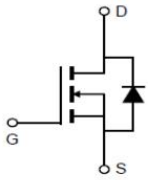
•General Description

The SJ MOSFET LH65R550 has the low $R_{DS(on)}$, low gate charge,fast switching and excellent avalanche characteristics.This device offers extremely fast and robust body diode,and is suitable for telecom and power supplies.



V_{DS}=650V

$R_{DS(ON)}$=0.55Ω

I_D=8A

■ RoHS COMPLIANT

SOT-223-2

•Features

■Much lower Ron*A performance for On-state efficiency

■Much lower FOM for fast switching effciency

•Application

■Lighting

■Solar/Renewable/UPS-Micro Inverter System

■Power Supplies

•Ordering Information:

Part number	LH65R550
Package	SOT-223-2
Basic ordering unit (pcs)	2500
Normal Package Material Ordering Code	LH65R550T8-SOT223-2-TAP
Halogen Free Ordering Code	LH65R550T8-SOT223-2-TAP-HF

•Absolute Maximum Ratings（TC =25℃）

PARAMETER		SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage		BV_{DSS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	TC = 25°C	I_D	8	A
	TC = 100°C		4.8	
Pulsed drain current (TC = 25°C, tp limited by Tjmax)[1]		I_D pulse	23	A
Single Pulse Avalanche Energy		I_{AR}	1.45	A
Single Pulse Avalanche Energy[2]		E_{AS}	91	mJ
Repetitive Avalanche Energy[2]		E_{AR}	0.32	mJ
Power Dissipation(TC=25℃)		P_D	28	W
Operating Temperature and Storage Temperature Range		T_J/T_{STG}	-55~+150	℃
Reverse diode dv/dt[3]		dv/dt	15	V/ns
Maximum diode commutation speed[3]		di_f/dt	50	V/ns

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D=250uA	650	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	2.0	--	4.0	V
Drain-source On Resistance[3]	$R_{DS(ON)}$	V_{GS} =10V, I_D=2.4A	--	0.48	0.55	Ω
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V,V_{GS}=0V,T_J=25℃	--	--	1	uA
		V_{DS}=650V,V_{GS}=0V,T_J=125℃	--	--	100	
Gate-Source Leakage Current	I_{GSS}	VGS=±30V	--	--	±1	uA
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = 400V f = 1.0MHz	--	680	--	pF
Output Capacitance	Coss		--	19	--	
Reverse transfer Capacitance	Crss		--	2.9	--	
Turn-on delay time	Td(on)	V_{DD}=325V, I_D =3.3A R_G=25Ω	--	25	--	ns
Turn -Off Delay Time	Td(off)		--	87	--	
Rise time	Tr		--	19	--	
Fall time	Tf		--	18	--	
Total Gate Charge	Qg	I_D =3.2A, V_{DS} = 520V V_{GS} = 10V	--	16	---	nC
Gate-to-Source Charge	Qgs		--	3.1	--	
Gate-to-Drain Charge	Qgd		--	5.2	---	
Continuous Diode Forward Current	I_S	--	--	--	8.0	A
Pulsed Diode Forward Current[1]	I_{SM}	--	--	--	23	A
Diode Forward Voltage	V_{SD}	Tj=25°C, Is=3.3A V_{GS} =0V	--	--	1.3	V
Reverse Recovery Time	trr	V_{RR}=400V, If=Is di_F/dt=100A/μs	--	250	--	ns
Reverse Recovery Charge	Qrr		--	1.9	--	uC

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	Rth_{JC}	4.47	℃/W
Thermal Resistance Junction-ambient	Rth_{JA}	80	℃/W

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2. I_{AS} = 1.45A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

3. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

●Typical Characteristics T_J=25ºC,unless otherwise noted

Figure 1. On Region Characteristics

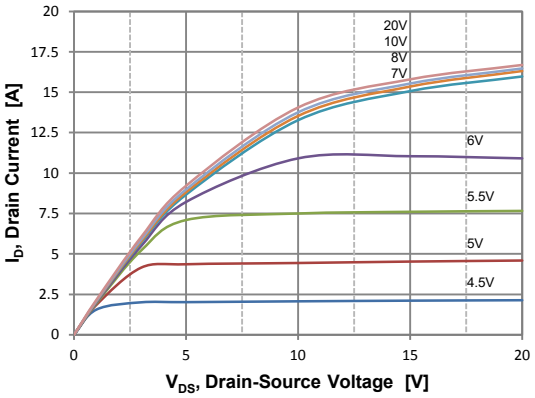


Figure 2. Transfer Characteristics

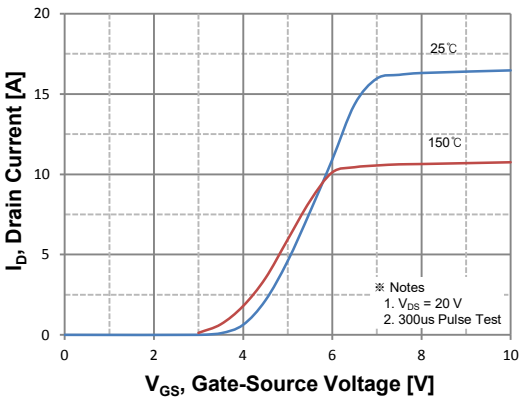


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

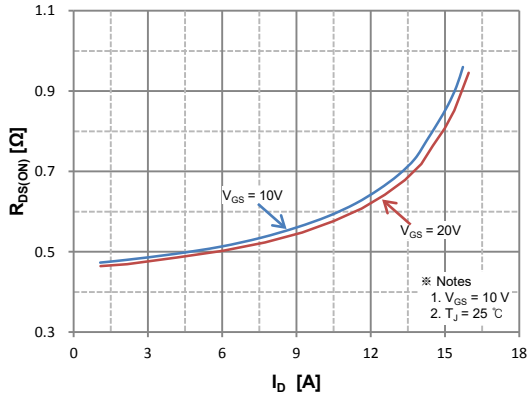


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

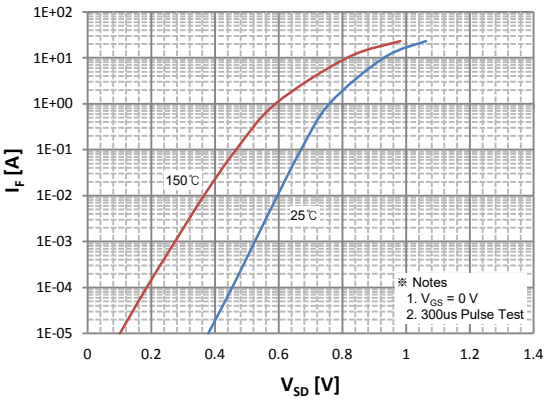


Figure 5. Capacitance Characteristics

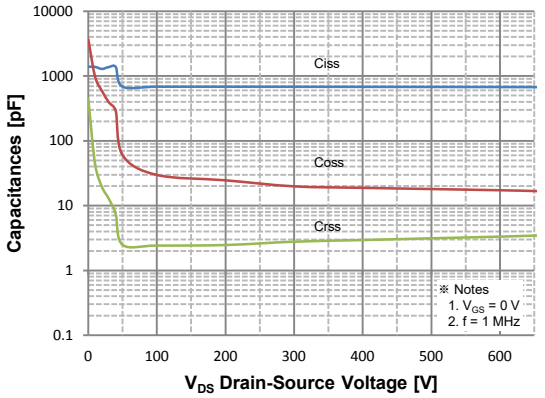
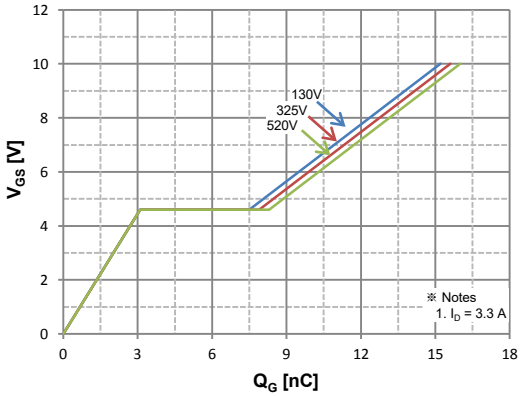


Figure 6. Gate Charge Characteristics



●Typical Characteristics(cont.)

Figure 7. Breakdown Voltage Variation vs. Temperature

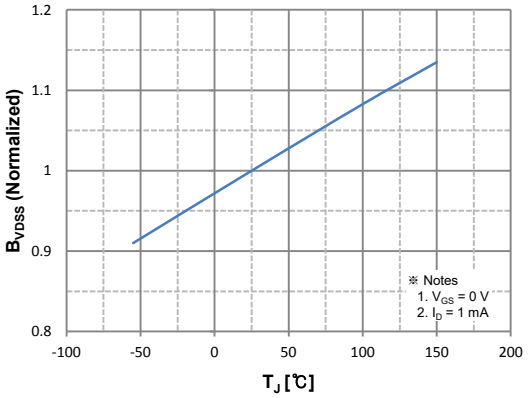


Figure 8. On-Resistance Variation vs. Temperature

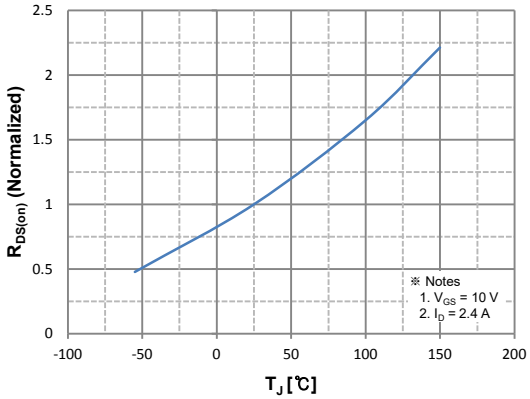


Figure 9. Maximum Safe Operating Area

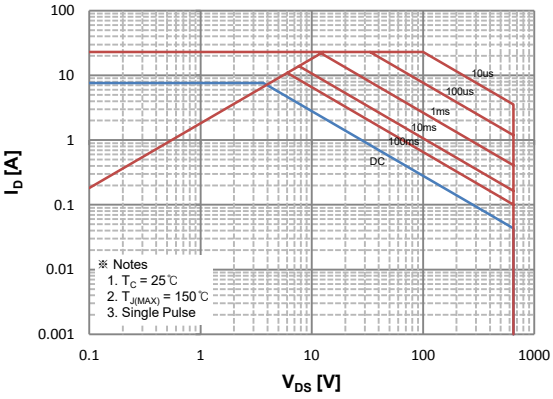


Figure 10. Maximum Drain Current vs. Case Temperature

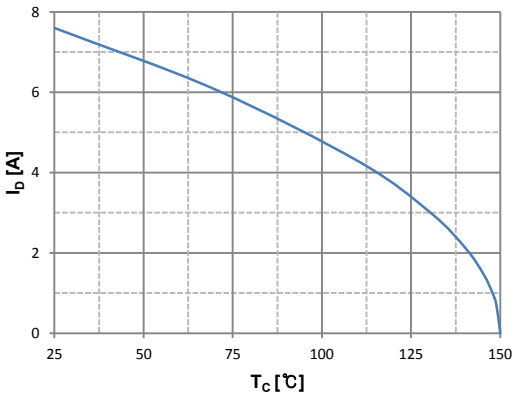
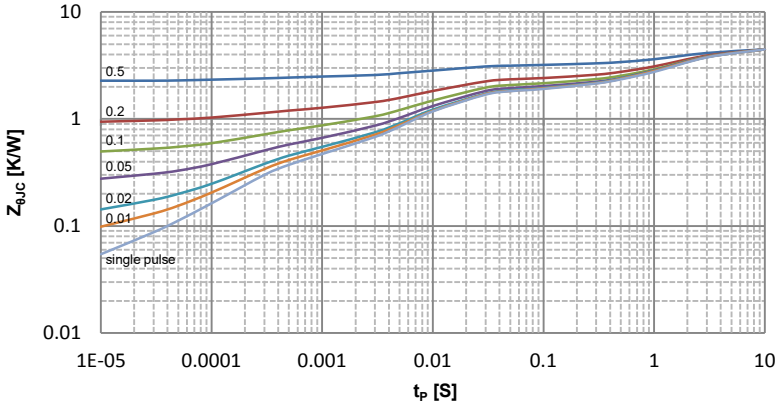


Figure 11. Transient Thermal Response Curve



● Test circuits&Waveforms

Fig 1. Gate Charge Test Circuit & Waveform

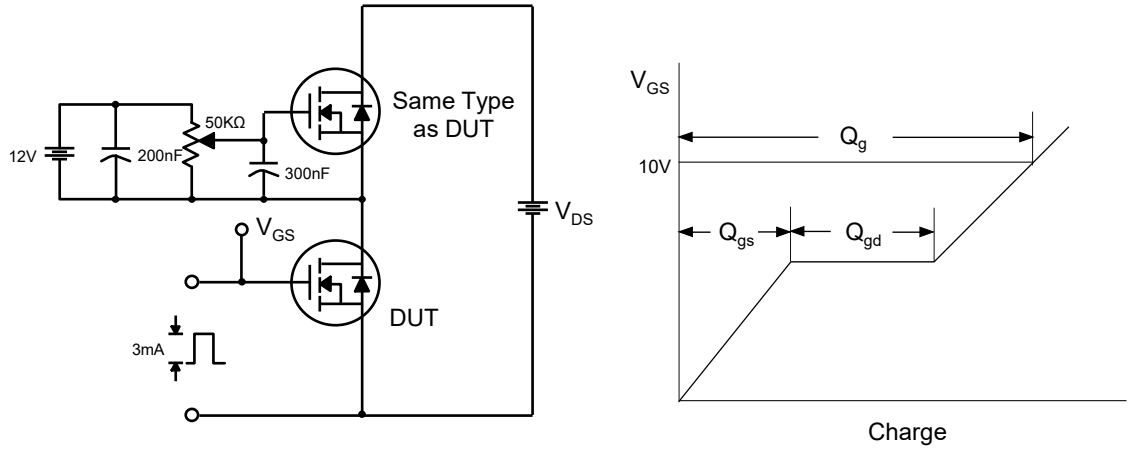


Fig 2. Resistive Switching Test Circuit & Waveforms

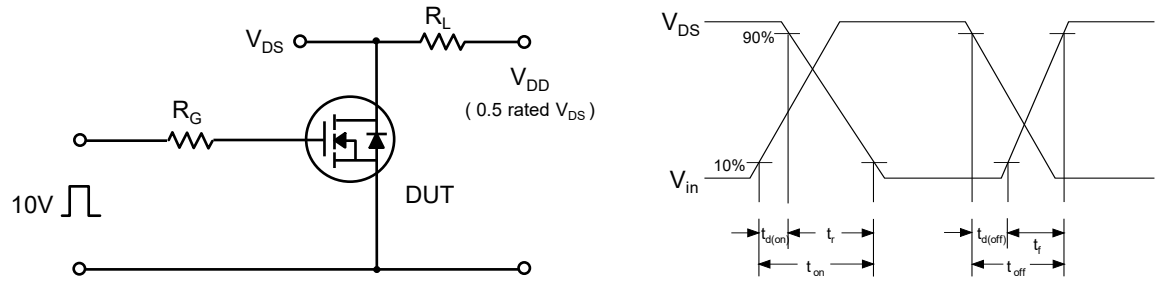
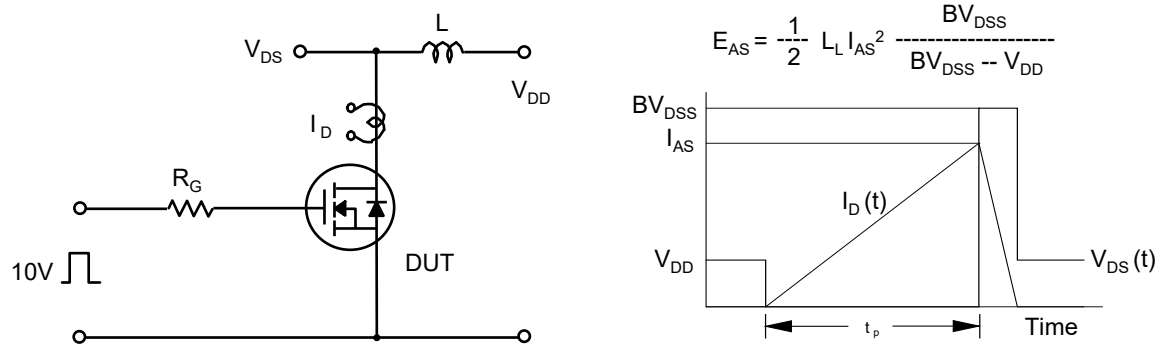
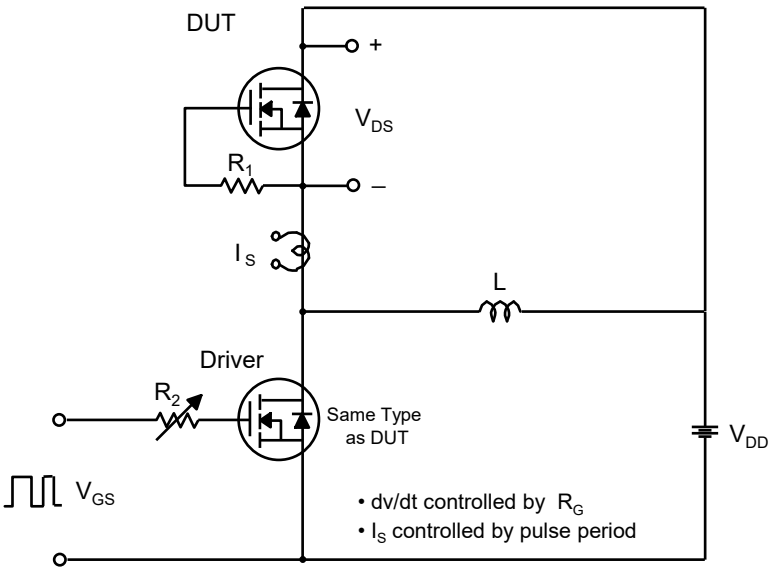


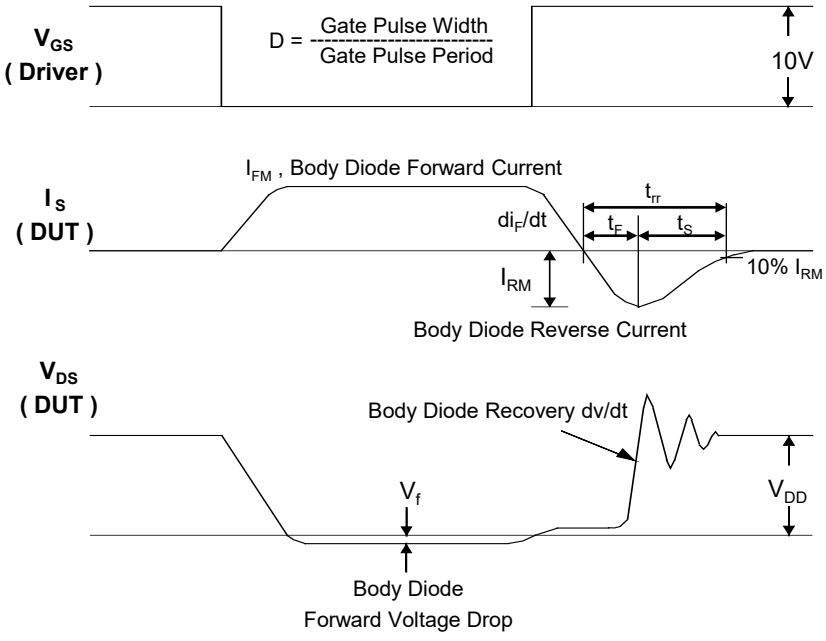
Fig 3. Unclamped Inductive Switching Test Circuit & Waveforms



●Test circuits&Waveforms(cont.)

Fig 4. Peak Diode Recovery dv/dt Test Circuit & Waveforms

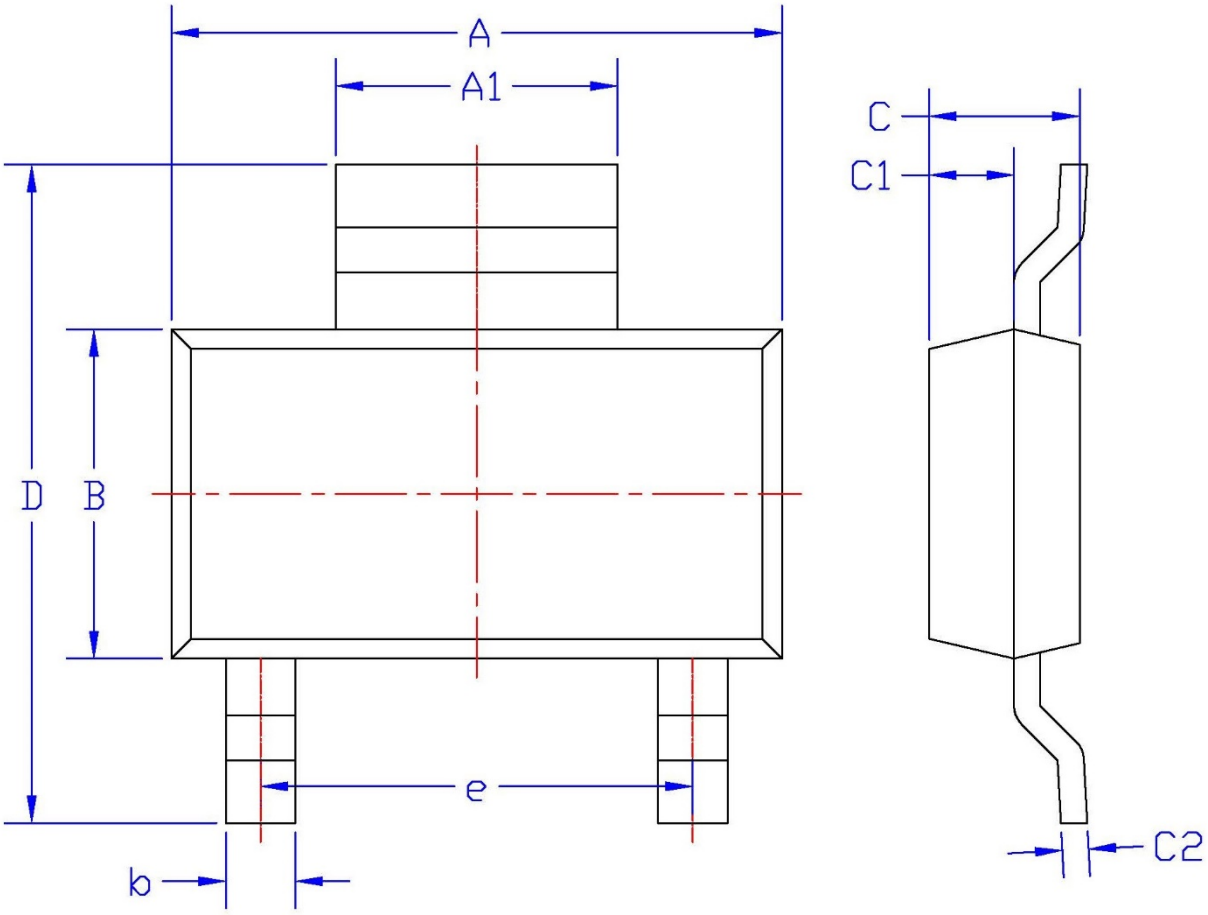




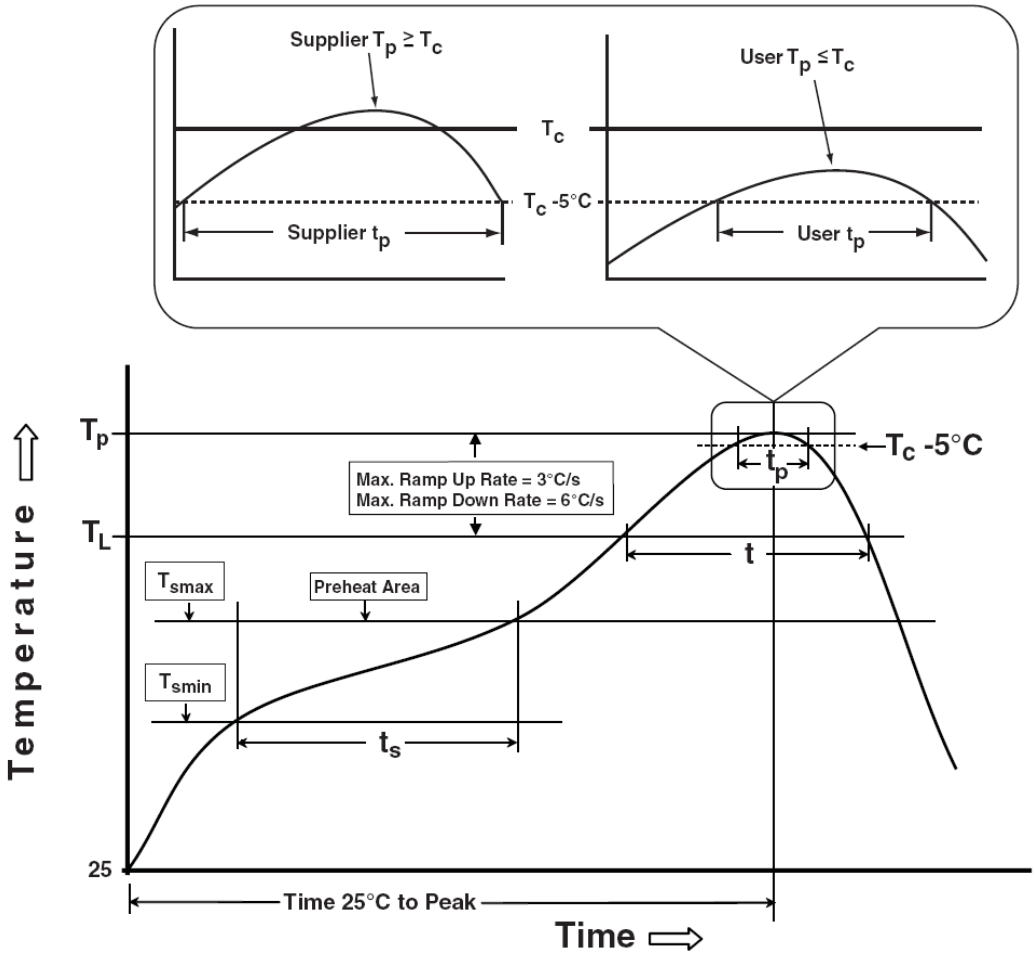
•Dimensions(SOT-223)

Unit：mm

Symbol	Min	Nor	Max
A	6.30	6.50	6.70
A1	2.85	3.00	3.15
B	3.35	3.50	3.65
C	1.40	1.55	1.70
C1	0.75	0.90	1.05
D	6.70	7.00	7.30
b	0.60	0.74	0.88
e	4.60 TYP		



- **Classification Profile**



• Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (T_{smin} to T_{smax}) (t_s)	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Average ramp-up rate (T_{smax} to T_P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_P)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate (T_p to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.		

Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (Tc)

Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test Item	Method	Description
Solder ability	JESD-22, B012	5 SEC., 245ºC
HOLT	JESD-22, A108	1000 HRs, Bias@125ºC
PCT	JESD-22, A102	168 HRs, 100% RH, 2ATM, 121ºC
TCT	JESD-22, A104	500 Cycles, -65 ~ 150ºC