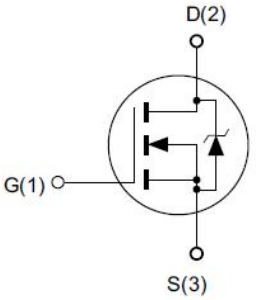
MSE002C

N-Channel Enhancement Mode MOSFET

Features

- ◆ 150V, 130A, $R_{DS(on)}$(Typ.) = 5.2mΩ@V_{GS} = 10V
- ◆ Excellent $R_{DS(on)}$ and Low Gate Charge
- ◆ Halogen free; RoHS compliant
- ◆ 100% E_{AS} Guaranteed



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°C unless otherwise noted

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-Source Voltage [a]		150	V
V_{GS}	Gate-Source Voltage		±20	
I_D	Drain Current-Continuous	T_C = 25°C	130	A
		T_C = 100°C	84	
I_{DM}	Drain Current-Pulsed [b]		190	
P_D	Maximum Power Dissipation, T_C = 25°C		240	W
E_{AS}	Single Pulsed Avalanche Energy [c]		900	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	0.52	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	45	

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	150	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 120V, 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	3.2	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 20A	-	5.2	6.2	mΩ

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_g	Gate Resistance	f = 1.0MHz	-	3.8	-	Ω
C_{iss}	Input Capacitance	V_{DS} = 75V, V_{GS} = 0V, f = 1.0MHz	-	5800	-	pF
C_{oss}	Output Capacitance		-	550	-	
C_{rss}	Reverse Transfer Capacitance		-	17	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 75V, V_{GS} = 10V, R_L = 3.75Ω, R_{GEN} = 3Ω	-	21	-	ns
t_r	Turn-On Rise Time		-	39	-	
$t_{d(off)}$	Turn-Off Delay Time		-	63	-	
t_f	Turn-Off Fall Time		-	32	-	
Q_g	Total Gate Charge	V_{DS} = 75V, V_{GS} = 0 to 10V, I_D = 20A	-	83	-	nC
Q_{gs}	Gate-Source Charge		-	28	-	
Q_{gd}	Gate-Drain Charge		-	19.2	-	

■ 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	-	-	130	A
I_{SM}	Maximum Pulsed Current		-	-	190	
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 1A	-	-	1.0	V
T_{rr}	Body Diode Reverse Recovery Time	I_F = 15A, dI_F/dt = 100A/μs	-	98	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F = 15A, dI_F/dt = 100A/μs	-	316	-	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} = 60A, R_G = 25Ω Starting T_J = 25 ℃.

d. Pulse width ≦ 300μs; duty cycle ≦ 2%.

■ Characteristic Curve

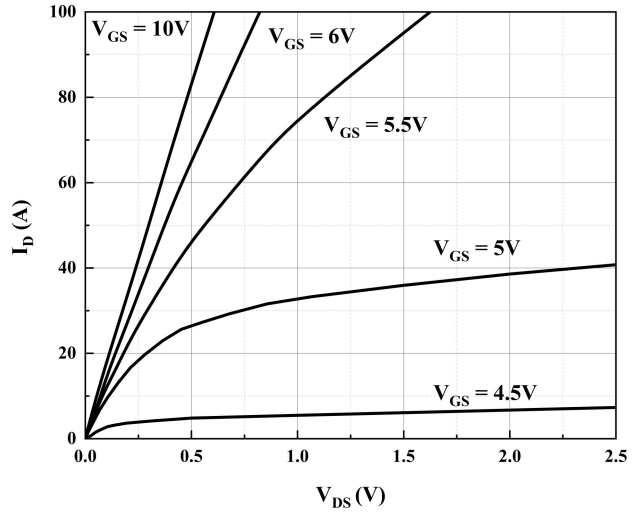


Figure 1. Typical Output Characteristics

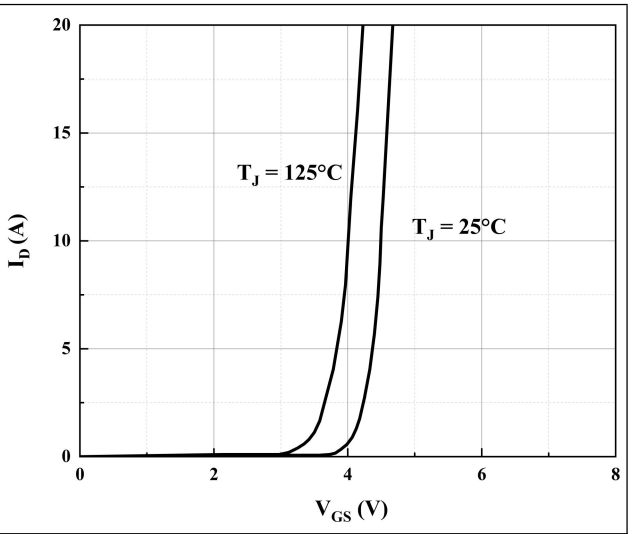


Figure 2. Typical Transfer Characteristics

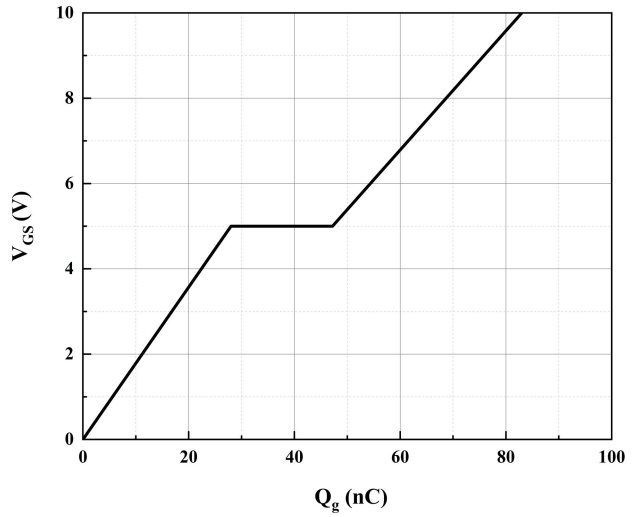


Figure 3. Typical Gate Charge

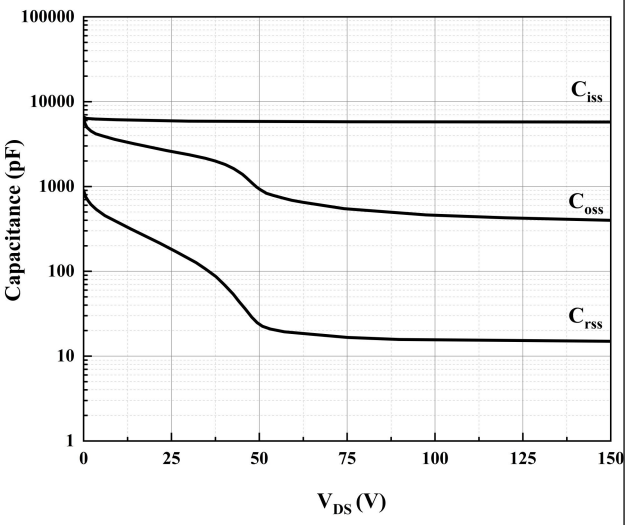


Figure 4. Typical Capacitance

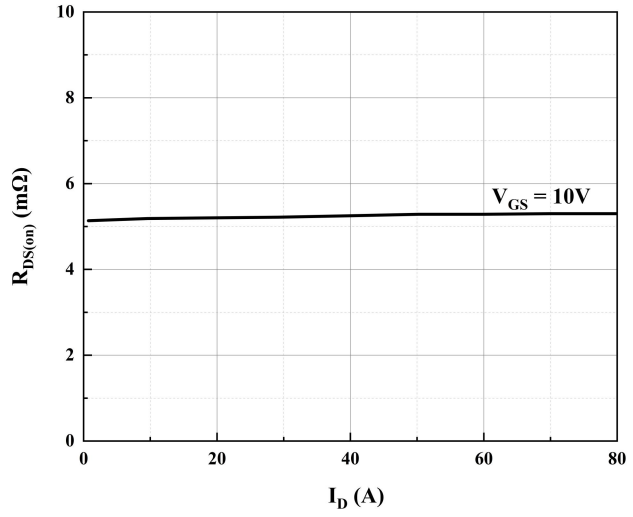


Figure 5. On-Resistance vs. Drain Current

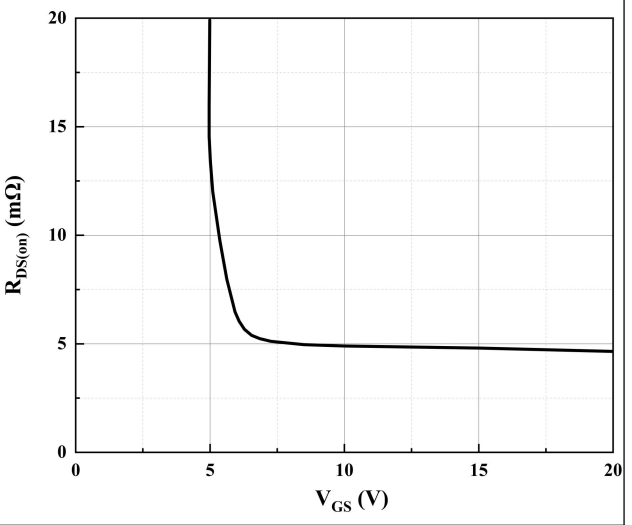


Figure 6. On-Resistance vs. Gate-Source Voltage

■ Characteristic Curve

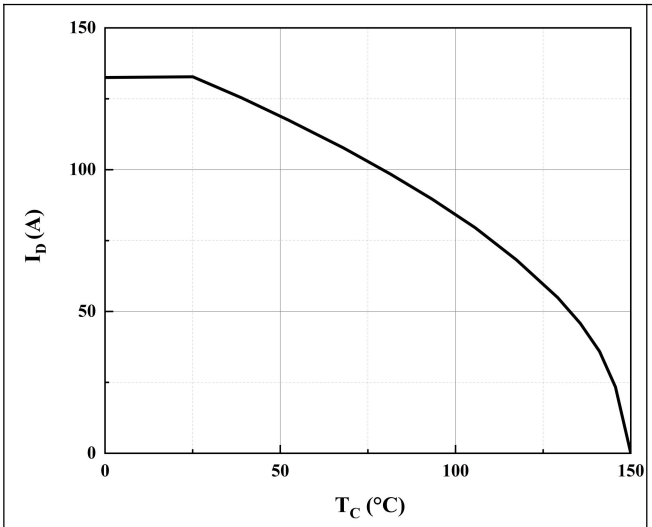


Figure 7. Maximum Continuous Drain Current vs. Case Temperature

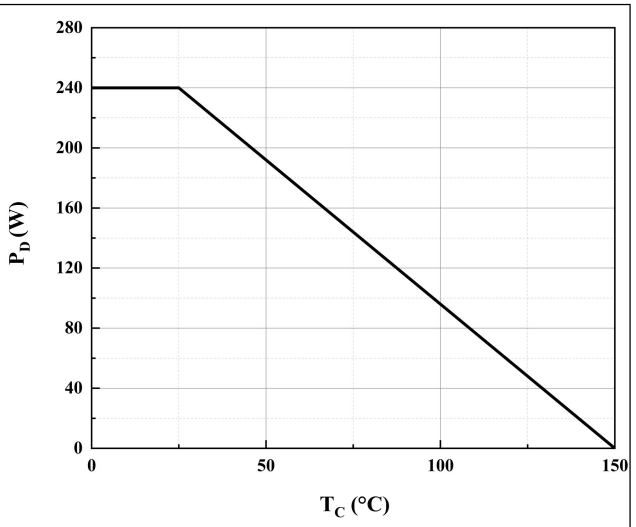


Figure 8. Power Dissipation

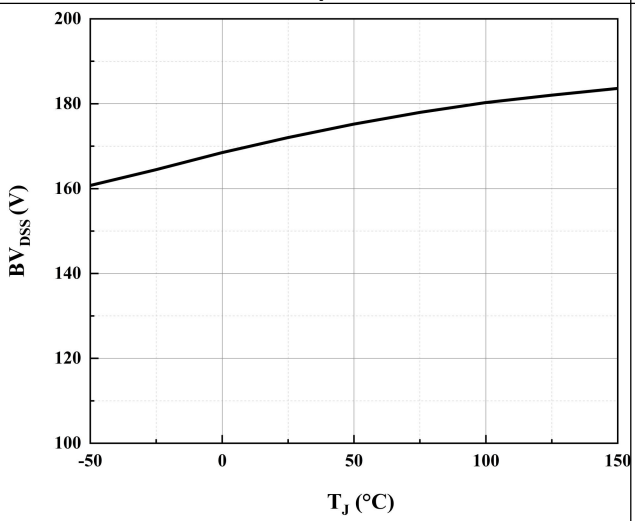


Figure 9. Drain-Source Breakdown Voltage vs. Junction Temperature

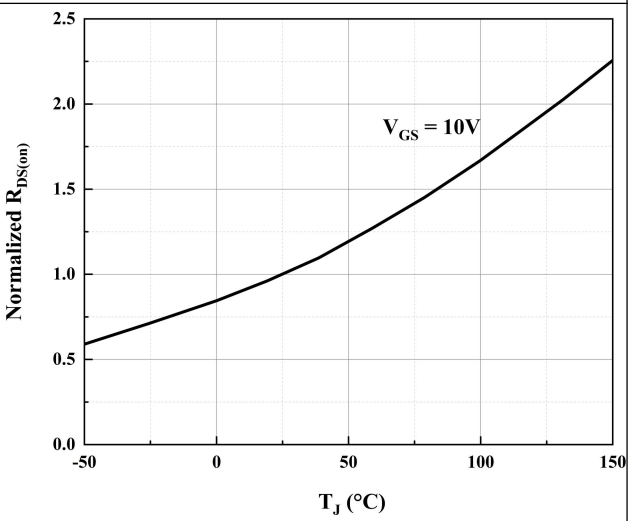


Figure 10. Normalized On-Resistance vs. Junction Temperature

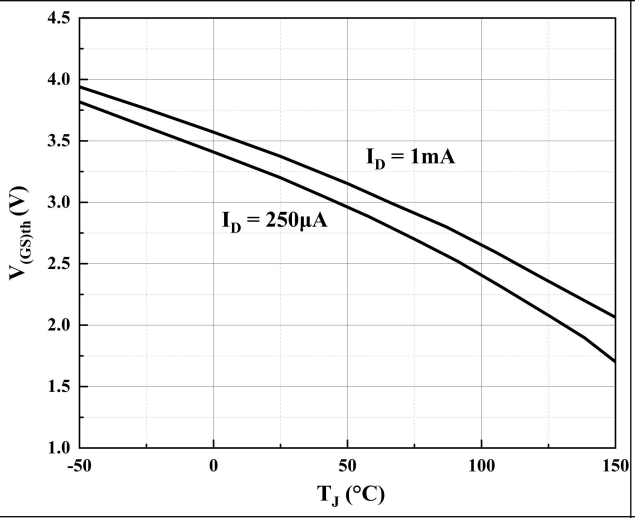


Figure 11. Gate Threshold Voltage vs. Junction Temperature

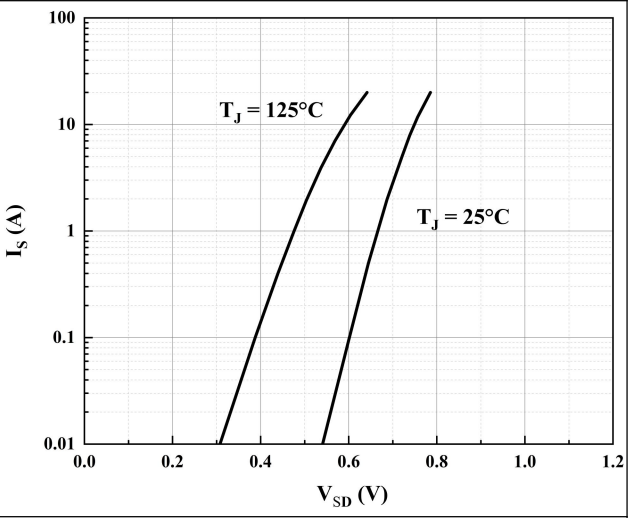


Figure 12. Body Diode Characteristics

■ Characteristic Curve

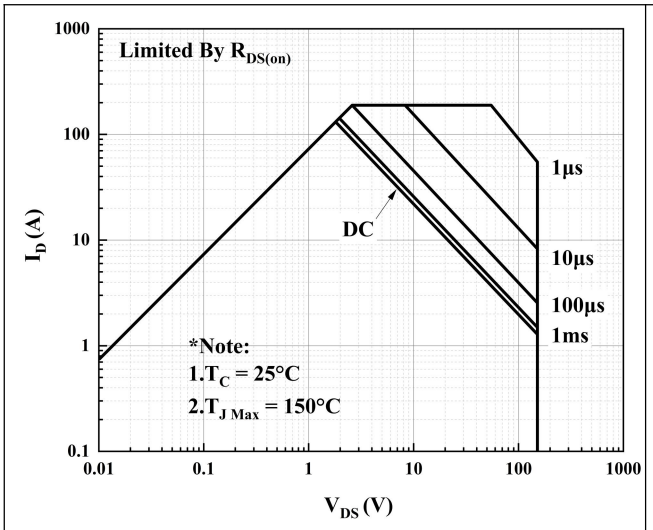


Figure 13. Maximum Safe Operating Area

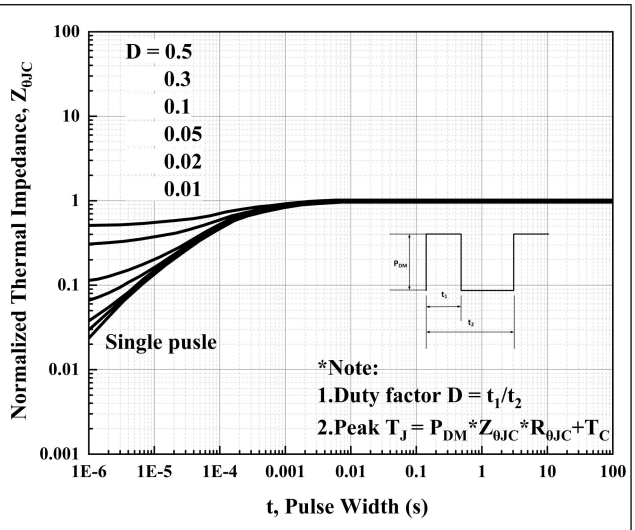


Figure 14. Normalized Maximum Transient Thermal Impedance

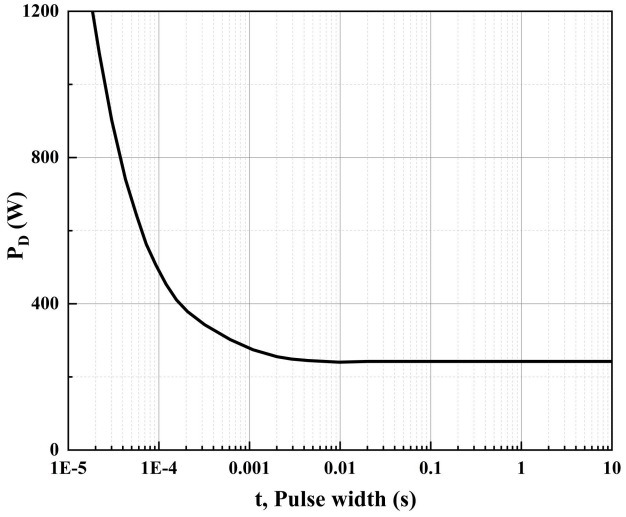
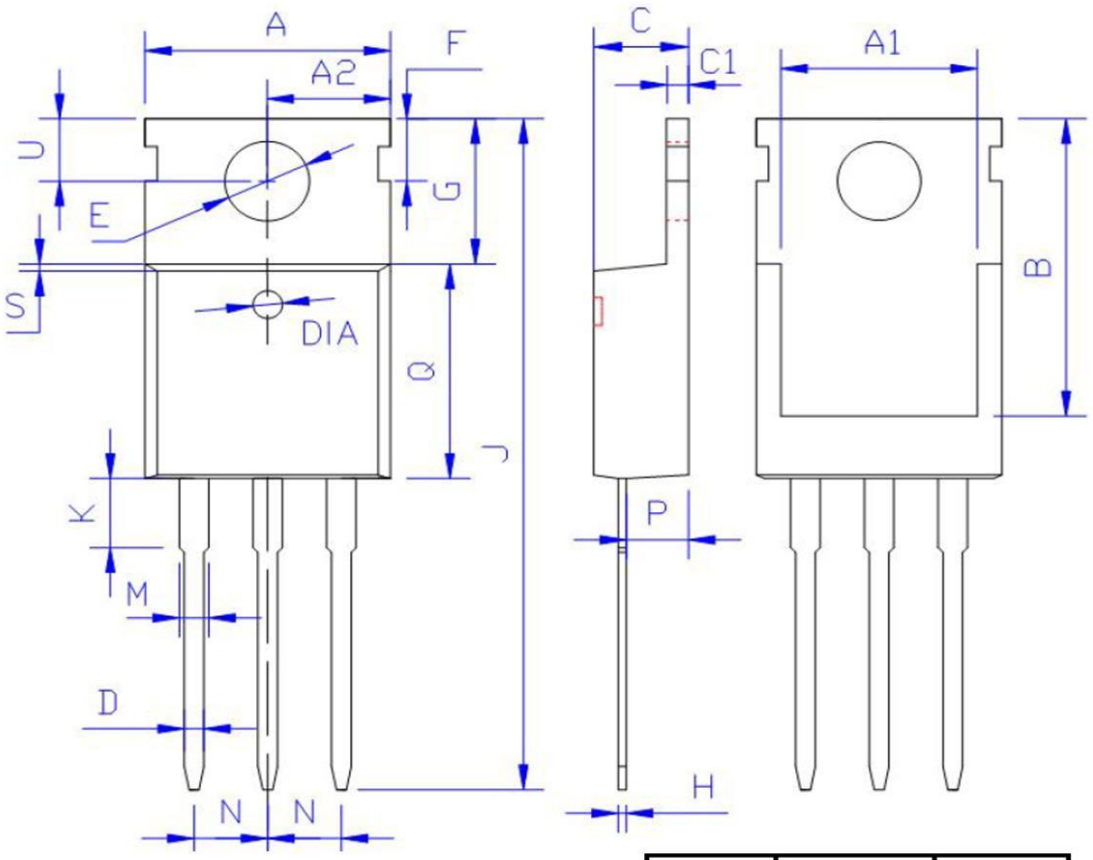
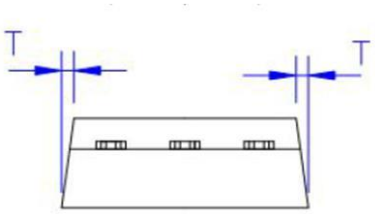


Figure 15. Single Pulse Power Rating, Junction to Case

■ Package Information

TO-220





Dim.	Min.	Max.
A	9.80	10.20
A1	7.80	8.20
A2	4.80	5.20
B	13.00	13.40
C	4.35	4.65
C1	1.15	1.45
D	0.65	0.95
E	3.45	3.75
F	2.85	3.15
G	6.40	6.80
H	0.35	0.65
J	28.68	29.08
K	2.80	3.20
M	1.15	1.45
N	Typical 2.54	
P	2.20	2.60
Q	9.00	9.40
S	0.15	0.35
T	0.15	0.35
U	2.65	2.95
DIA	直径 1.5±0.1 深 MAX 0.5	
All Dimensions in millimeter		