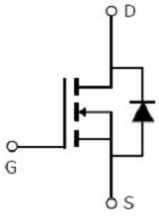
Main Product Characteristics

V_{DSS}	150V
R_{DS}(on)	5.6mΩ (typ.)
I_D	140A ①

TO-263

Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced Process Technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature

Description

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute max Rating

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	140	A
I_{DM}	Pulsed Drain Current ②	440	
P_D @TC = 25°C	Power Dissipation ③	320	W
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.5mH	1296	mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

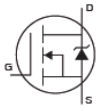
Thermal Resistance

Symbol	Characterizes	Value	Units
$R_{\theta JC}$	Junction-to-case ③	0.47	°C/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

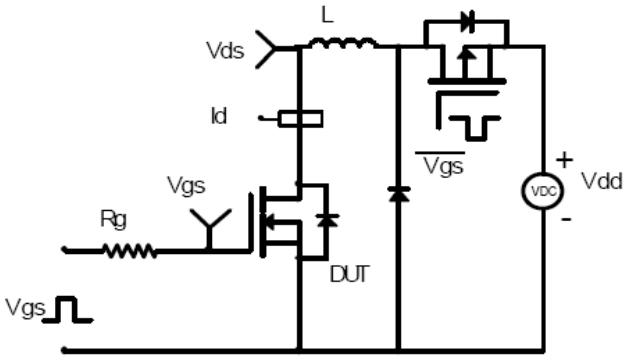
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	150	—	—	V	V_{GS} = 0V, I_D= 250uA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	5.6	6.2	mΩ	V_{GS}=10V,I_D =70A
$V_{GS(th)}$	Gate threshold voltage	2.0	3.3	4.0	V	V_{DS} = V_{GS}, I_D =250μA
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} =150V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =20V
		—	—	-100		V_{GS} = -20V
Q_g	Total gate charge	—	74	—	nC	I_D = 70A,
Q_{gs}	Gate-to-Source charge	—	32	—		V_{DS}=75V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	11	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on delay time	—	26	—	nS	V_{GS}=10V, V_{DD} =75V, R_{GEN}=4.7Ω I_D =70A
t_r	Rise time	—	36	—		
$t_{d(off)}$	Turn-Off delay time	—	47	—		
t_f	Fall time	—	15	—		
C_{iss}	Input capacitance	—	5500	—	pF	V_{GS} = 0V V_{DS} = 75V f = 1MHz
C_{oss}	Output capacitance	—	600	—		
C_{rss}	Reverse transfer capacitance	—	7	—		

Source-Drain Ratings and Characteristics

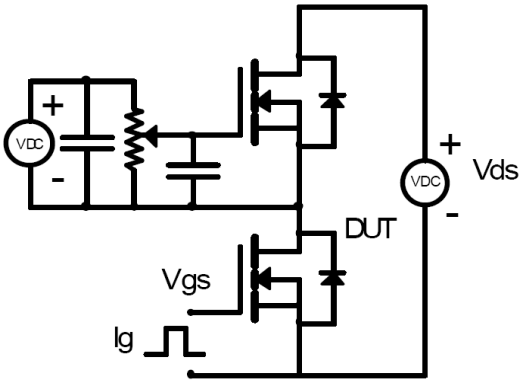
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode) ①	—	—	140	A	MOSFET symbol showing the integral reverse p-n junction diode. 
V_{sd}	Diode Forward Voltage	—	—	1.2	V	I_S=140A, V_{GS}=0V, T_J = 25°C
trr	Reverse Recovery Time	—	146	—	ns	I_S=140A,di/dt=100A/us
Qrr	Reverse Recovery Charge	—	485	—	nC	

Test circuits and Waveforms

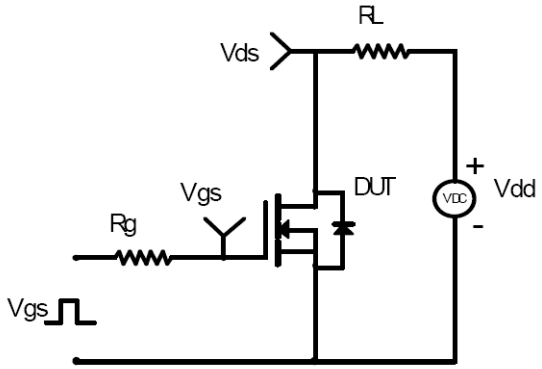
EAS Test Circuit:



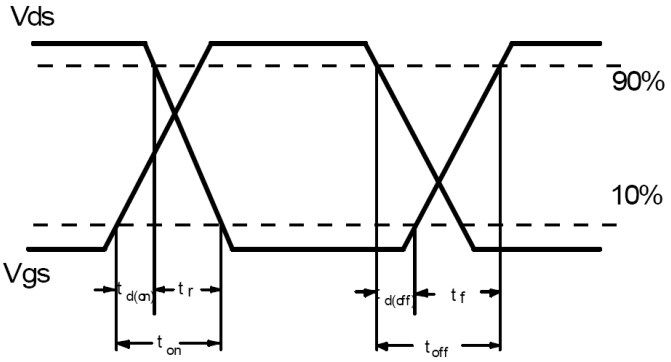
Gate charge test circuit:



Switching Time Test Circuit:



Switching Waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature.
②Repetitive rating; pulse width limited by max. junction temperature.
③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

Typical electrical and thermal characteristics

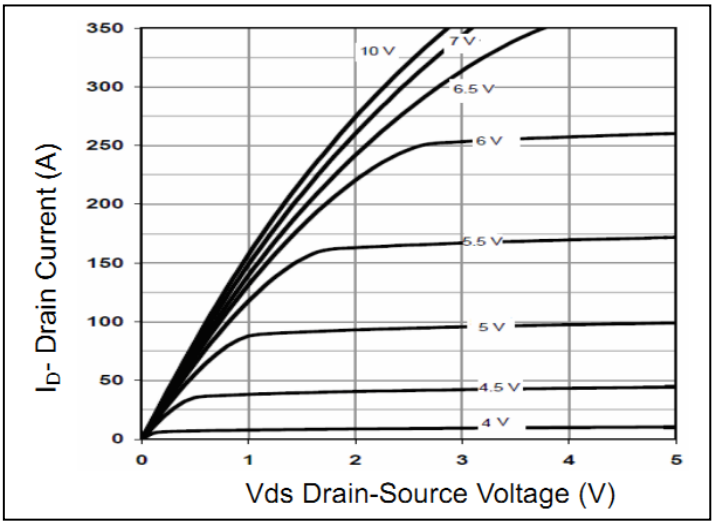


Figure 1: Typical Output Characteristics

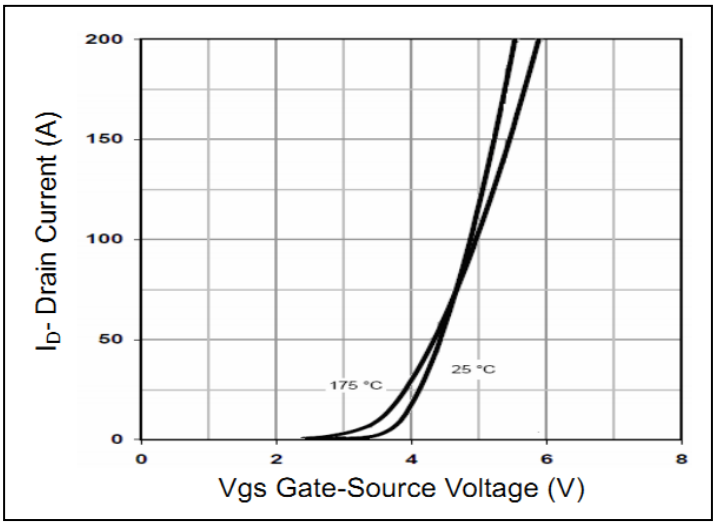


Figure 2:Typ. Transfer Characteristics

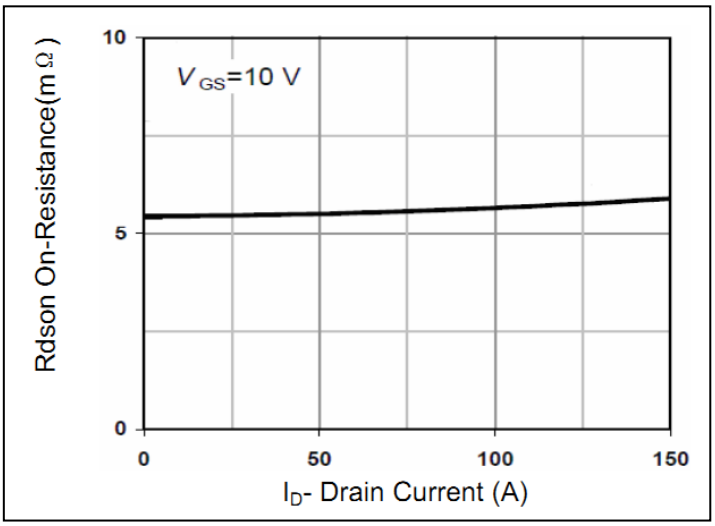


Figure 3: Rdson-Drain Current

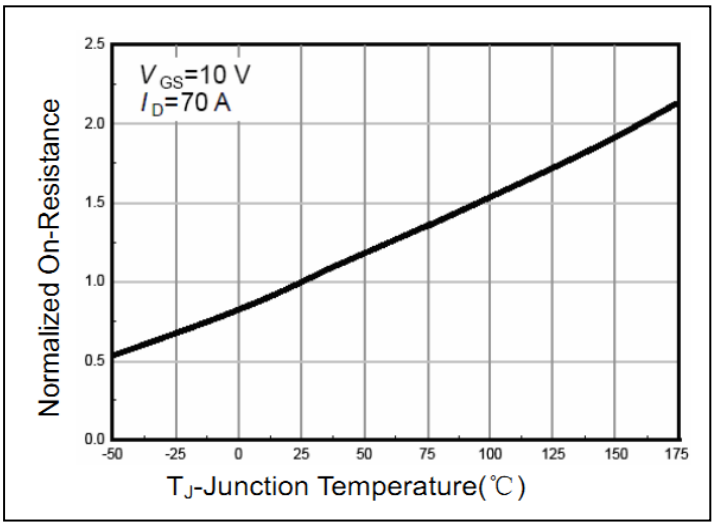


Figure 4: Rdson-Junction Temperature

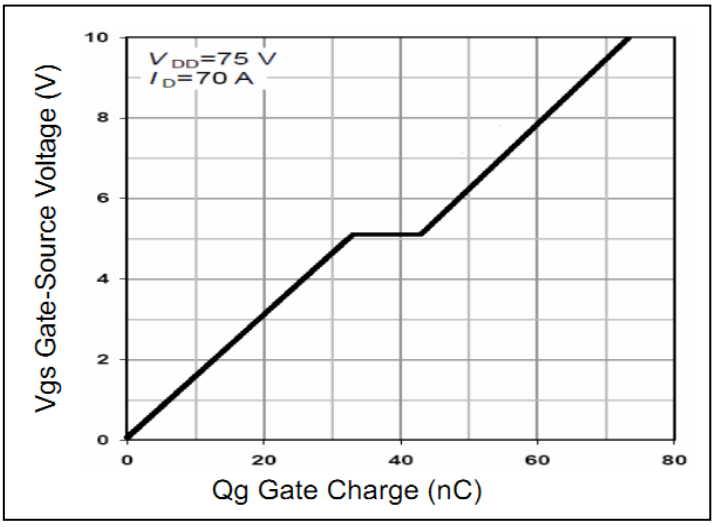


Figure 5: Gate Charge

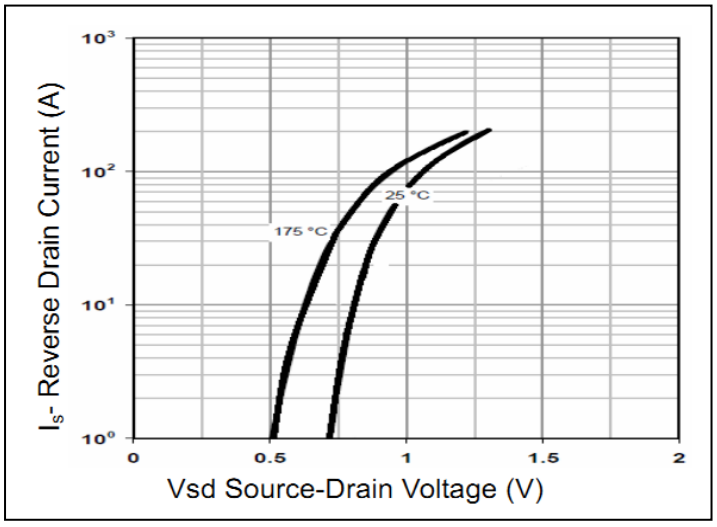


Figure 6: Source-Drain Diode Forward

Typical electrical and thermal characteristics

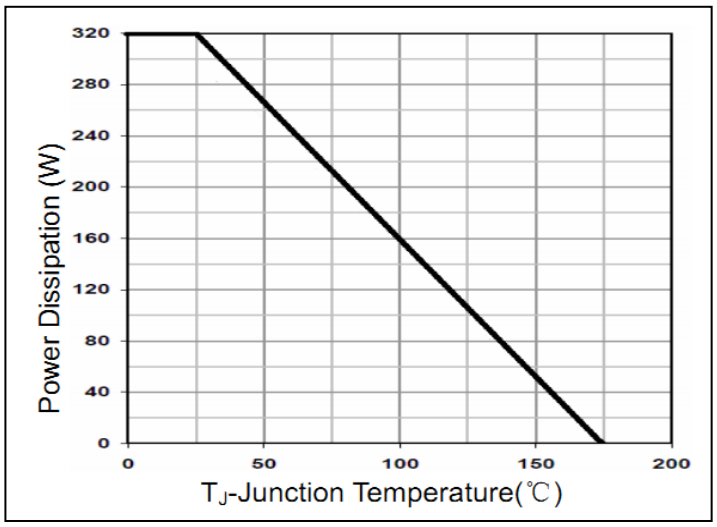


Figure 7: Power De-rating

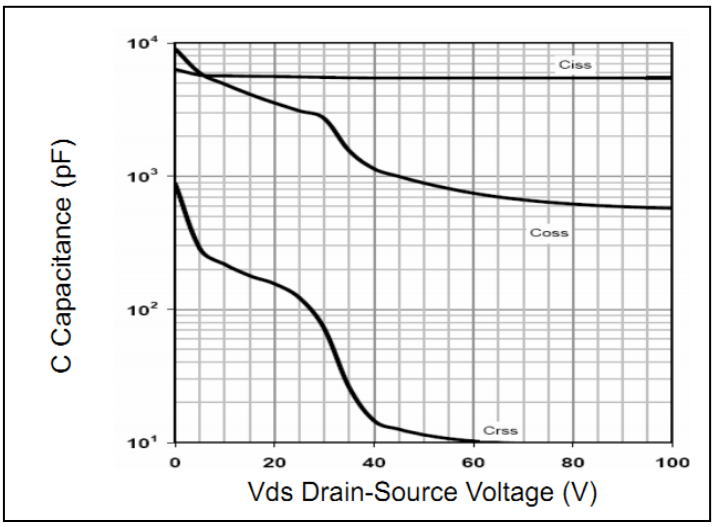


Figure 8: Typical Capacitance Vs. Drain-to-Source Voltage

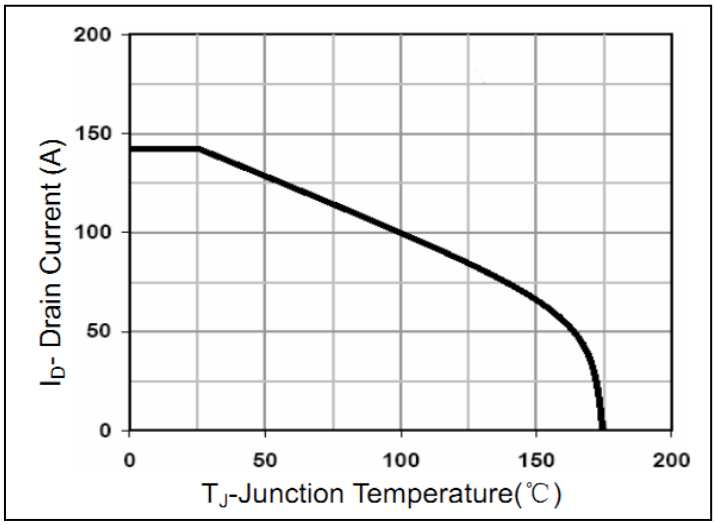


Figure 9: Current De-rating

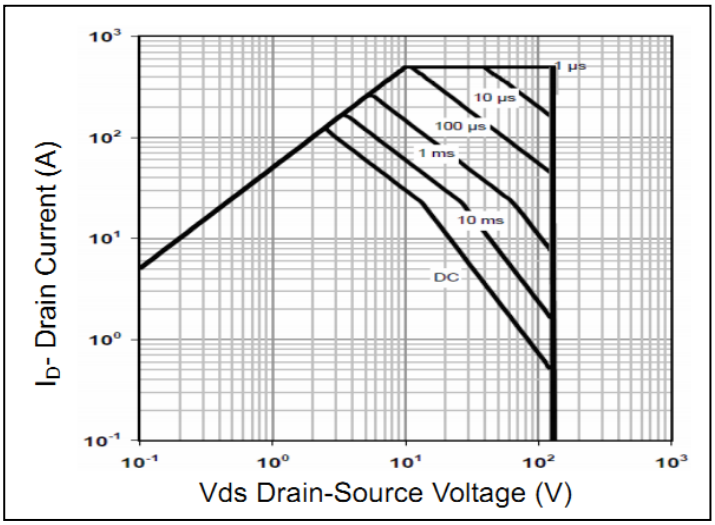


Figure10: Safe Operation Area

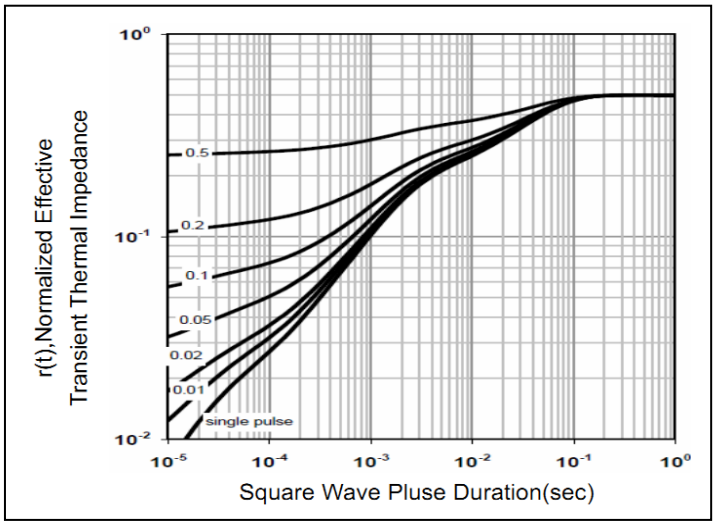
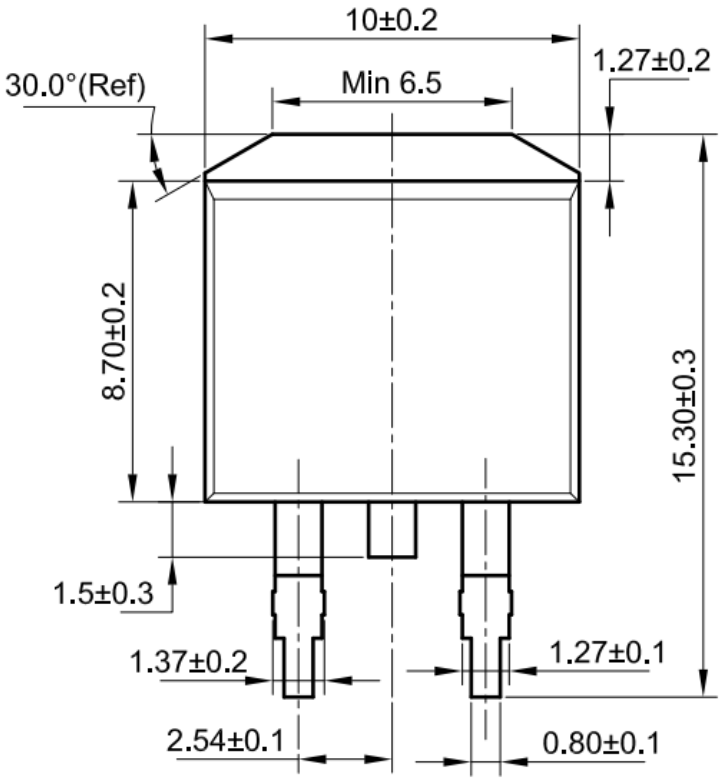
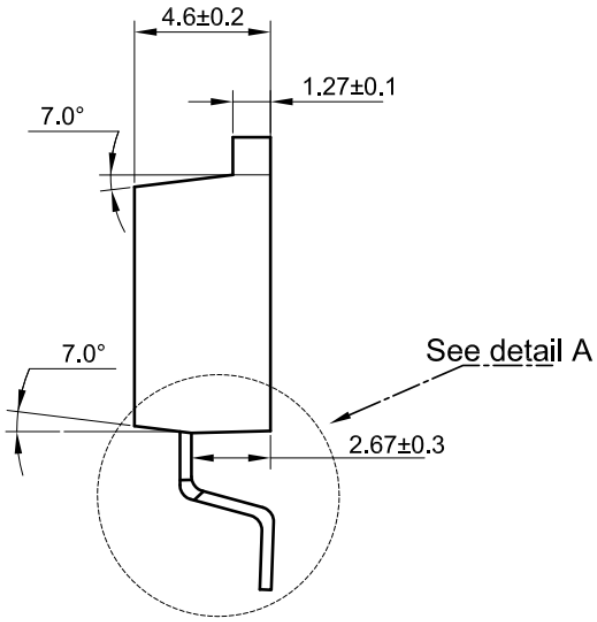


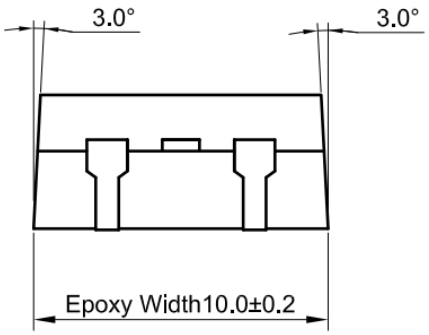
Figure11: Normalized Maximum Transient Thermal Impedance

Mechanical Data：

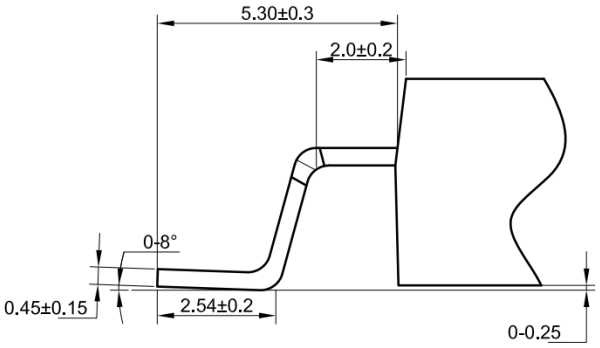
TO263 Package Outline Dimension







Detail A



Ordering and Marking Information

Device Marking: SSS1510UA

Package (Available)

TO-263

Operating Temperature Range

C : -55 to 150 ºC

Devices per Unit

Package Type	Units/ Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-263	50	20	1000	6	6000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_j=125℃ to 175℃ @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_j=125℃ or 175℃ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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