N-Channel Enhancement Mode Power MOSFET

Description

The GT020N10MA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

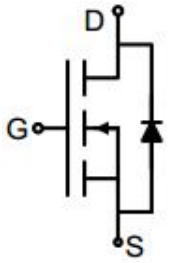
AEC-Q101 Qualified

General Features

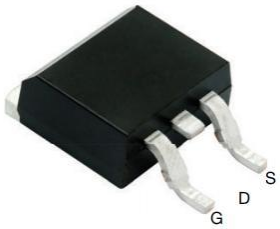
- V_{DS} 100V
- I_D (at V_{GS} = 10V) 236A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 2.5mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-263

Ordering Information

Device	Package	Marking	Packaging
GT020N10MA	TO-263	GT020N10	2000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Continuous Drain Current	T_C = 25ºC	I_D	236	A
	T_C =100ºC		149	
Pulsed Drain Current (note1)		I_{DM}	944	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	270	W
Single pulse avalanche energy （note2）		E_{AS}	812	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	ºC/W
Maximum Junction-to-Case	R_{thJC}	0.46	ºC/W

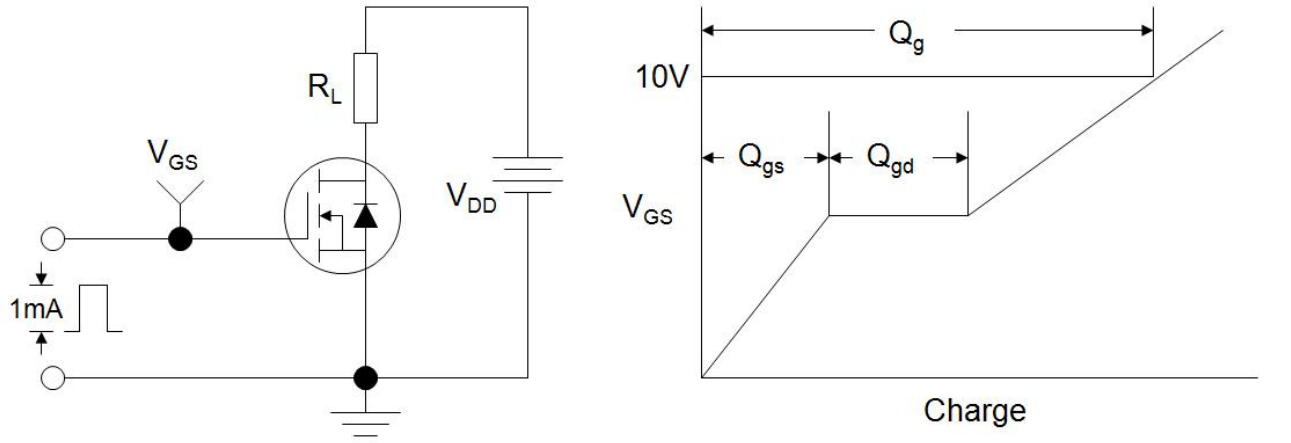
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V, V_{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.3	2.8	3.7	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 80A	--	2.1	2.5	mΩ
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 80A	--	89	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 0.6MHz	--	10800	--	pF
Output Capacitance	C_{oss}		--	1355	--	
Reverse Transfer Capacitance	C_{rss}		--	110	--	
Total Gate Charge	Q_g	V_{DD} = 50V, I_D = 80A, V_{GS} = 10V	--	160	--	nC
Gate-Source Charge	Q_{gs}		--	53	--	
Gate-Drain Charge	Q_{gd}		--	60	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 50V, I_D = 80A, R_G = 6Ω	--	57	--	ns
Turn-on Rise Time	t_r		--	124	--	
Turn-off Delay Time	$t_{d(off)}$		--	116	--	
Turn-off Fall Time	t_f		--	47	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	236	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 80A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 80A, V_{GS} = 0V di/dt=100A/us	--	139	--	nC
Reverse Recovery Time	Trr		--	64	--	ns

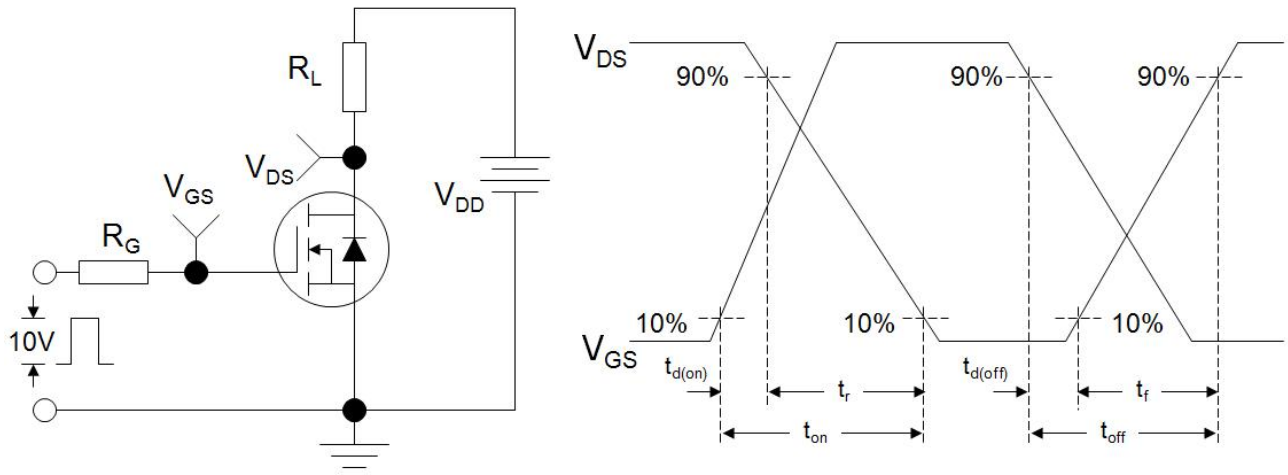
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 2256mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

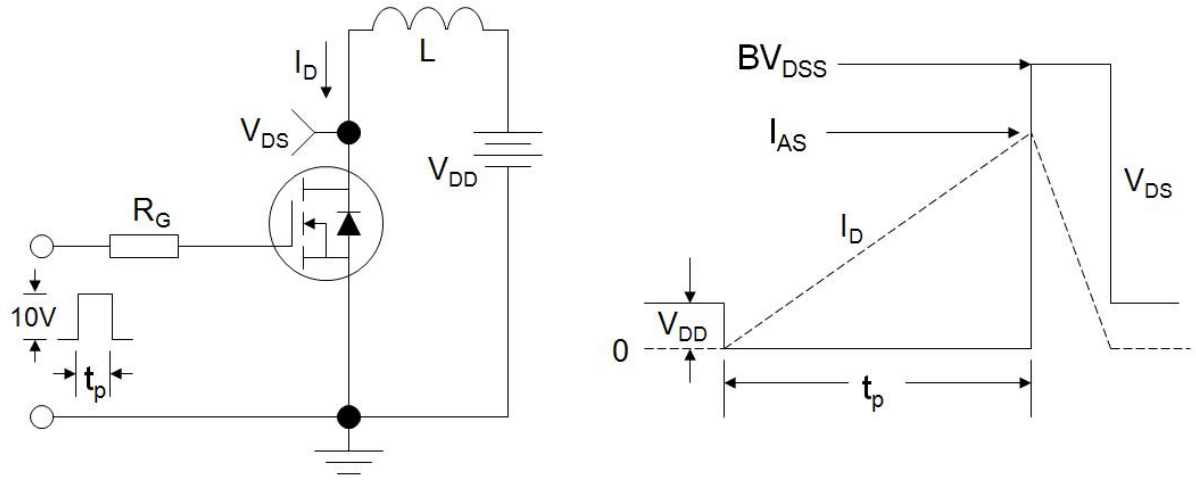
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

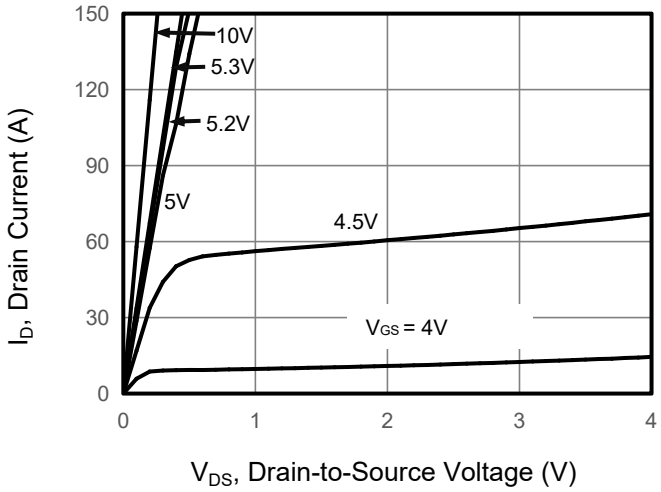


Figure 2. Transfer Characteristics

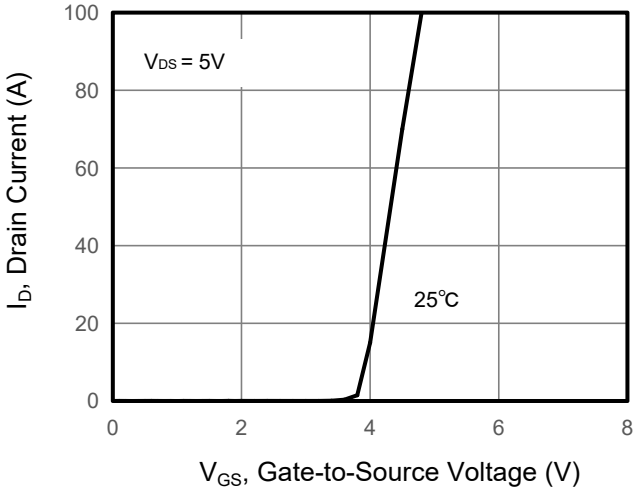


Figure 3. Drain Source On Resistance

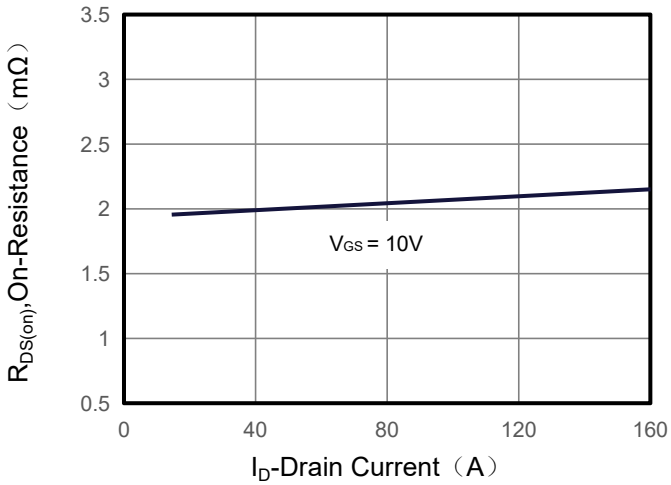


Figure 4. Gate Charge

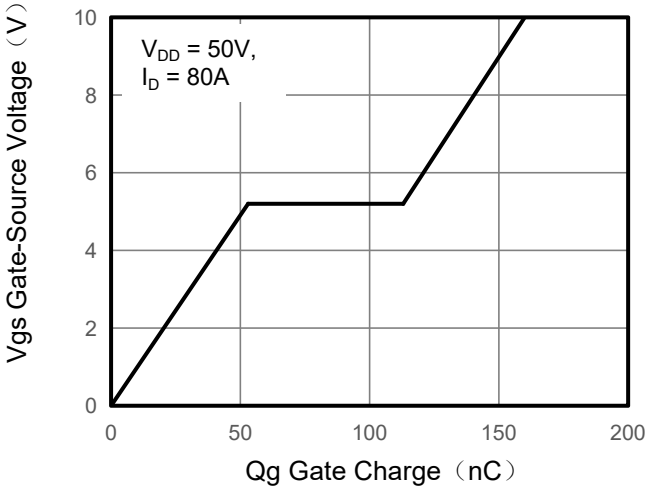


Figure 5. Capacitance

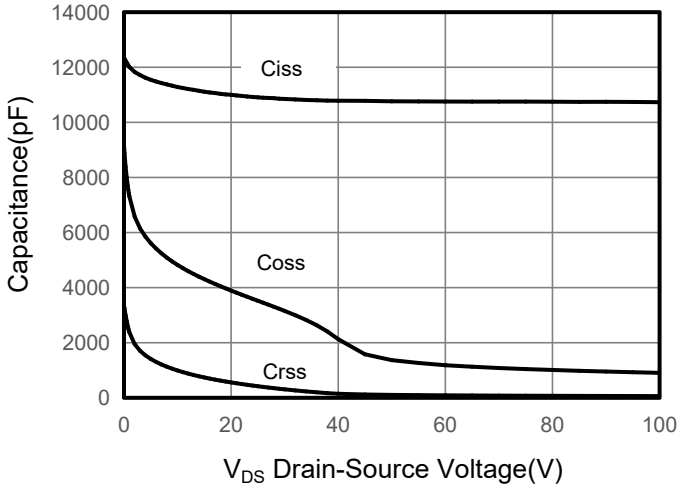
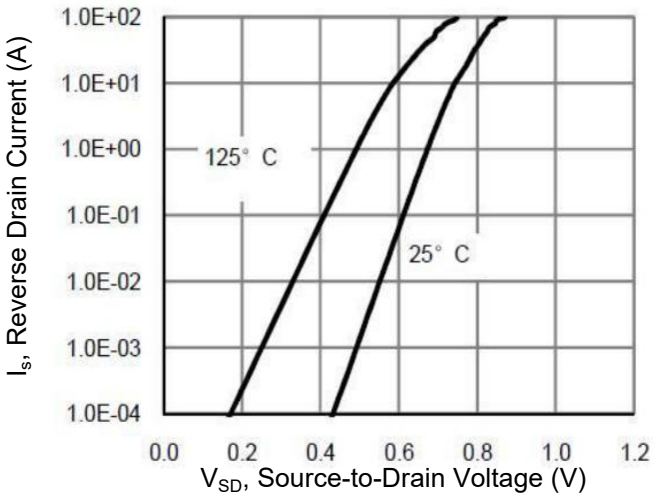


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

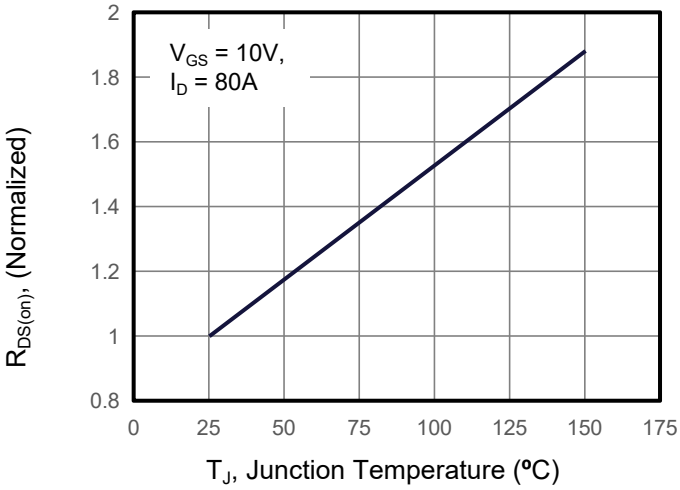


Figure 8. Safe Operation Area

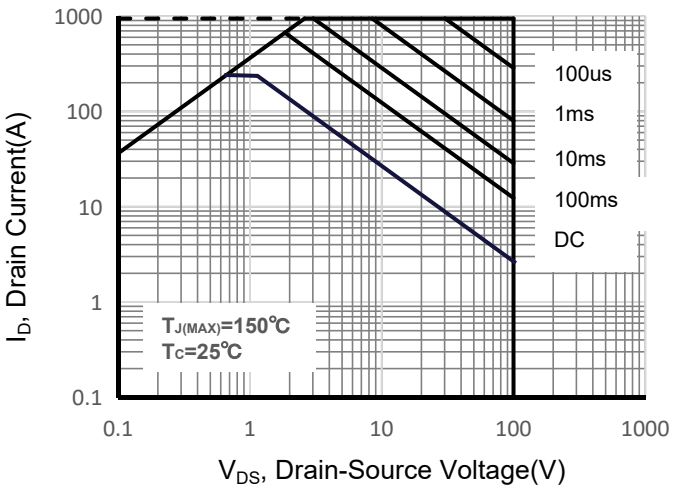


Figure 9. Maximum Continuous Drain Current vs Case Temperature

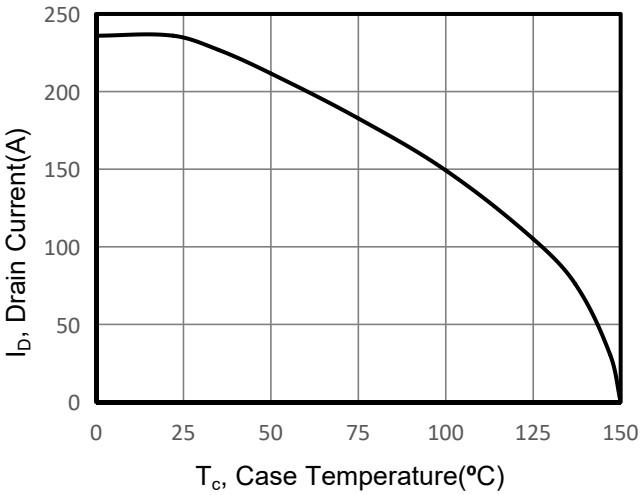
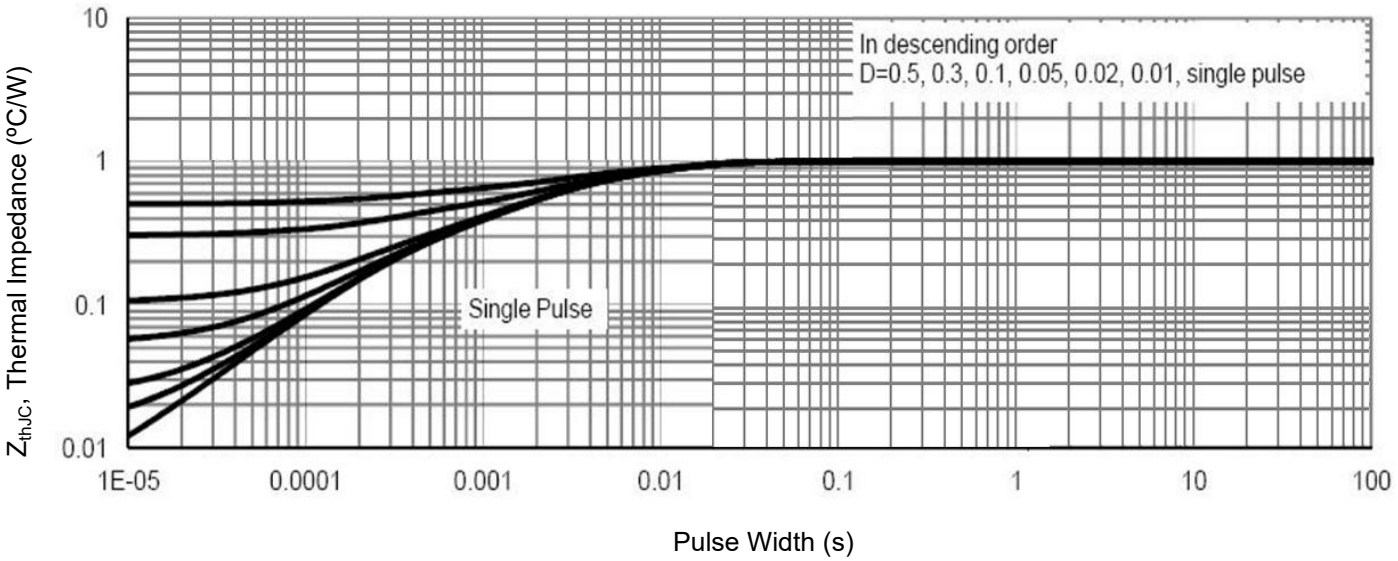
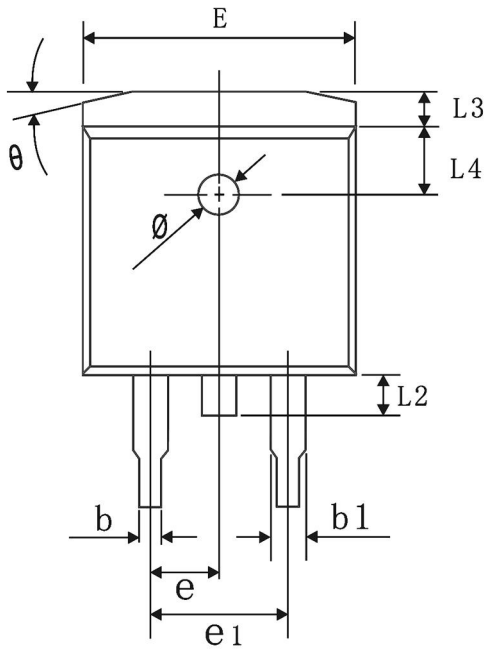


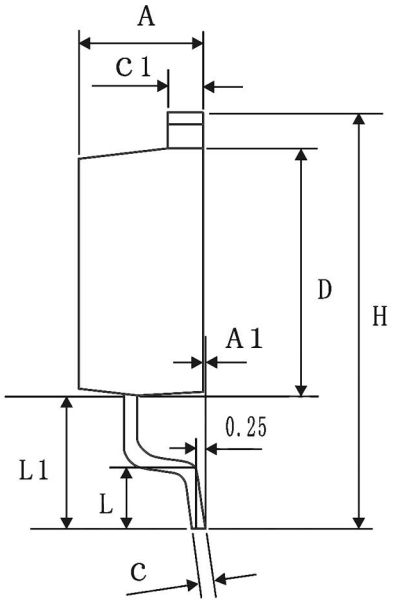
Figure 10. Normalized Maximum Transient Thermal Impedance



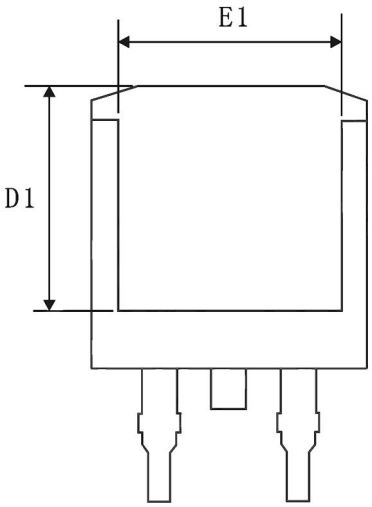
TO-263 Package Information



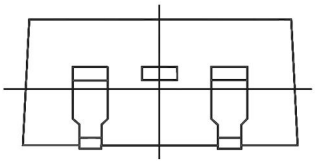
TOP VIEW



SIDE VIEW



BOTTOM VIEW



SIDE VIEW

COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	0.00	NA	0.25
b	0.70	0.80	0.90
b1	1.20	1.30	1.40
c	0.40	0.47	0.55
c1	1.25	1.30	1.35
D	9.00	9.10	9.20
D1	8.00	8.10	8.20
H	14.9	15.2	15.5
E	9.80	10.0	10.2
E1	7.85	8.00	8.15
e1	4.93	5.08	5.23
L	2.00	2.20	2.45
L1	4.60	4.80	5.00
L2	1.30	1.50	1.70
L3	1.15	1.25	1.35
L4	2.40	2.50	2.60
Ø	1.5 REF		
e	2.54 BSC		
θ	13° TYP		