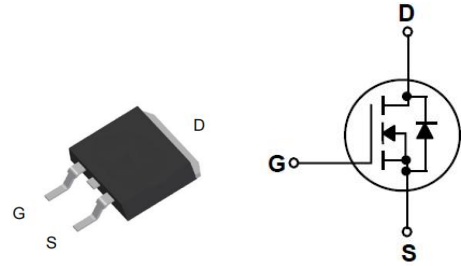


Features

- ◆ 100V, 120A, $R_{DS(ON)}(Typ.) = 3.4m\Omega @ V_{GS} = 10V$
- ◆ Ultra-low $R_{DS(ON)}$ and Low Gate Charge
- ◆ Halogen-free and RoHS-compliant
- ◆ 100% Avalanche Tested



Application

- ◆ Motor Driving in Power Tool, E-vehicle, Robotics
- ◆ Current Switching in DC/DC & AC/DC (SR) Sub-systems
- ◆ Power Management in Telecom, Industrial Automation, CE

Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	100	V
V_{GS}	Gate-Source Voltage	± 20	
I_D	Drain Current-Continuous, $T_c = 25^\circ C$	120	A
I_{DM}	Drain Current-Pulsed ^b	480	
P_D	Maximum Power Dissipation @ $T_J = 25^\circ C$	312	W
E_{AS}	Single Pulsed Avalanche Energy ^d	576	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.4	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	45	

Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 100V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA



MS0004B

N-Channel Enhancement Mode MOSFET

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^c	$V_{GS} = 10V, I_D = 50A$	-	3.4	4.2	mΩ

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	$f = 1.0MHz$	-	2.5	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 50V,$ $V_{GS} = 0V,$ $f = 1MHz$	-	4025	-	pF
C_{oss}	Output Capacitance		-	660	-	
C_{rss}	Reverse Transfer Capacitance		-	13.6	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 50V,$ $V_{GS} = 10V,$ $R_L = 2.5\Omega,$ $R_{GEN} = 3\Omega,$	-	17	-	ns
t_r	Turn-On Rise Time		-	37	-	
$t_{d(off)}$	Turn-Off Delay Time		-	68	-	
t_f	Turn-Off Fall Time		-	61	-	
Q_{gs}	Gate-Source Charge	$V_{DS} = 50V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 20A$	-	19	-	nC
Q_{gd}	Gate-Drain Charge		-	19.4	-	
Q_g	Total Gate Charge		-	50	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Maximum Continuous Drain-Source Diode Forward Current		-	-	120	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	480	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 20A$	-	0.80	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	94	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	242	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$
- $L = 0.5mH, V_{DD} = 25V, I_{AS} = 48A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.

■ Characteristic Curve

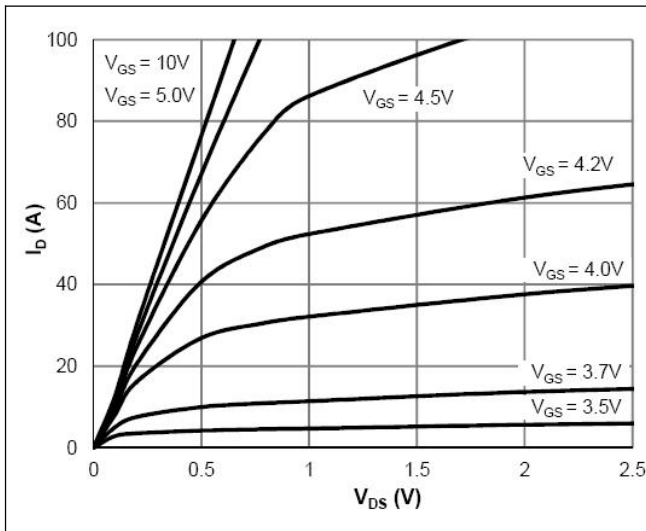


Figure 1. Typical Output Characteristics

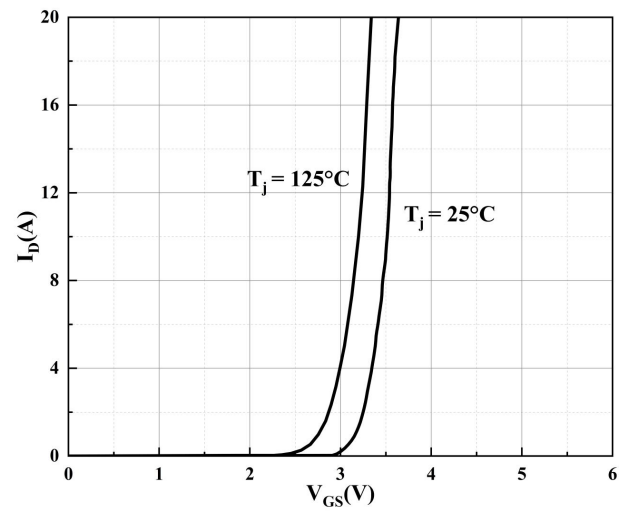


Figure 2. Typical Transfer Characteristics

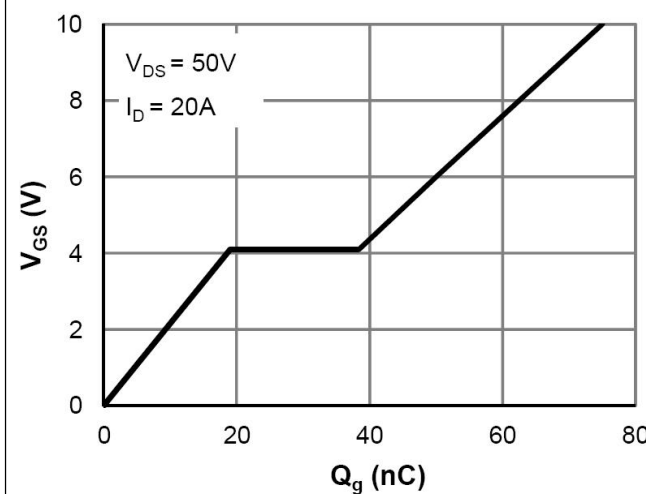


Figure 3. Typical Gate Charge

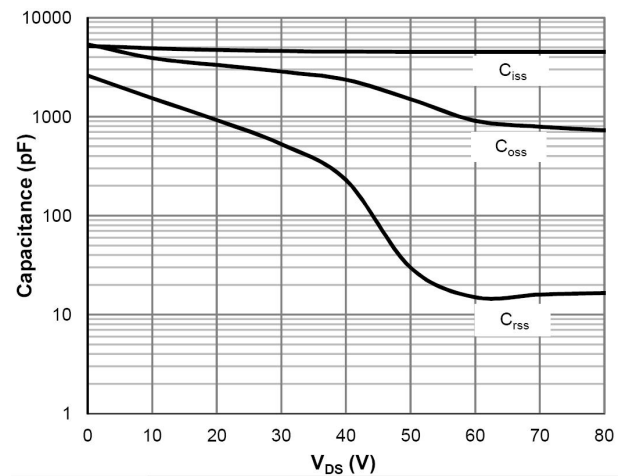


Figure 4. Typical Capacitance

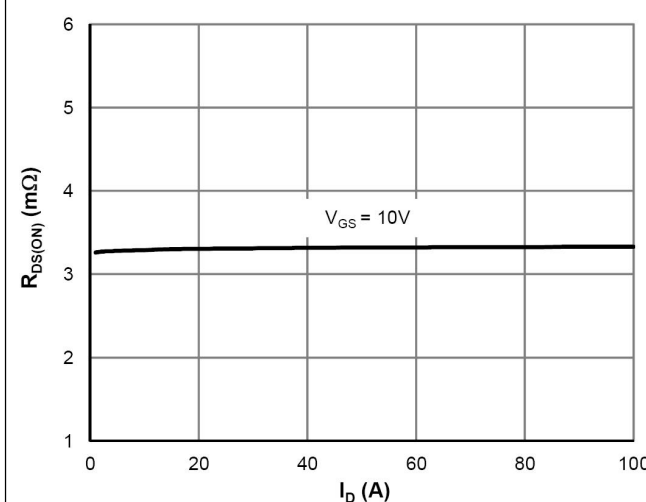


Figure 5. On-resistance vs Drain Current

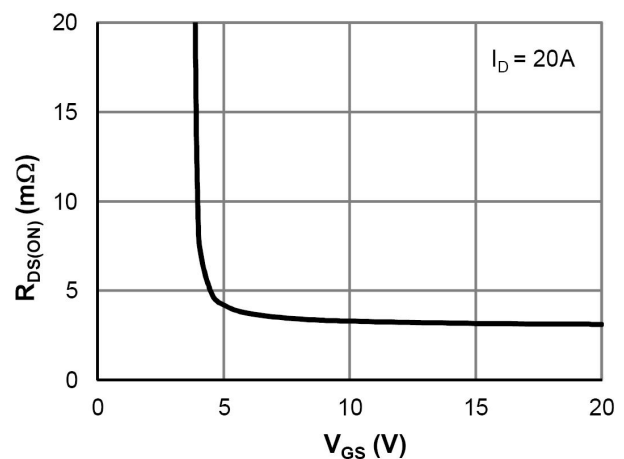


Figure 6. On-resistance vs Gate-Source Voltage

■ Characteristic Curve

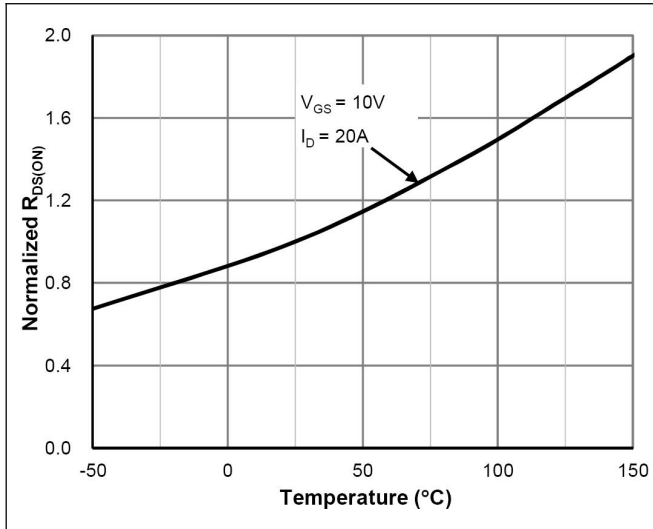


Figure 7. Normalized on-resistance vs Junction Temperature

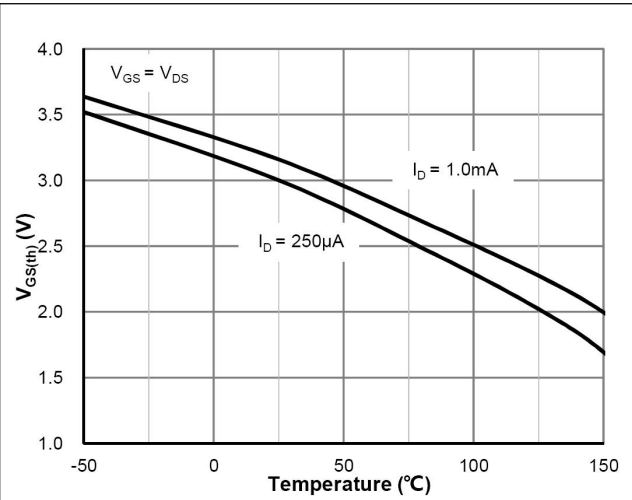


Figure 8. Gate-Source Voltage vs Junction Temperature

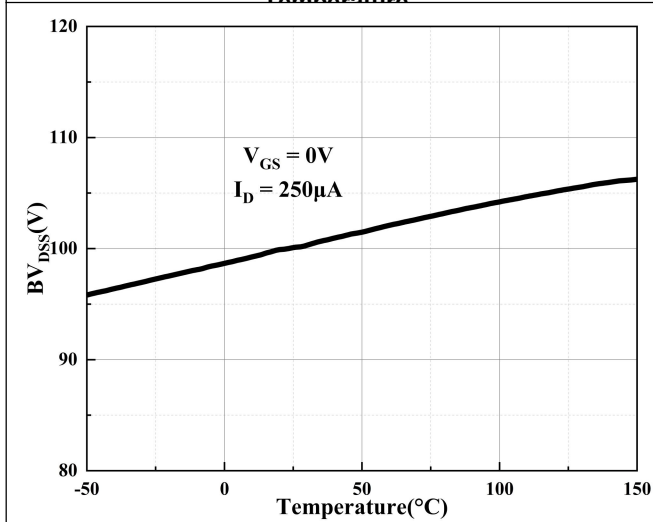


Figure 9. Drain-source Breakdown Voltage vs Junction Temperature

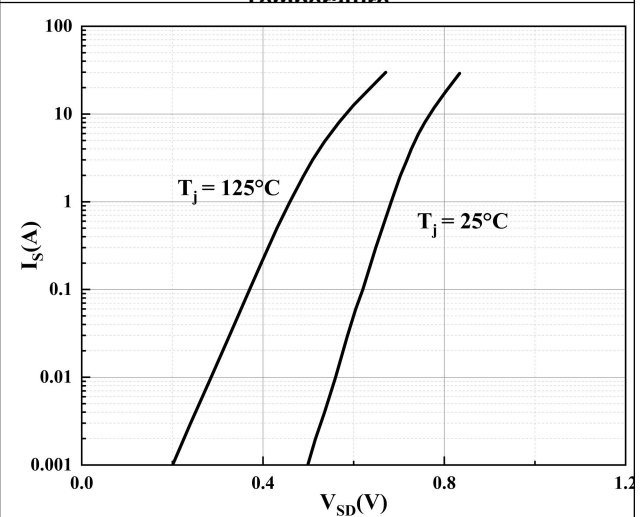


Figure 10. Body Diode Characteristics

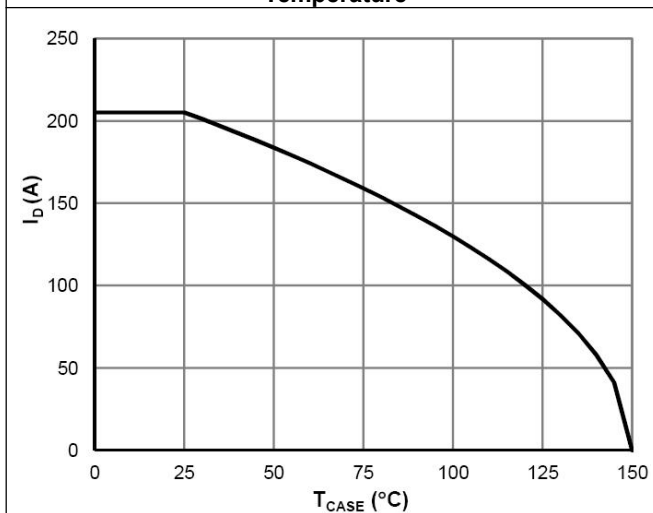


Figure 11. Current De-rating

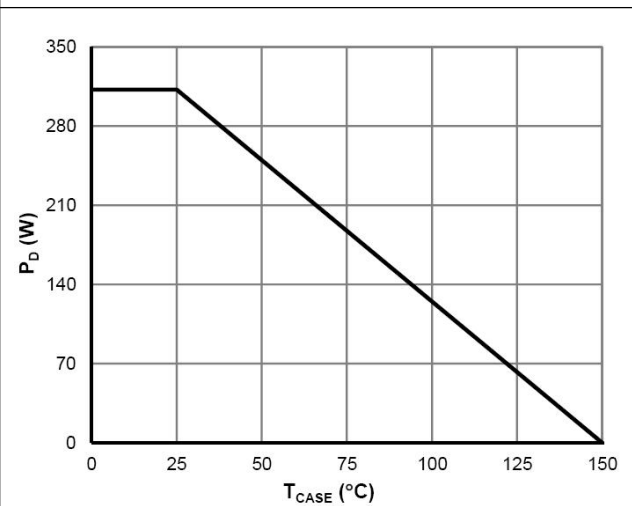


Figure 12. Power De-rating

■ Characteristic Curve

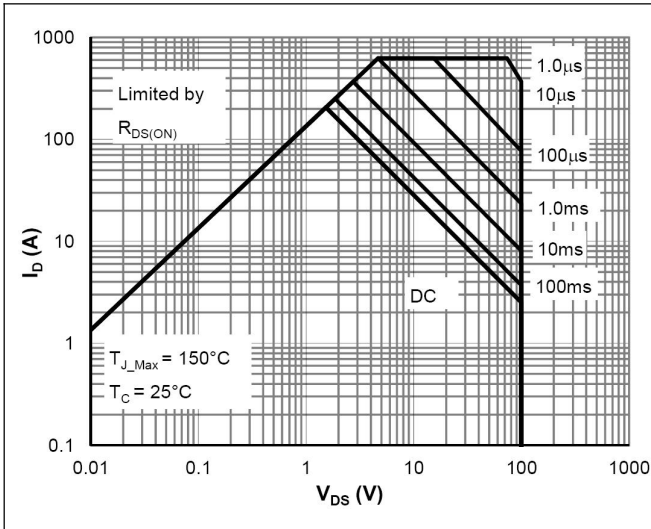


Figure 13. Maximum Safe Operating Area

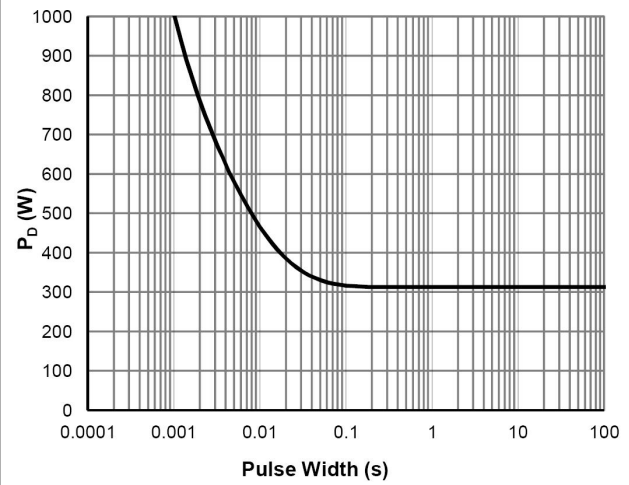


Figure 14. Single Pulse Power Rating, Junction-to-Case

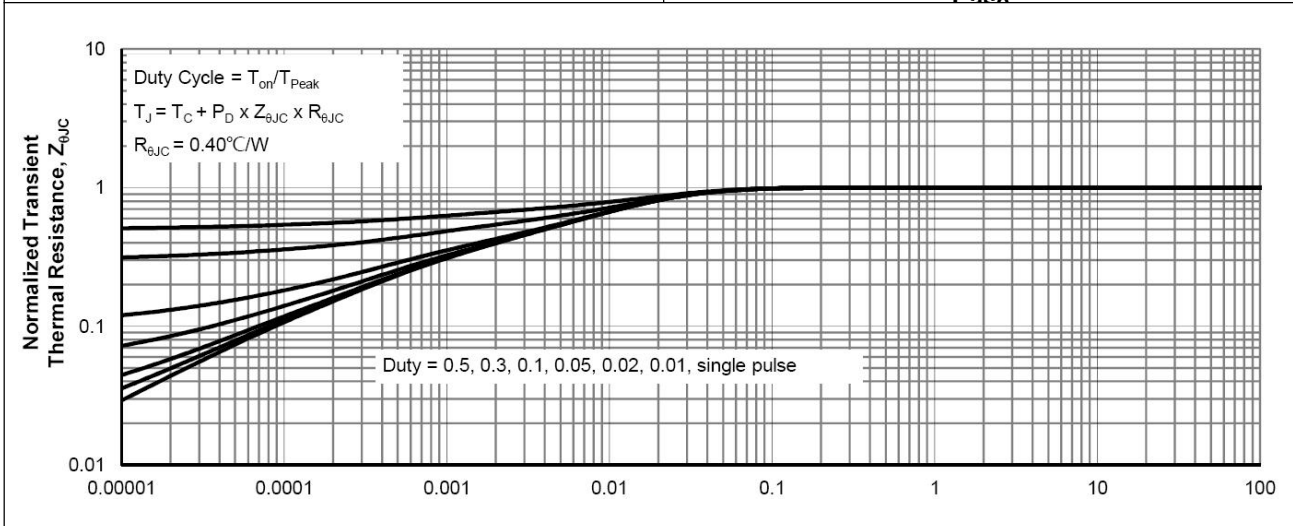
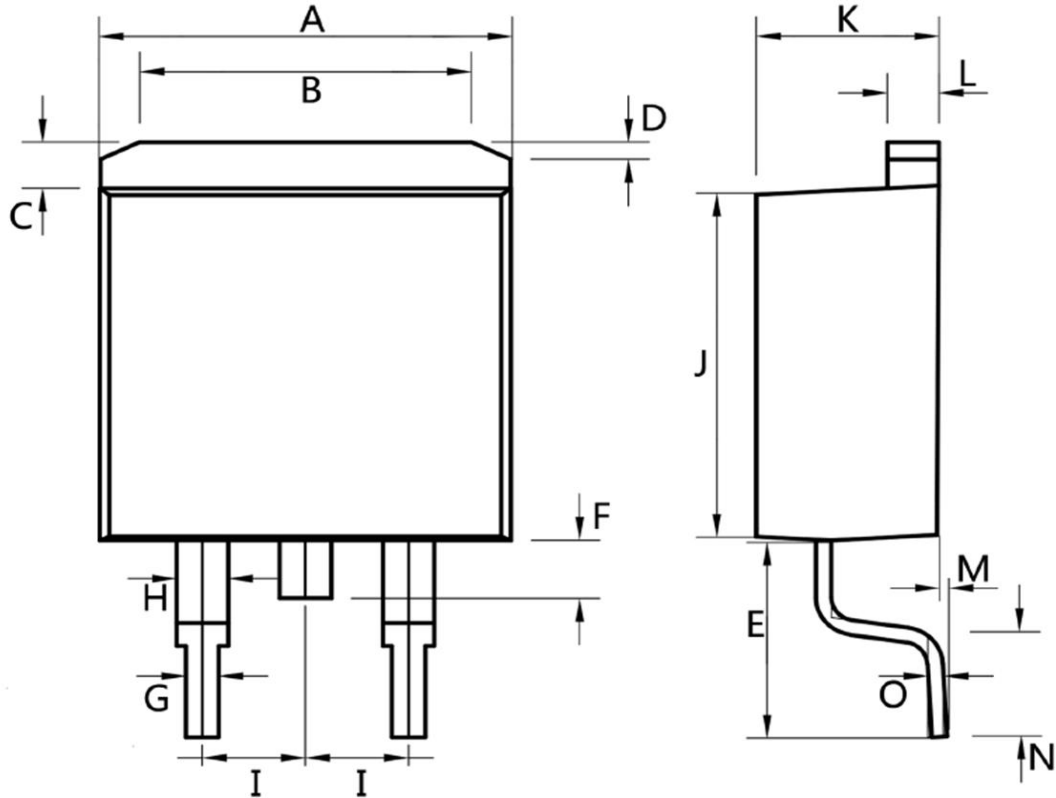


Figure 15. Normalized Maximum Transient Thermal Impedance

Package Information

TO-263



Dim.	Min.	Max.
A	10.15	10.35
B	6	8
C	1.2	1.5
D	0.55	1.0
E	4.3	5.3
F	1.4	1.6
G	0.75	0.85
H	1.2	1.5
I	Typ2.54	
J	8.5	9.5
K	4.3	4.55
L	1.25	1.35
M	0.02	0.23
N	2.2	2.8
O	0.35	0.45
All Dimensions in millimeter		