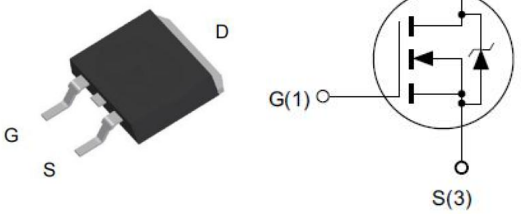
MSA001B

N-Channel Enhancement Mode MOSFET

Features

- 110V, 294A, $R_{DS(on)}$(Typ.) = 2.0mΩ@V_{GS} = 10V
- Excellent $R_{DS(on)}$ and Low Gate Charge
- 100% E_{AS} Guaranteed
- Halogen-free; RoHS-compliant



Application

- Load Switch
- PWM Application
- Power Management

Absolute Maximum Ratings T_c = 25°C unless otherwise noted

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-Source Voltage [a]		110	V
V_{GS}	Gate-Source Voltage		±20	
I_D	Drain Current-Continuous	T_C = 25°C	294	A
		T_C = 100°C	185.5	
I_{DM}	Drain Current-Pulsed [b]		1175	
P_D	Maximum Power Dissipation, T_C = 25°C		417	W
E_{AS}	Single Pulsed Avalanche Energy [c]		1502	mJ
T_J, T_{STG}	Operating and Store Temperature Range		150, -55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	34	

Electrical Characteristics T_J = 25°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 = 250μA	110	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 110V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Forward Gate Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance [d]	V_{GS} = 10V, I_D = 20A	-	2.0	2.6	mΩ

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	V_{DS} = V_{GS} = 0V, f = 1.0MHz	-	2.8	-	Ω
C_{iss}	Input Capacitance	V_{DS} = 55V, V_{GS} = 0V, f = 1.0MHz	-	11.55	-	nF
C_{oss}	Output Capacitance		-	1590	-	pF
C_{rss}	Reverse Transfer Capacitance		-	37	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 55V, V_{GS} = 10V, I_D = 20A, R_{GEN} = 6.2Ω	-	50	-	ns
t_r	Turn-On Rise Time		-	76	-	
$t_{d(off)}$	Turn-Off Delay Time		-	143	-	
t_f	Turn-Off Fall Time		-	84	-	
Q_g	Total Gate Charge	V_{DS} = 55V, V_{GS} = 0 to 10V, I_D = 20A	-	172	-	nC
Q_{gs}	Gate-Source Charge		-	57	-	
Q_{gd}	Gate-Drain Charge		-	40	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	V_G = V_D = 0V, Force Current	-	-	294	A
I_{SM}	Maximum Pulsed Current		-	-	1175	
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	I_F = 20A, dI_F/dt = 100A/μs	-	104	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F = 20A, dI_F/dt = 100A/μs	-	351	-	nC

Notes:

a. T_J = +25 ℃ to +150 ℃.

b. Repetitive rating: pulse width limited by maximum junction temperature.

c. L = 0.5mH, V_{DD} = 25V, I_{AS} = 77.5A, R_G = 25Ω Starting T_J = 25 ℃.

d. Pulse width ≦ 300μs; duty cycle ≦ 0.5%.

■ Characteristic Curve

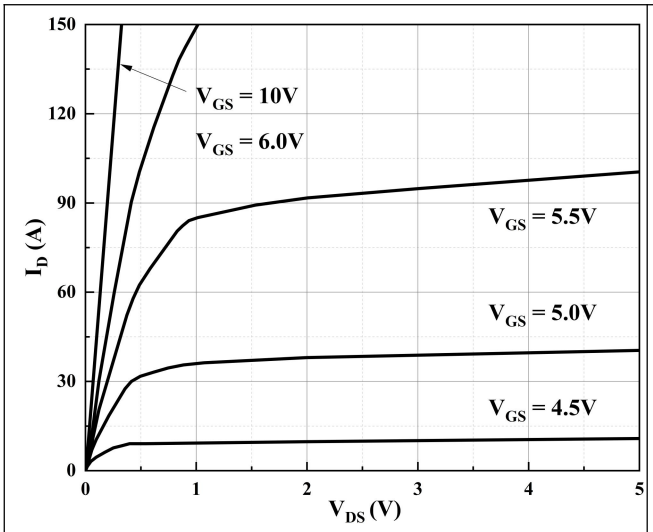


Figure 1. Typical Output Characteristics

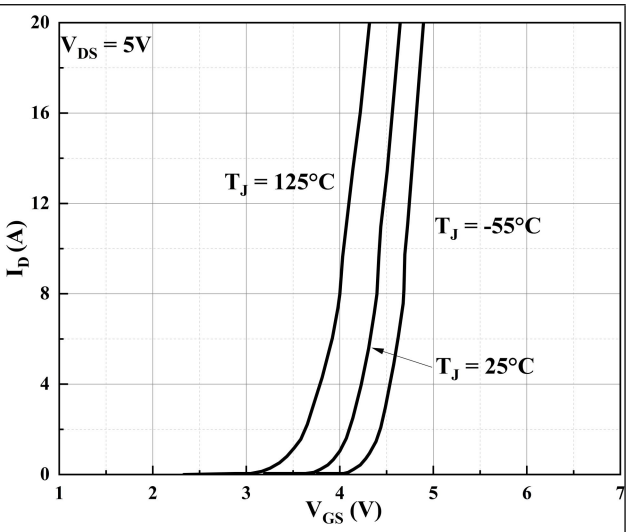


Figure 2. Typical Transfer Characteristics

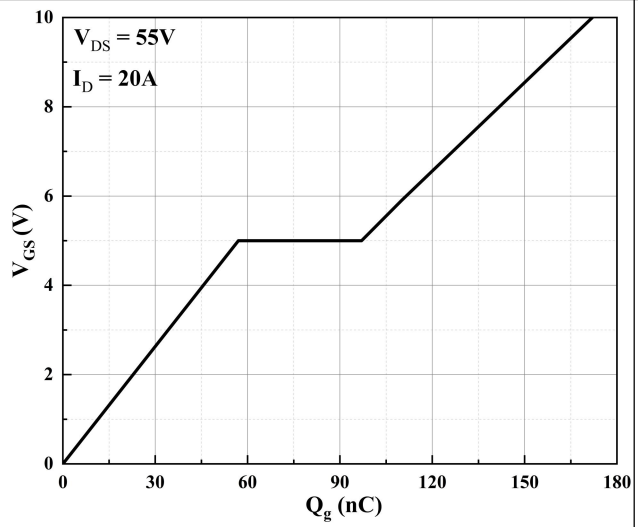


Figure 3. Typical Gate Charge

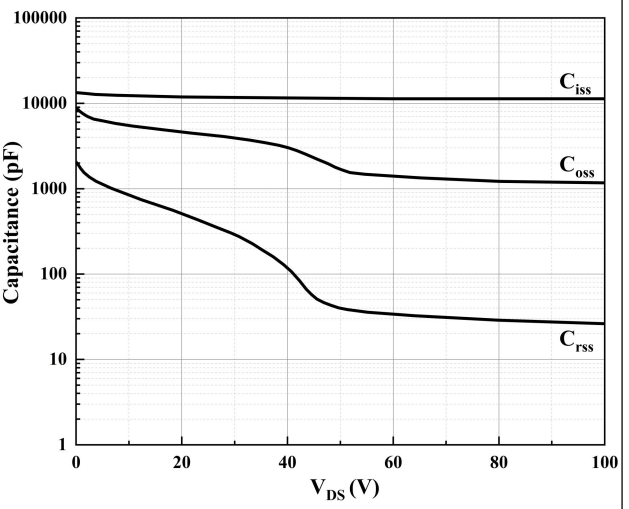


Figure 4. Typical Capacitance

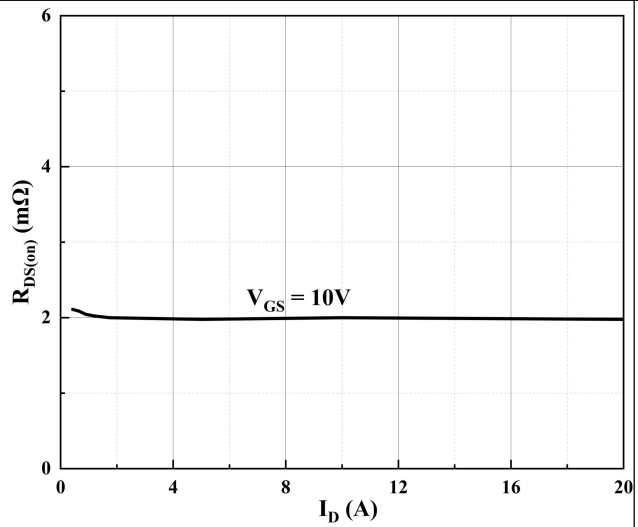


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

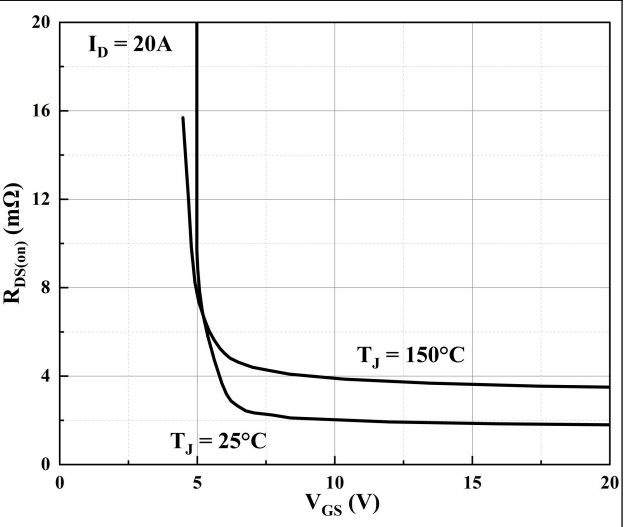


Figure 6. Static Drain-Source On-Resistance vs. Gate-Source Voltage

■ Characteristic Curve

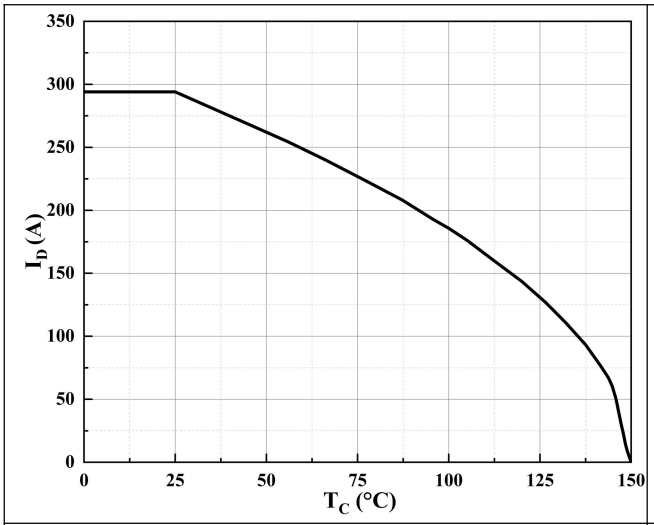


Figure 7. Maximum Continuous Drain Current vs. Case Temperature

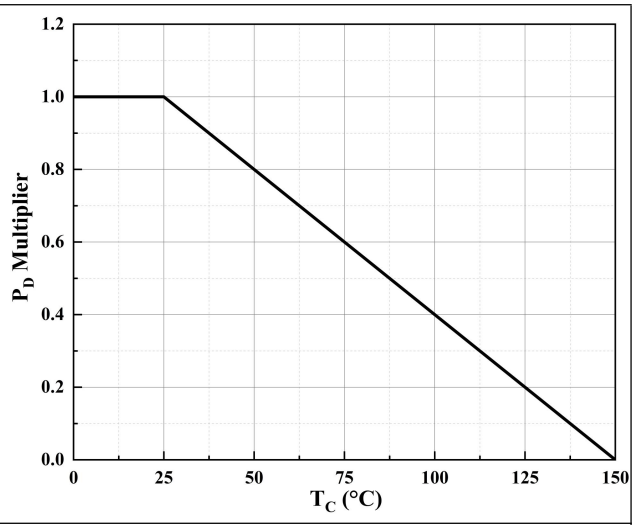


Figure 8. Maximum Power Dissipation Multiplier vs. Case Temperature

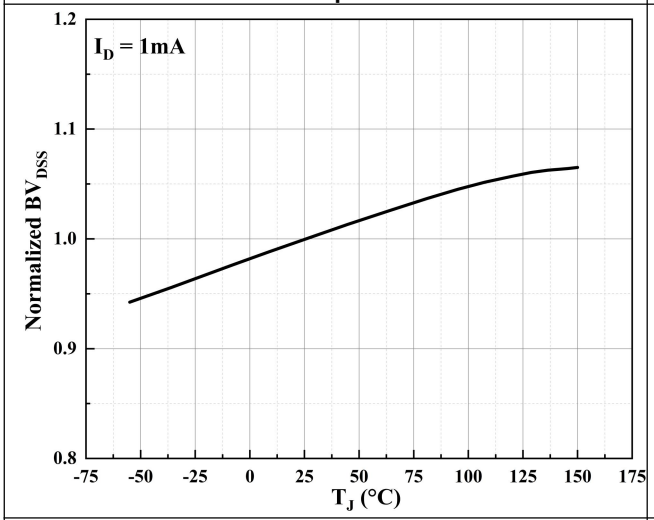


Figure 9. Normalized Breakdown Voltage vs. Junction Temperature

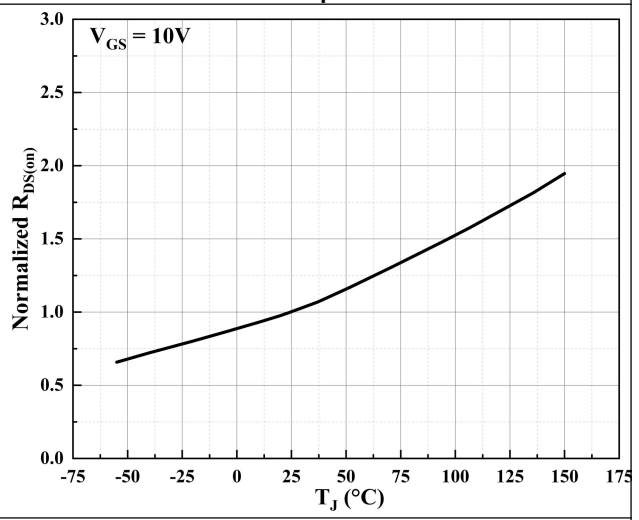


Figure 10. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

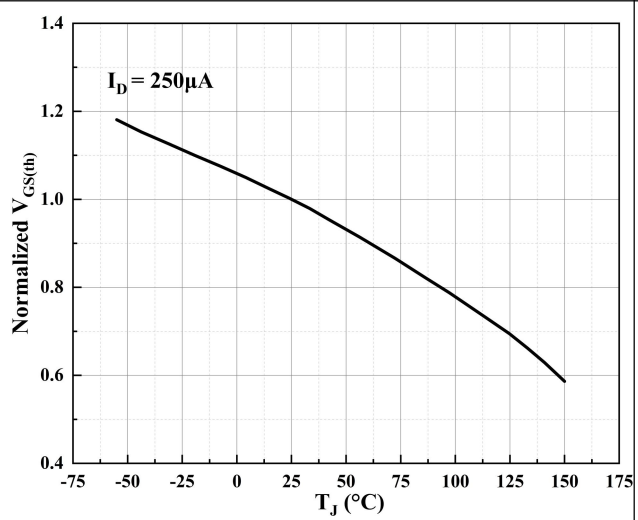


Figure 11. Normalized Threshold Voltage vs. Junction Temperature

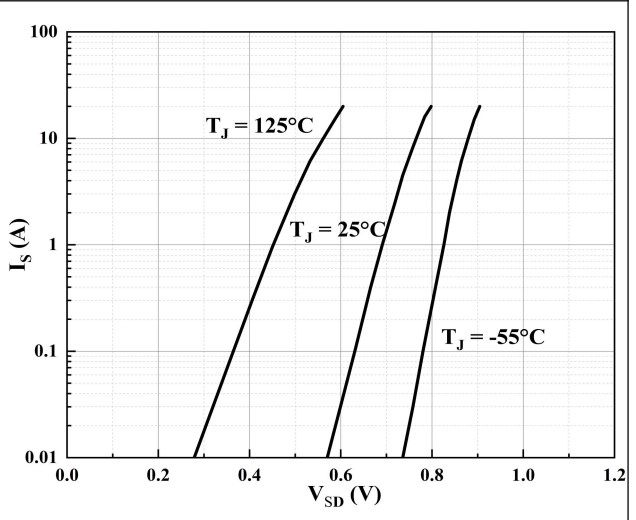


Figure 12. Body Diode Characteristics

■ Characteristic Curve

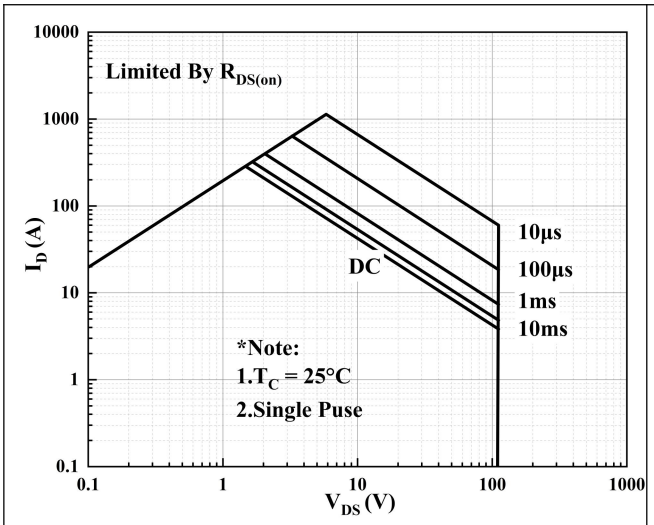


Figure 13. Maximum Safe Operating Area

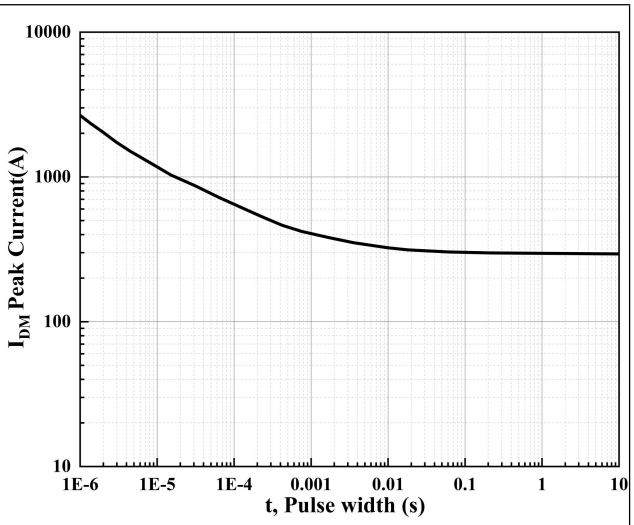


Figure 14. Peak Current Capacity

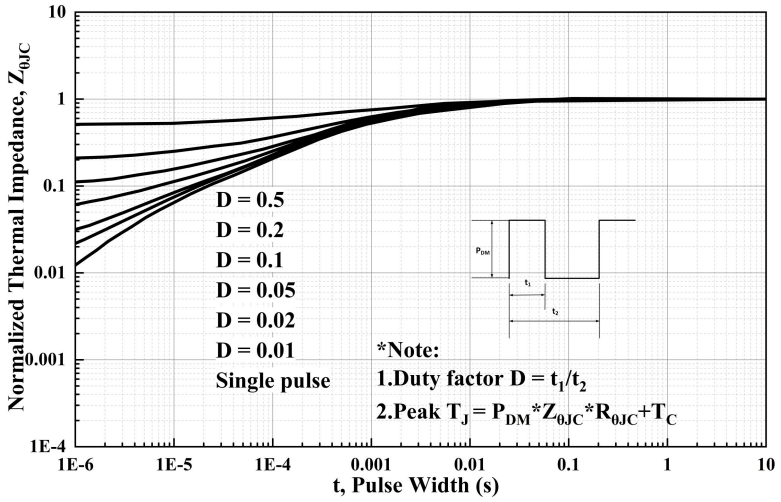
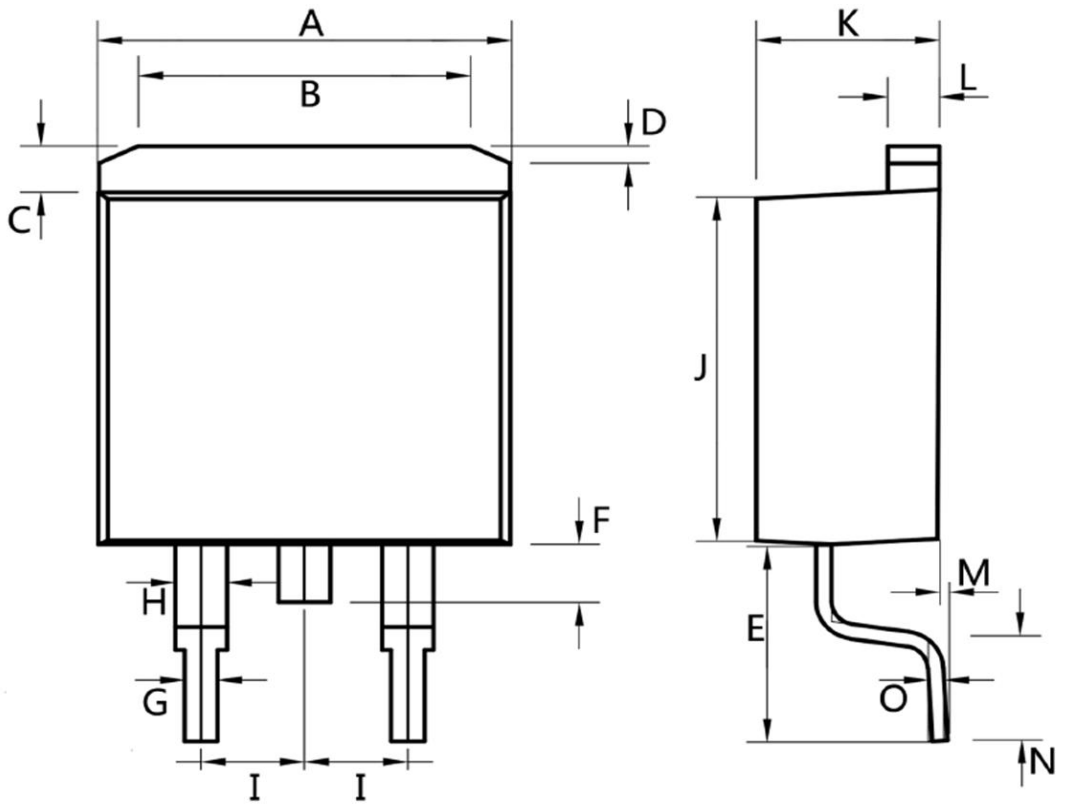


Figure 15. Normalized Maximum Transient Thermal Impedance

■ 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		