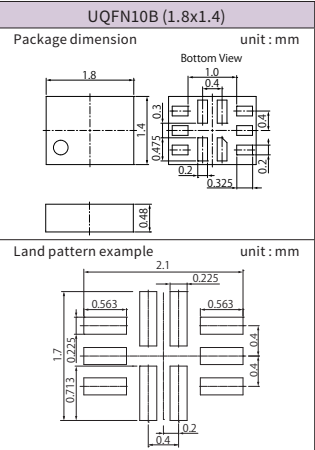
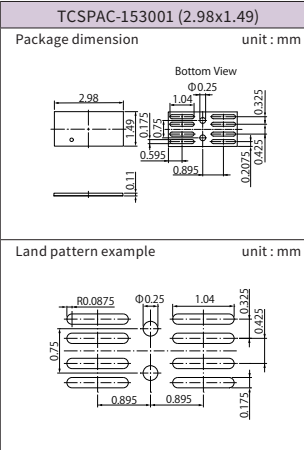
8 Pin packages



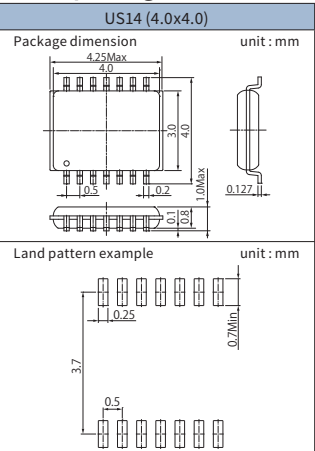
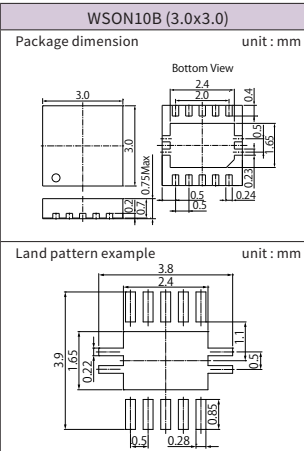
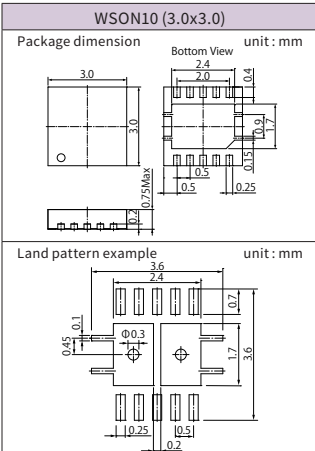
9 Pin packages



10 Pin packages



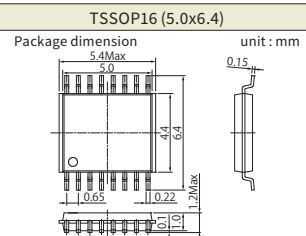
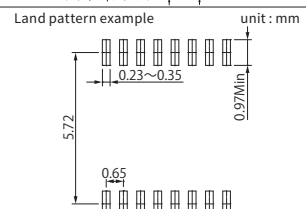
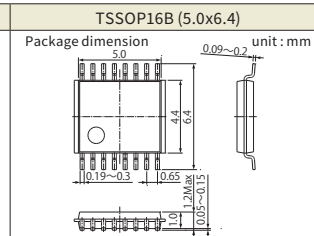
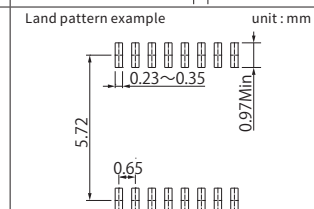
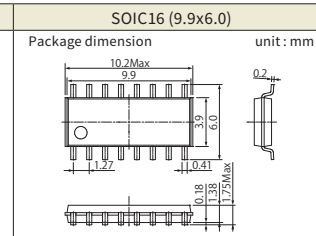
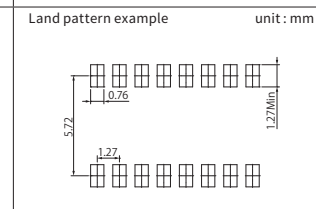
14 Pin packages



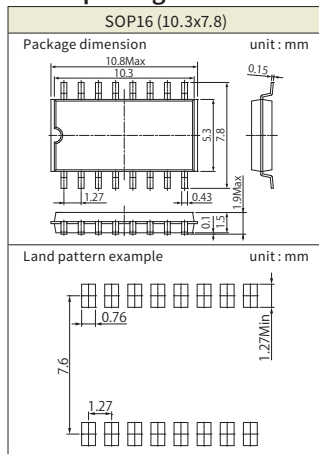
TSSOP14 (5.0x6.4)	TSSOP14B (5.0x6.4)	SOIC14 (8.65x6.0)
Package dimension unit: mm	Package dimension unit: mm	Package dimension unit: mm
Land pattern example unit: mm	Land pattern example unit: mm	Land pattern example unit: mm

16 Pin packages

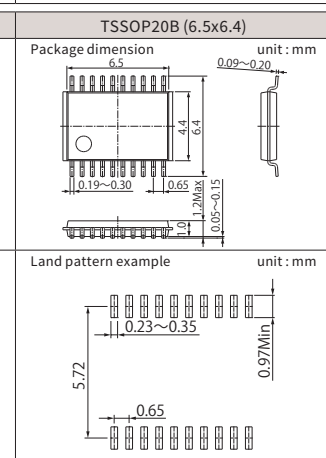
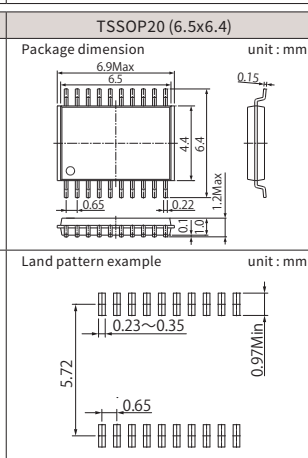
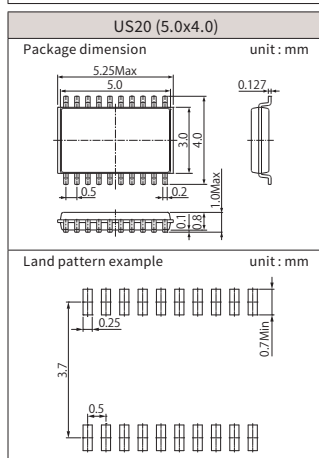
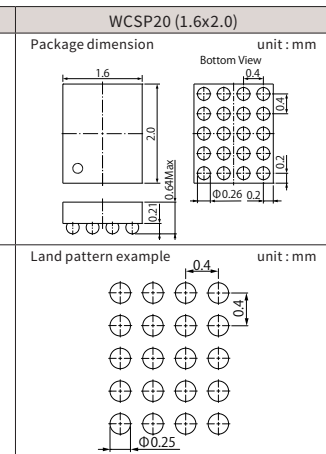
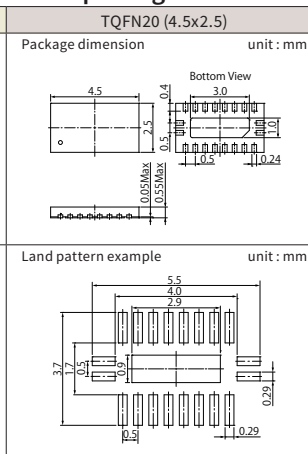
SOP14 (10.3x7.8)	WCSP16C (1.9x1.9)	US16 (4.0x4.0)
Package dimension unit : mm	Package dimension unit : mm	Package dimension unit : mm
Land pattern example unit : mm	Land pattern example unit : mm	Land pattern example unit : mm

TSSOP16 (5.0x6.4) Package dimension unit: mm  Package dimension: 5.0, 5.4Max, 0.15, 4.4, 6.4, 0.65, 0.22, 1.2Max, 0.1, 0.05~0.15 Land pattern example unit: mm  Land pattern example: 5.72, 0.23~0.35, 0.65, 0.97Min	TSSOP16B (5.0x6.4) Package dimension unit: mm  Package dimension: 5.0, 0.09~0.2, 4.4, 6.4, 0.19~0.3, 0.65, 1.2Max, 1.0, 0.05~0.15 Land pattern example unit: mm  Land pattern example: 5.72, 0.23~0.35, 0.65, 0.97Min	SOIC16 (9.9x6.0) Package dimension unit: mm  Package dimension: 10.2Max, 9.9, 3.9, 6.0, 0.2, 1.27, 0.41, 0.18, 1.38, 1.25Max Land pattern example unit: mm  Land pattern example: 5.72, 0.76, 1.27, 1.27Min
--	---	---

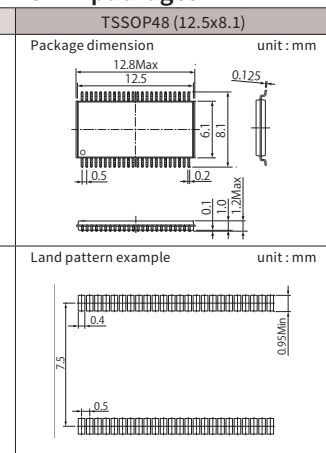
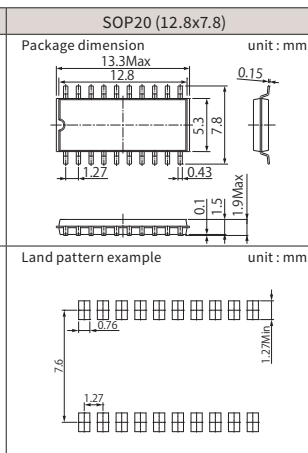
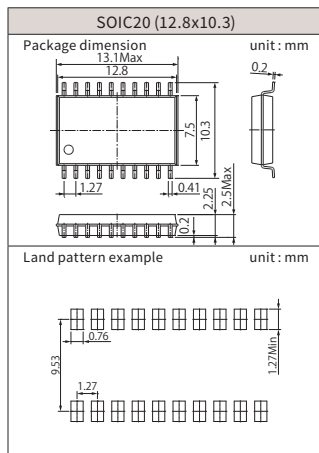
16 Pin packages



20 Pin packages



48 Pin packages



RESTRICTIONS ON PRODUCT USE

Toshiba Corporation and its subsidiaries and affiliates are collectively referred to as "TOSHIBA". Hardware, software and systems described in this document are collectively referred to as "Product".

- TOSHIBA reserves the right to make changes to the information in this document and related Product without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, lifesaving and/or life supporting medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, and devices related to power plant. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative or contact us via our website.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**

TOSHIBA

Toshiba Electronic Devices & Storage Corporation
Toshiba Electronic Device Solutions Corporation