

N-Channel Enhancement Mode MOSFET

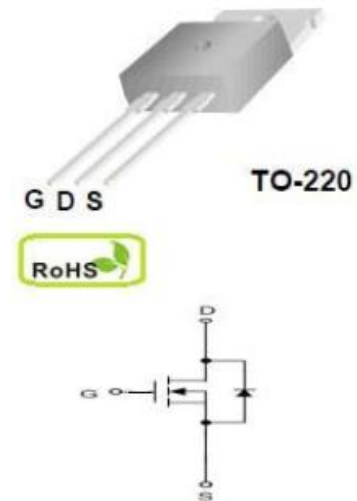
Features

- 100V/120A $R_{DS(on)}=6.0m\Omega(max.)@V_{GS}=10V$
- Uses Si-trend advanced MOSFET technology
- Extremely low on-resistance $R_{DS(on)}$
- Qualified according to JEDEC criteria
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)

Applications

- Motor Drives
- UPS (Uninterruptible Power Supplies)
- DC/DC converter
- General purpose applications

PIN DESCRIPTION



Part Number	Package	Marking	ROHS Status	Packing
SI100N13B	TO-220	SI100N13B	Pb-Free	Box (Tube)

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Typical	Unit
V_{DSS}	Drain-Source Voltage	100	v
V_{GSS}	Gate –Source Voltage	± 20	v
I_D	Continuous Drain Current	$T_C=25^\circ C$ (Silicon limit)	120
		$T_C=25^\circ C$ (Package limit)	107
I_{DM}	Pulsed Drain Current Tested, t_p limited by T_{jmax}	$T_C=25^\circ C$	480
T_J	Operating Junction Temperature	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
E_{AS}	Avalanche energy, single pulse ($L=0.5mH, R_g=25\Omega$)	600	mJ
P_{tot}	Power dissipation	$T_c=25^\circ C$	227

Thermal Resistance

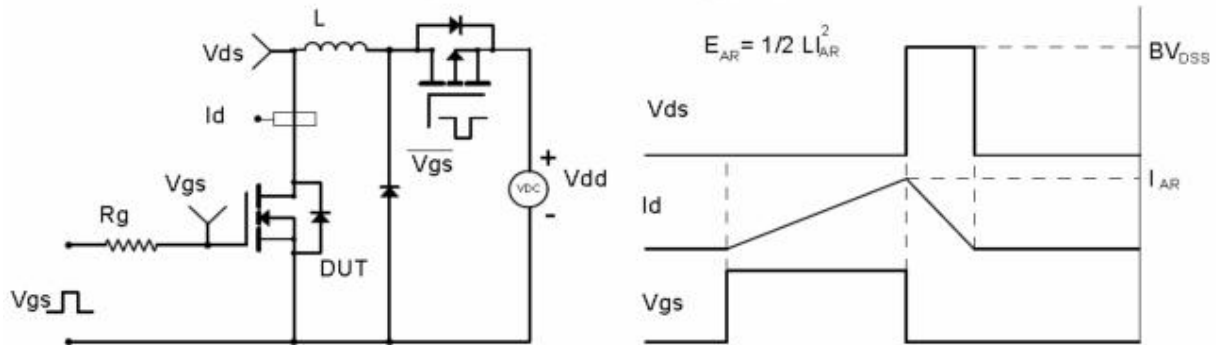
Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.55	$^\circ C/W$
Thermal resistance, junction – ambient. Max	R_{thJA}	62.0	

Electrical Characteristics (T_A=25°C unless otherwise noted)

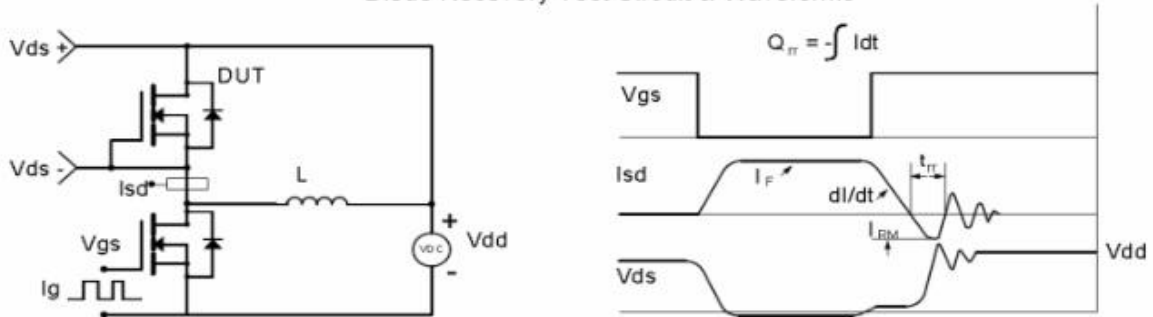
Symbol	Parameter	Test Conditions	Min	TYP	Max	Unit
Static Characteristics						
V _{(BR)DSS}	Drain-source breakdown voltage	V _{GS} =0V, I _D =250uA	100	-	-	V
V _{GS(th)}	Gate threshold voltage	V _{DS} =V _{GS} , I _D =250uA T _j =25°C	2.0	-	4.0	V
I _{DSS}	Zero gate voltage drain current	V _{DS} =80V, V _{GS} =0V T _j =25°C T _j =125°C	- -	- -	1 5	uA
I _{GSS}	Gate-source leakage current	V _{GS} =20V, V _{DS} =0V	-	-	100	nA
R _{DS(on)}	Drain-source on-state resistance	V _{GS} =10V, I _D =50A, T _j =25°	-	5.3	6.0	mΩ
R _G	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	2.6	-	Ω
g _{fs}	Transconductance	V _{DS} =50V, I _D =20A	-	47	-	S
Dynamic Characteristic						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, f=1MHz	-	6900	-	pF
C _{oss}	Output Capacitance		-	1250	-	
C _{rss}	Reverse Transfer Capacitance		-	47	-	
Q _G	Gate Total Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A, f=1MHz	-	117	-	nC
Q _{gs}	Gate-Source charge		-	40	-	
Q _{gd}	Gate-Drain charge		-	37	-	
t _{d(on)}	Turn-on delay time	T _j =25°C, V _{GS} =10V, V _{DS} =50V, R _L =2.5Ω	-	48	-	nS
t _r	Rise time		-	56	-	
t _{d(off)}	Turn-off delay time		-	75	-	
t _f	Fall time		-	33	-	
Body Diode Characteristic						
V _{SD}	Body Diode Forward Voltage	V _{GS} =0V, I _{SD} =50A	-	0.85	1.3	V
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, di/dt=500A/μs	-	60	-	nS
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, di/dt=500A/μs	-	560	-	nC

Switching Time Test Circuit and Wave forms

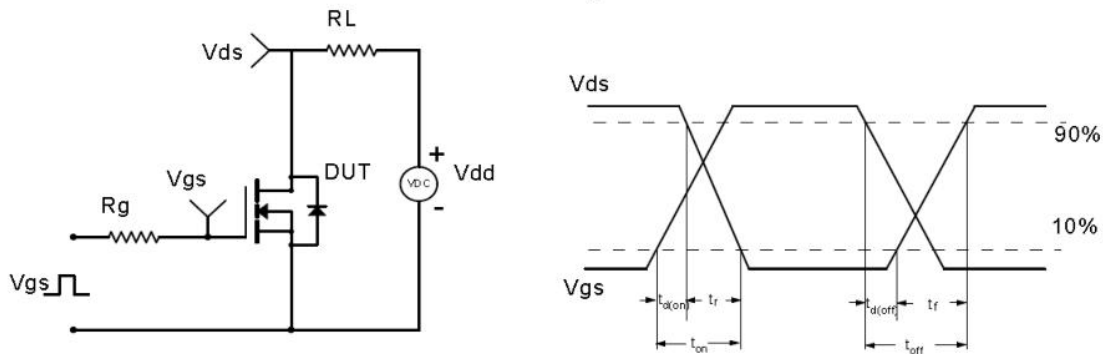
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



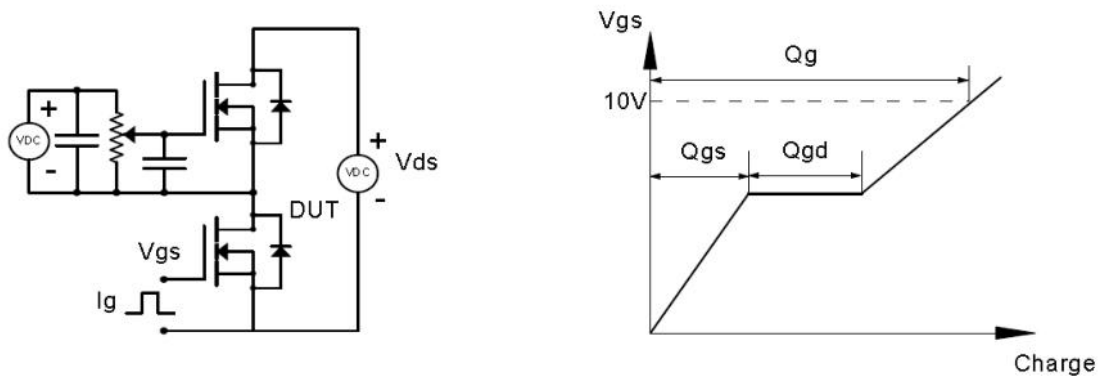
Diode Recovery Test Circuit & Waveforms



Resistive Switching Test Circuit & Waveforms



Gate Charge Test Circuit & Waveform



Typical Performance Characteristics

Figure 1. Typ. Output Characteristics

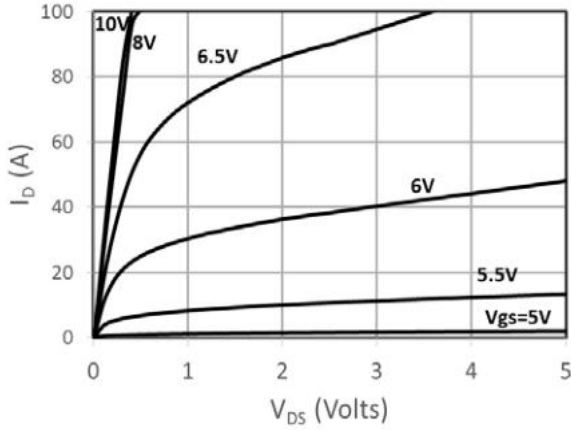


Figure 2. Transfer Characteristics (Junction Temperature)

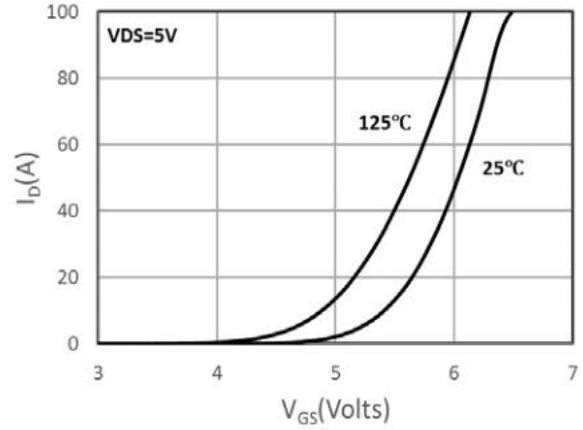


Figure 3. On-Resistance vs. Drain Current and Gate Voltage Figure

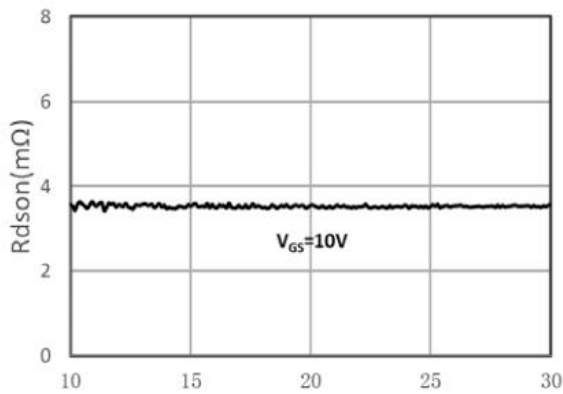


Figure 4. On-Resistance vs. Junction Temperature

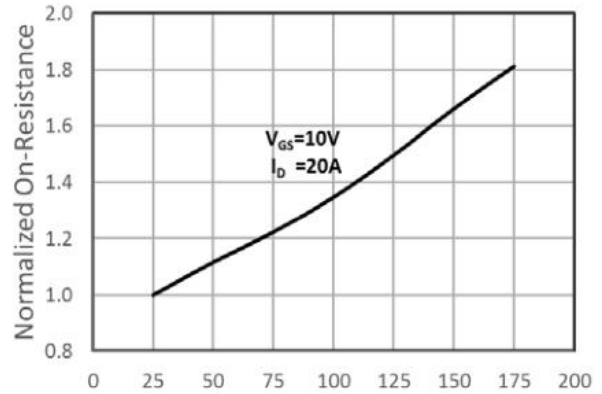


Figure 5. On-Resistance vs. Gate-Source Voltage (Junction Temperature)

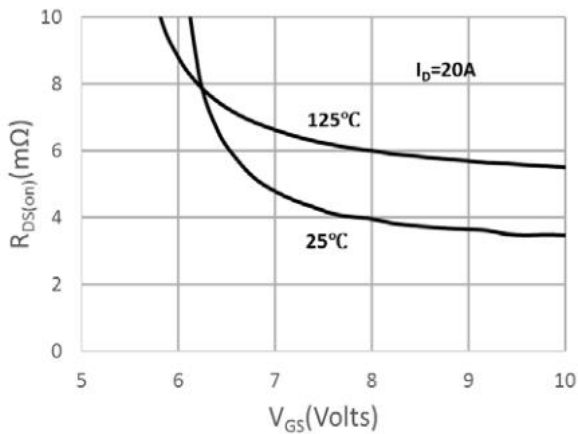
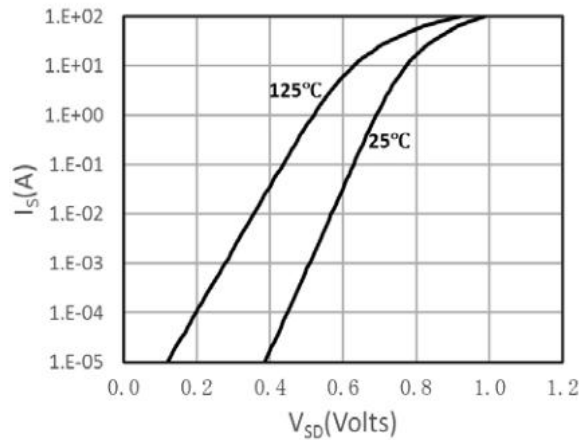


Figure 6. Body-Diode Characteristics (Junction Temperature)



Typical Performance Characteristics (Cont.)

Figure 7. Gate-Charge Characteristics

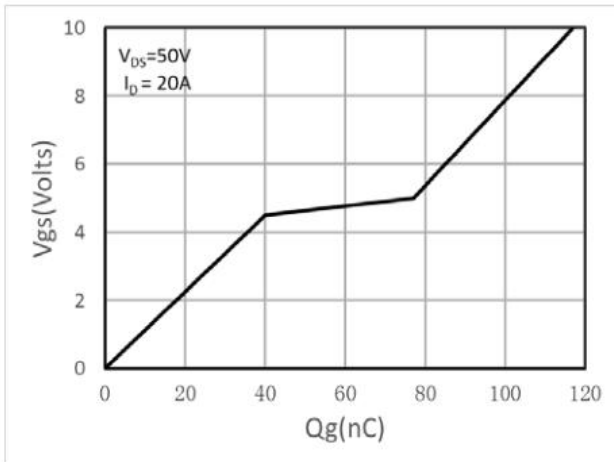


Figure 8. Capacitance Characteristics

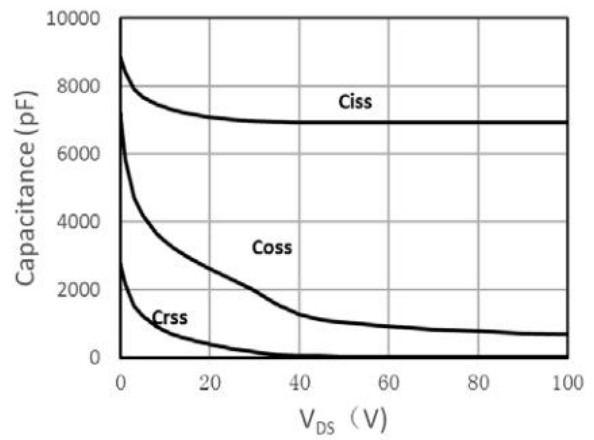


Figure 9: Normalized Maximum Transient Thermal Impedance (R_{thJC})

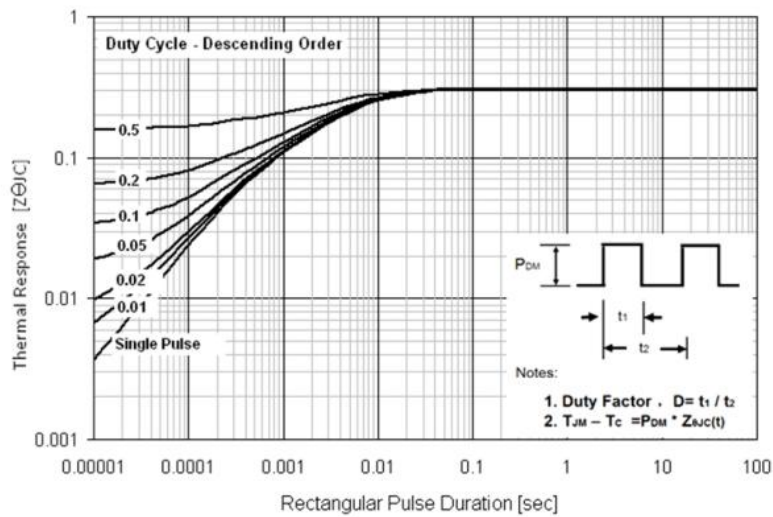
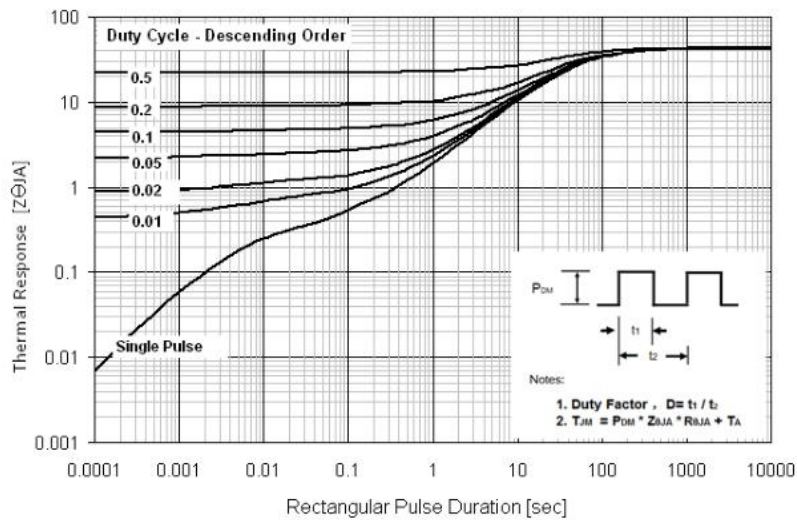
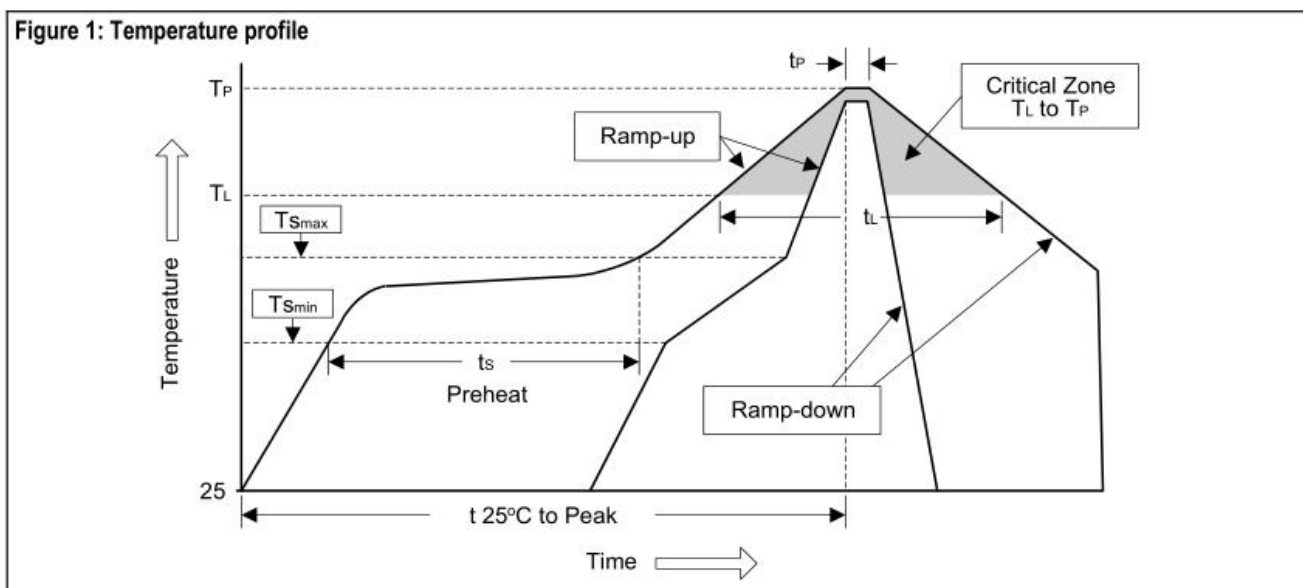


Figure 10: Normalized Maximum Transient Thermal Impedance (R_{thJA})



Soldering Methods for Products

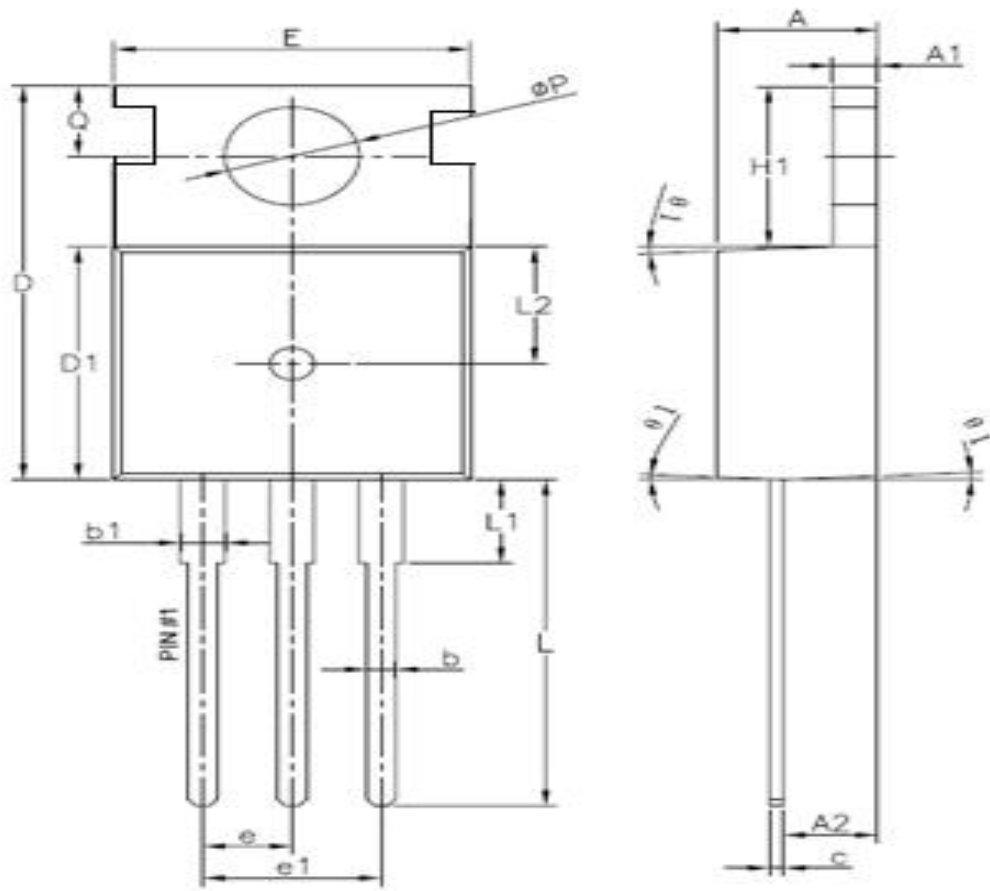
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp -up rate(TL to TP)	<3°C/sec	<3°C/sec
Preheat -Temperature Min(Ts min) -Temperature Max(Ts max) -Time(min to max)(ts)	- 100°C 150°C 60 to 120 sec	- 150°C 200°C 60 to 180 sec
Ts max to TL - ramp-up rate	<3°C/sec	<3°C/sec
Time maintained above: -Temperature(TL) -Time(TL)	183°C 60 to 150 sec	217°C 60 to 150 sec
Peak Temperature(TP)	240°C+0/-5°C	250°C+0/-5°C
Time within 5°C of actual Peak Temperature	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25 °C to Peak Temperature	<6 minutes	<8 minutes



- Note :**
- 1.Storage environment: Temperature=20°C to 35@Humidity=45%±15%
 - 2.Reflow soldering of surface-mount devices
 - 3.Flow(wave) soldering(solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices	245°C±5°C	5sec±1sec
Pb-free devices	250°C+0/-5°C	5sec±1sec

Package Outline



Millimeters					
Symbol	Min	Max	Symbol	Min	Max
A	4.2	4.8	e	2.54 Typ.	
A1	1.28	1.34	e1	5.08	5.18
A2	2.2	2.6	H1	6.1	7.0
b	0.69	0.91	L	12.9	13.5
b1	1.17	1.37	L1	2.9	3.7
c	0.42	0.51	L2	4.4	4.8
D	15.1	16.3	ΦP	3.4	3.8
D1	9.0	9.5	Q	2.63	2.90
E	9.6	10.5	θ1 (°)	1	5

■ Important Notice

Si-Trend reserves the right to change all product specifications and data without prior notice ; Our customer Please confirm to place an order confirmation before make the integrity of information complete and up-to-date ◦

Any semiconductor under specific conditions are possible to certain failure or malfunction rate ; Customers are responsible in the use of Si-Trend products to system design and manufacturing in compliance with safety standards and adopting safety measures ◦ To avoid the potential risk of failure may cause the personal safety and property loss ◦

Si-Trend Always refine on to provide more excellent products

■ Modify record

Date	Version	Description	Pagination
20160626	A.0	original	8
20170426	A.1	original	8