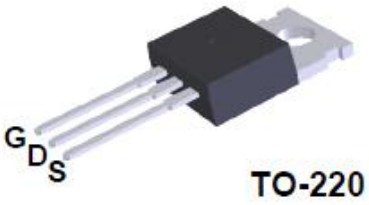
150V N-Channel MOSFET

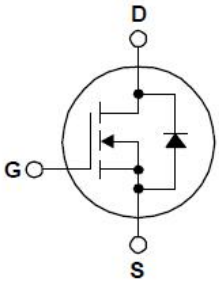
Features

- V_{DSS}=150V / I_D=45A
  $R_{DS(On)}$=27mΩ(Typ.)@V_{GS}=10V
- Low On-Resistance
- Low Input Capacitance
- Low Miller Charge
- Low Input / Output Leakage

PIN DESCRIPTION



TO-220



Applications

- Motor / Body Load Control
- Automotive Systems
- Solenoid and Motor Control
- DC-DC converters and Off-line UPS

Part Number	Package	Marking	ROHS Status	Packing
SI150N03B	TO-220	SI150N03B	Halogen-Free	Tube&Box

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		150	V
V_{GSS}	Gate-Source Voltage		±30	V
I_D	Drain Current-Continuous	T_C=25°C	45	A
		T_C=70°C	36	A
I_{DM}	Drain Current-Pulsed NOTE 1		180	A
E_{AS}	Avalanche Energy, L=3mH, V_G=10V, Rated V_{DS}=150V		180	mJ
I_{AS}	Avalanche Current,L=3mH, V_G=10V, Rated V_{DS}=150V		10	A
P_D	Maximum Power Dissipation	T_C=25°C	104	W
		T_A=25°C	2	W
T_J	Operating Junction Temperature		-55 to 150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C

Thermal Resistance Ratings

Symbol	Parameter	Conditions	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient NOTE2	Steady State	62	℃/W
$R_{\theta JC}$	Maximum Junction-to-Case	Steady State	1.2	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise noted)

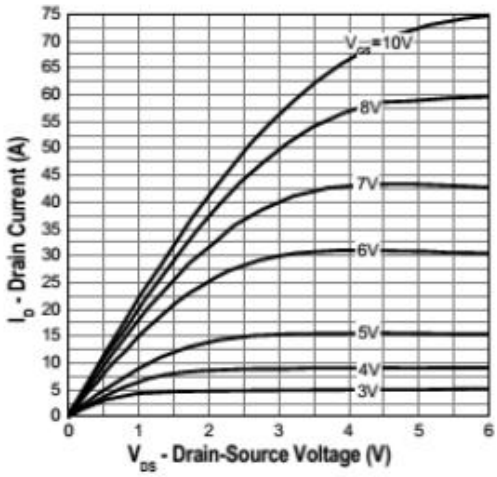
Symbol	Parameter	Test Conditions	Min	TYP	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-source breakdown voltage	V_{GS}=0V, I_{DS}=250uA	150	-	-	V
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS},I_{DS}=250uA	2	-	4	V
I_{DSS}	Zero gate voltage drain current	V_{DS}=120V,V_{GS}=0V	-	-	1	uA
I_{GSS}	Gate-source leakage current	V_{GS}=±30V,V_{DS}=0V	-	-	±100	nA
$R_{DS(on)}$	Drain-source on-state resistance	V_{GS}=10V, I_{DS}=40A	-	27	34	mΩ
Dynamic Characteristic						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz	-	1933	-	pF
C_{oss}	Output Capacitance		-	147	-	
C_{rss}	Reverse Transfer Capacitance		-	49	-	
Switching Characteristics						
Q_g	Total Gate Charge at 4.5V	V_{GS}=10V, V_{DS}=75V, I_{DS}=15A	-	55	-	nc
Q_{gs}	Gate-Source charge		-	18	-	
Q_{gd}	Gate-Drain charge		-	17	-	
$T_{d(on)}$	Turn-on delay time	V_{GS}=10V,V_{DS}=75V R_{GEM}=3Ω ,I_D=15A	-	22	-	ns
t_r	Rise time		-	10	-	ns
$T_{d(off)}$	Turn-off delay time		-	12	-	us
t_f	Fall time		-	35	-	us
Diode Characteristic						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V,I_S=15A	-	-	1.3	V
t_{rr}	Body Diode Reverse Recovery Time	I_f=15A,T_J=25°C dI/dt=500A/μs,	-	25	-	nS
Q_{rr}	Body Diode Reverse Recovery Charge		-	32	-	nC

Notes:

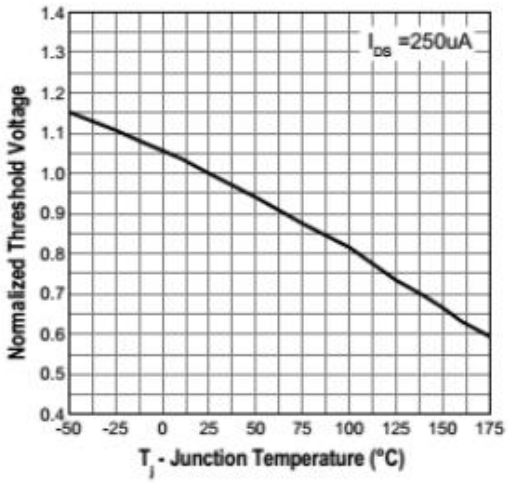
1. Pulse Test: Pulse Width ≦300μs, Duty Cycle ≦ 2%.
2. $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\Theta JC}$ is guaranteed by design while $R_{\Theta CA}$ is determined by the user's board design. $R_{\Theta JA}$ shown below for single device operation on FR-4 instill air

Typical Performance Characteristics

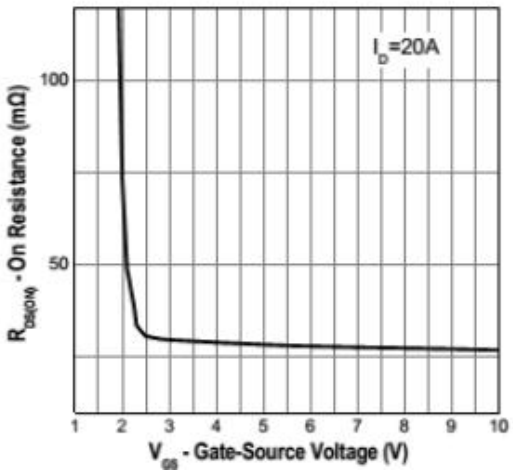
Output Characteristics



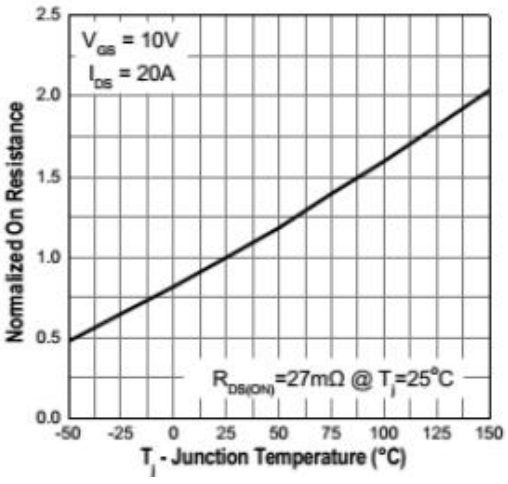
Gate Threshold Voltage



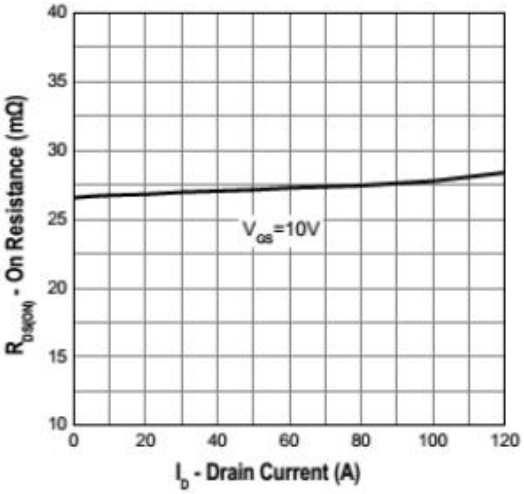
Gate-Source On Resistance



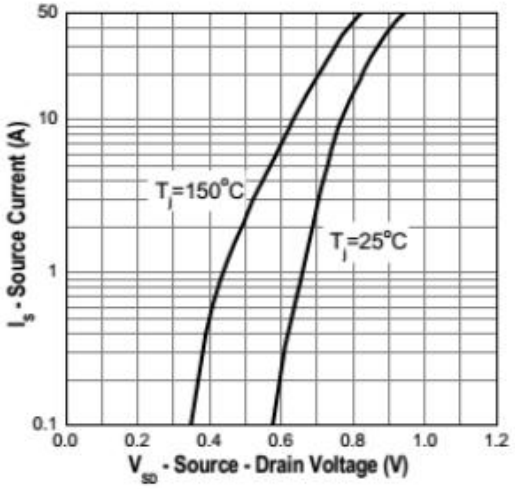
Drain-Source On Resistance



Drain-Source On Resistance

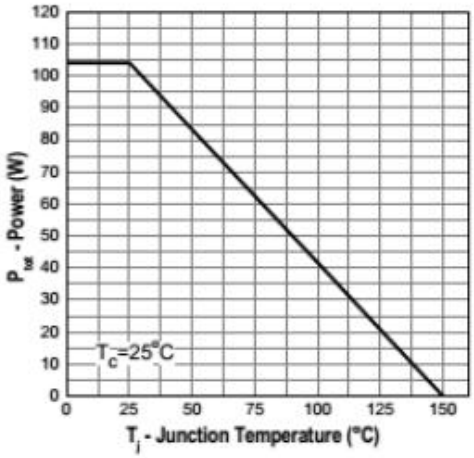


Source-Drain Diode Forward

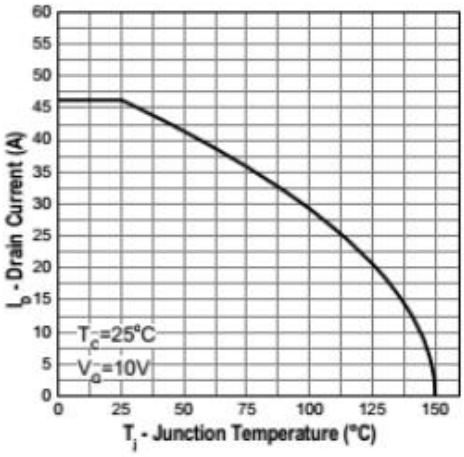


Typical Performance Characteristics (Cont.)

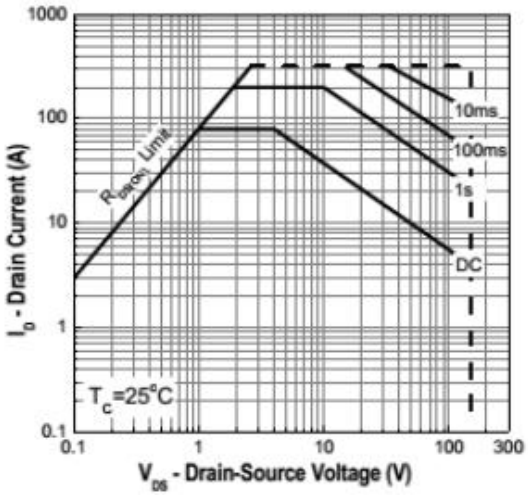
Power Dissipation



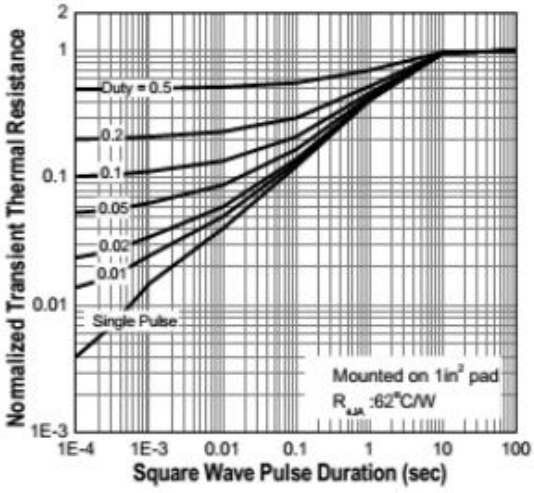
Drain Current



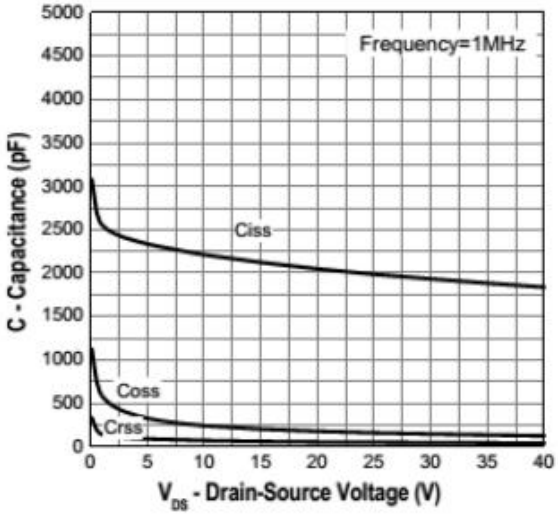
Safe Operation Area



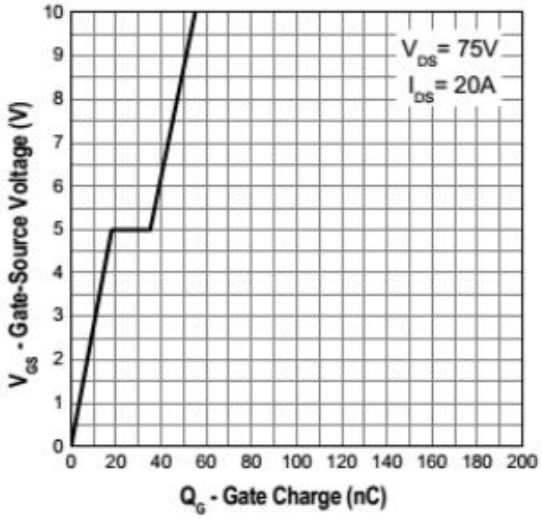
Transient Thermal Impedance



Capacitance



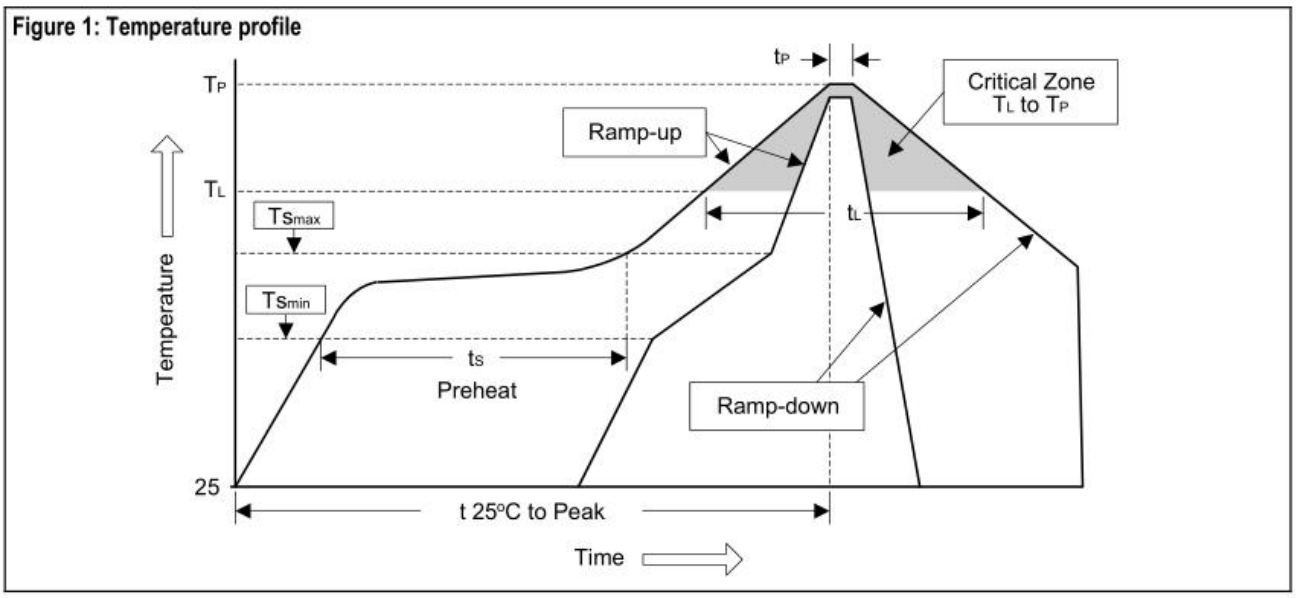
Gate Charge



Soldering Methods for Products

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp -up rate(TL to TP)	<3℃/sec	<3℃/sec
Preheat -Temperature Min(Ts min) -Temperature Max(Ts max) -Time(min to max)(ts)	- 100℃ 150℃ 60 to 120 sec	- 150℃ 200℃ 60 to 180 sec
Ts max to TL - ramp-up rate	<3℃/sec	<3℃/sec
Time maintained above: -Temperature(TL) -Time(TL)	183℃ 60 to 150 sec	217℃ 60 to 150 sec
Peak Temperature(TP)	240℃+0/-5℃	260℃+0/-5℃
Time within 5℃ of actual Peak Temperature	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6℃/sec	<6℃/sec
Time 25 ℃ to Peak Temperature	<6 minutes	<8 minutes

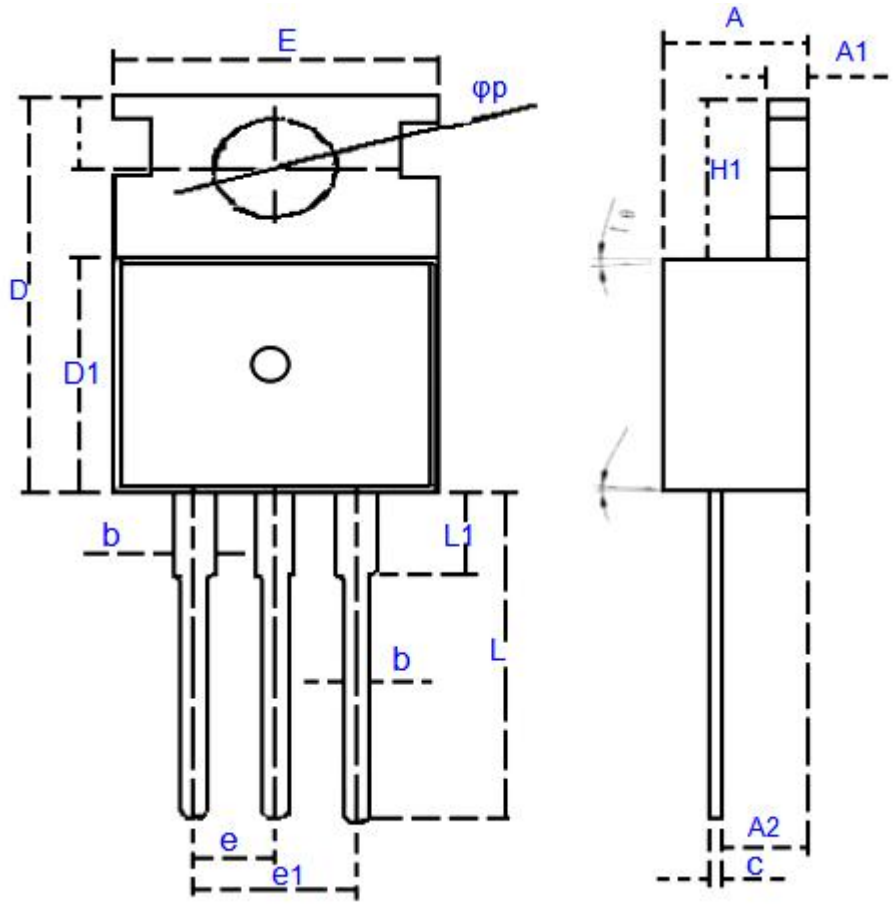
Figure 1: Temperature profile



Note : 1.Storage environment: Temperature=10℃ 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℃±5℃	5sec±1sec
Pb-free devices	260℃+0/-5℃	5sec±1sec

Package Outline



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

Important Notice

Si-Trend reserves the right to change all product、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

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Date	Version	Description	Pagination
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20190820	A.1	/	7