

A2G60N1200MT3

1200V N-Channel MOSFET

Features

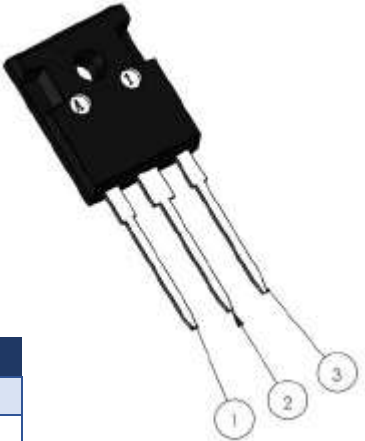
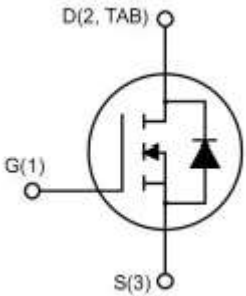
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to parallel and simple to drive
- ROHS Compliant, Halogen free

Application

- EV motor drive
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Solar inverters
- EV charging

Product Summary

V_{DS}	1200V
I_D	60A



Ordering Information

Part Number	Marking	Package	Packaging
A2G60N1200MT3	A2G60N1200MT3	TO-247-3	Tube

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1200	V
I_D	Drain Current (continuous) at $T_C=25^\circ\text{C}$	60	A
I_D	Drain Current (continuous) at $T_C=100^\circ\text{C}$	48	A
I_{DM}	Drain Current (pulsed)	100	A
V_{GS}	Gate-Source Voltage	-10/+22	V
P_D	Power Dissipation $T_C=25^\circ\text{C}$	395	W
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=1200\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$			100	μA
I_{GSS}	Gate-body Leakage Current	$V_{DS}=0\text{V}, V_{GS}=-10\text{ to }20\text{V}$			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=10\text{mA}$	2	3	4	V
$V_{GS(on)}$	Recommended turn-on Voltage	Static		18		V
$V_{GS(off)}$	Recommended turn-off Voltage			-5		V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS}=18\text{V}, I_D=20\text{A}$		45	52	$\text{m}\Omega$
		$V_{GS}=18\text{V}, I_D=20\text{A}, T_J=175^\circ\text{C}$		81		$\text{m}\Omega$

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Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C _{iss}	Input Capacitance	V _{DS} =1000V, f=100kHz V _{AC} =25mV		2565		pF
C _{oss}	Output Capacitance			109		pF
C _{rss}	Reverse Transfer Capacitance			4		pF
g _{fs}	Transconductance	V _{DS} =20V, I _D =20A		24		S
E _{oss}	C _{oss} Stored Energy	V _{DS} =1000V, f=100kHz		63		uJ
E _{on}	Turn-On Energy (Body Diode)	V _{DS} =800V		1695		uJ
E _{off}	Turn-Off Energy (Body Diode)	V _{GS} =-5/20V, I _D =20A L=100uH, T _J =175°C		306		uJ
Q _g	Total Gate Charge	V _{DS} =800V		125		nC
Q _{gs}	Gate-source Charge	V _{GS} =-5/20V		32		nC
Q _{gd}	Gate-Drain Charge	I _D =20A		33		nC
R _{G(int)}	Internal Gate Resistance	f=1MHz, V _{AC} =25mV		4.2		Ω
t _{d(on)}	Turn-on Delay Time	V _{DS} =800V V _{GS} =-5/20V, I _D =20A L=100uH, R _{ext} =2.5Ω		17		ns
t _r	Rise Time			66		ns
t _{d(off)}	Turn-off Delay Time			28		ns
t _f	Fall Time			14		ns

Typical Performance-Reverse Diode (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{FSD}	Forward Voltage	V _{GS} =0V, I _F =20A, T _J =25°C		4.2	6	V
		V _{GS} =0V, I _F =20A, T _J =175°C		3.5	6	V
I _S	Continuous Diode Forward Current	V _{GS} =0V, T _C =25°C		55		A
t _{rr}	Reverse Recovery Time	V _{GS} =-5V, I _F =20A		50		ns
Q _{rr}	Reverse Recovery Charge	V _R =800V		712		nC
I _{rrm}	Peak Reverse Recovery Current	di/dt=900A/μs, T _J =175°C		19		A

Thermal Characteristics

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	0.38	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	40	°C/W

The values are based on the junction-to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of T_J(max)=175°C.

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Electrical Characteristics

Fig1. Output characteristics ($T_J = 25^\circ\text{C}$)

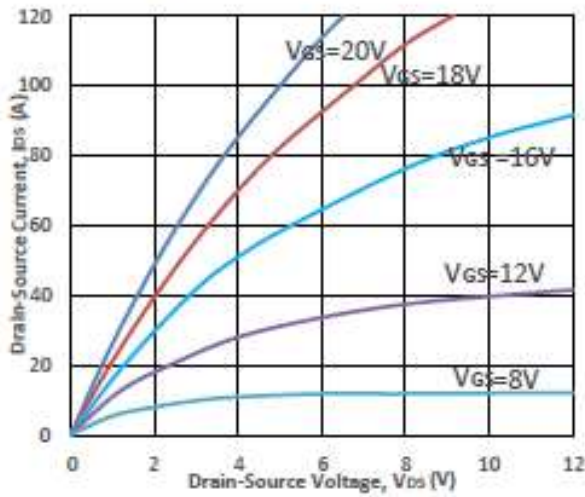


Fig2. Output characteristics ($T_J = 175^\circ\text{C}$)

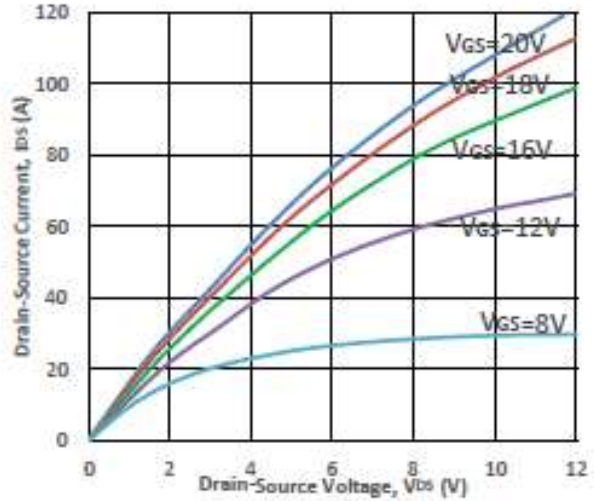


Fig3. Normalized On-Resistance vs. Temperature

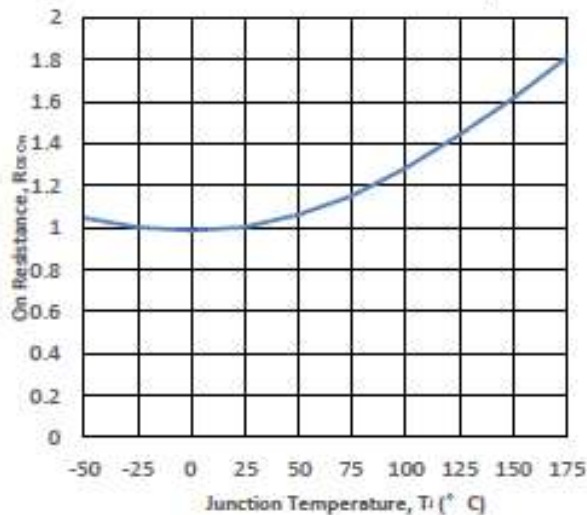


Fig4. On-Resistance vs. Temperature

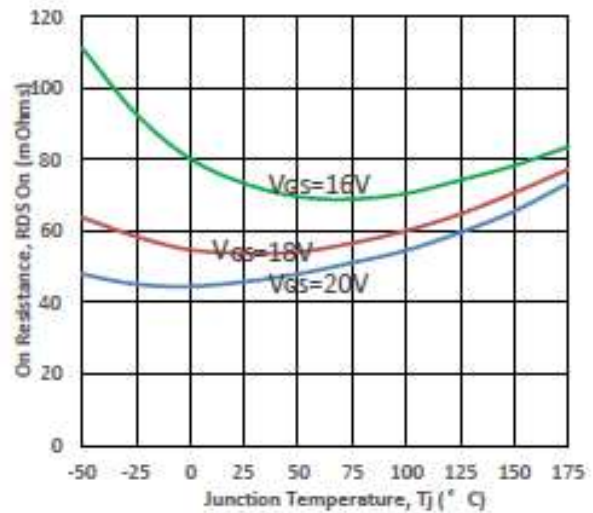


Fig5. Transfer Characteristic

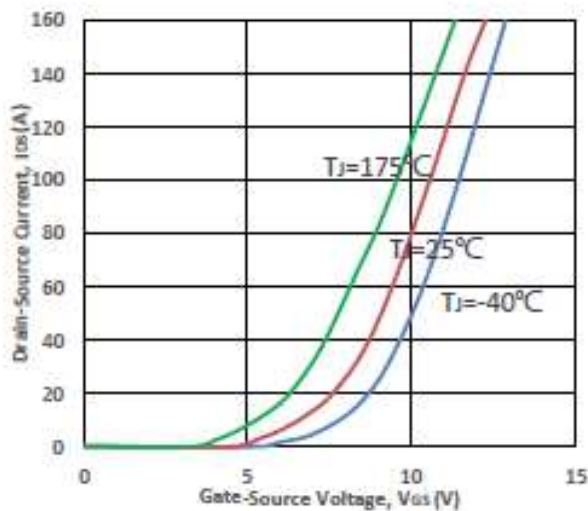
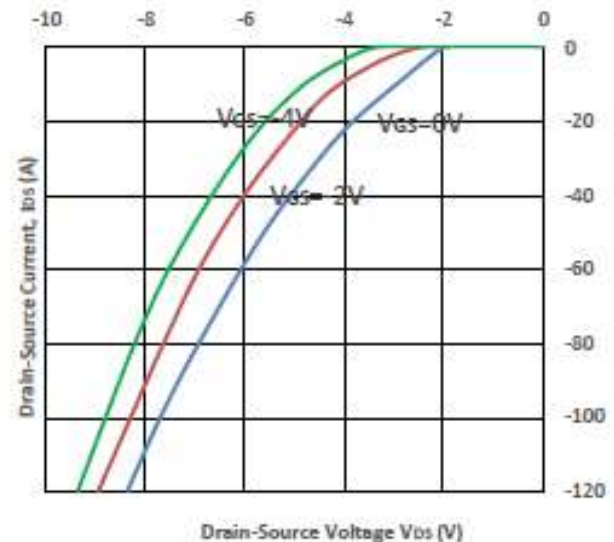


Fig6. Body Diode Characteristic at 25°C



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Fig7. Threshold Voltage vs. Temperature

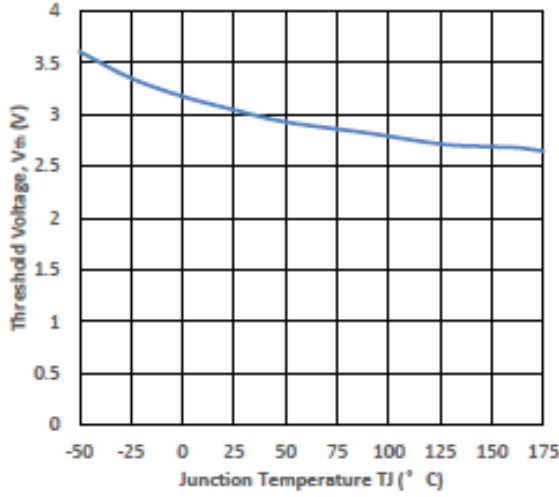


Fig8. Gate Charge Characteristics

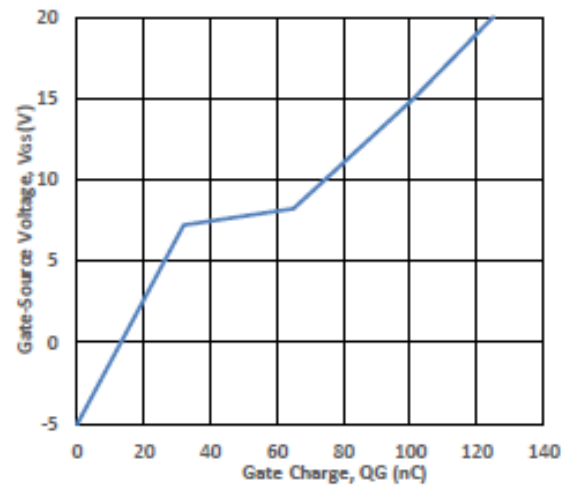


Fig9. 3rd Quadrant Characteristic at 25 $^{\circ}$ C

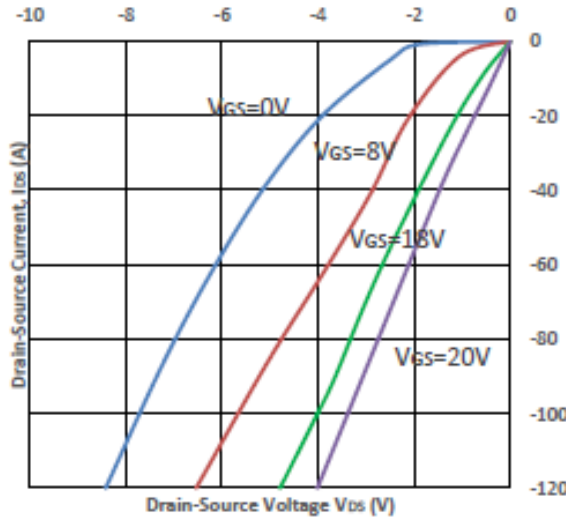


Fig10. Output Capacitor Stored Energy

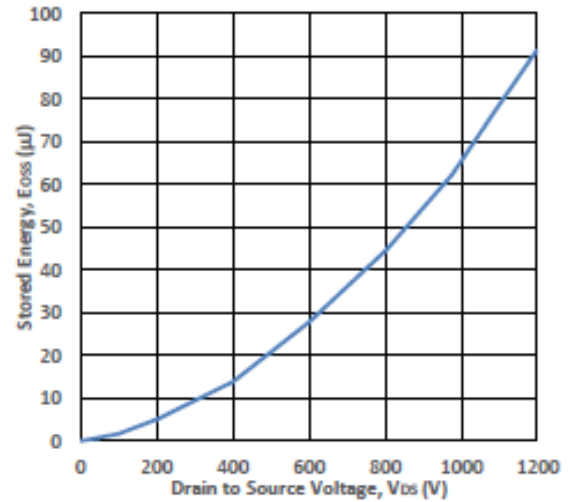


Fig11. Capacitances vs. Drain-Source

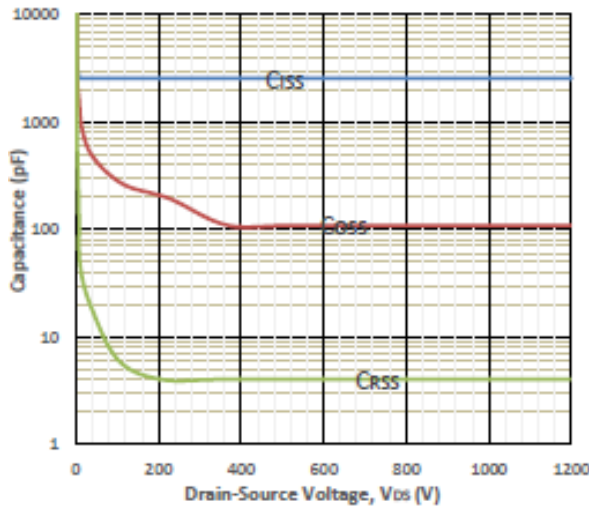
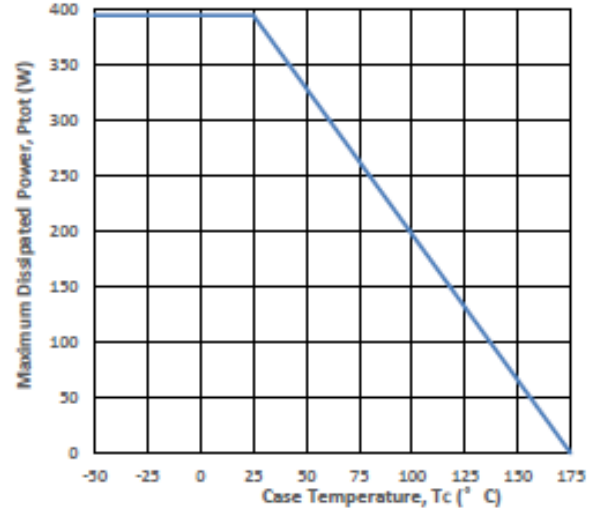


Fig12. Max Power Dissipation Derating Vs Tc



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Fig13. Switching Energy vs. Drain Current

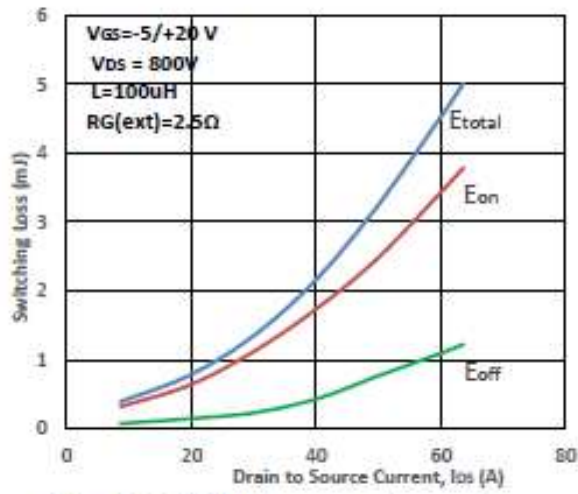


Fig14. Switching Energy vs. $R_{G(ext)}$

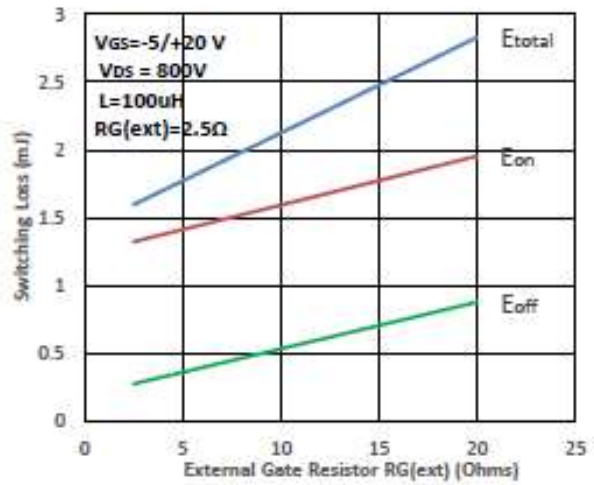


Fig15. Switching Energy vs. Temperature

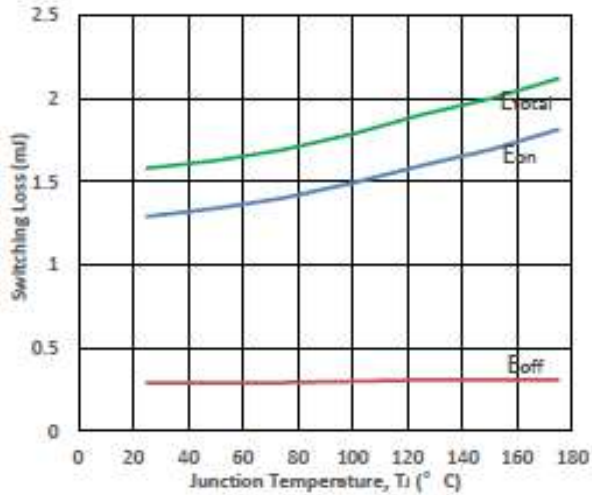


Fig16. Switching Times vs. $R_{G(ext)}$

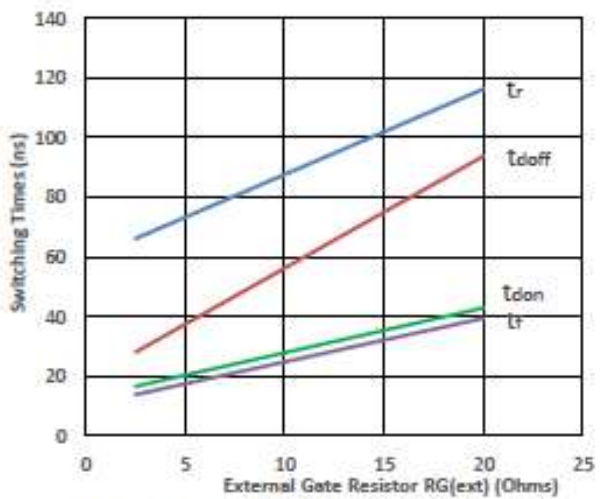


Fig17. Transient Thermal Impedance

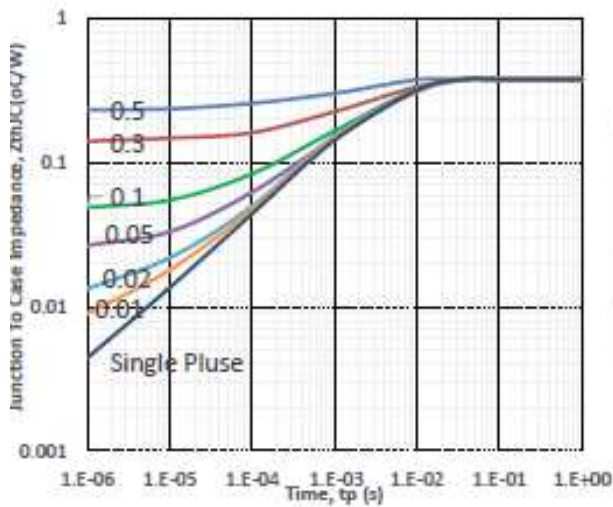
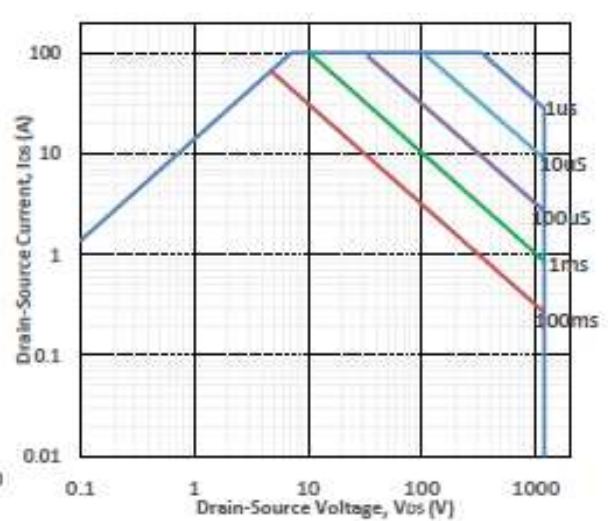
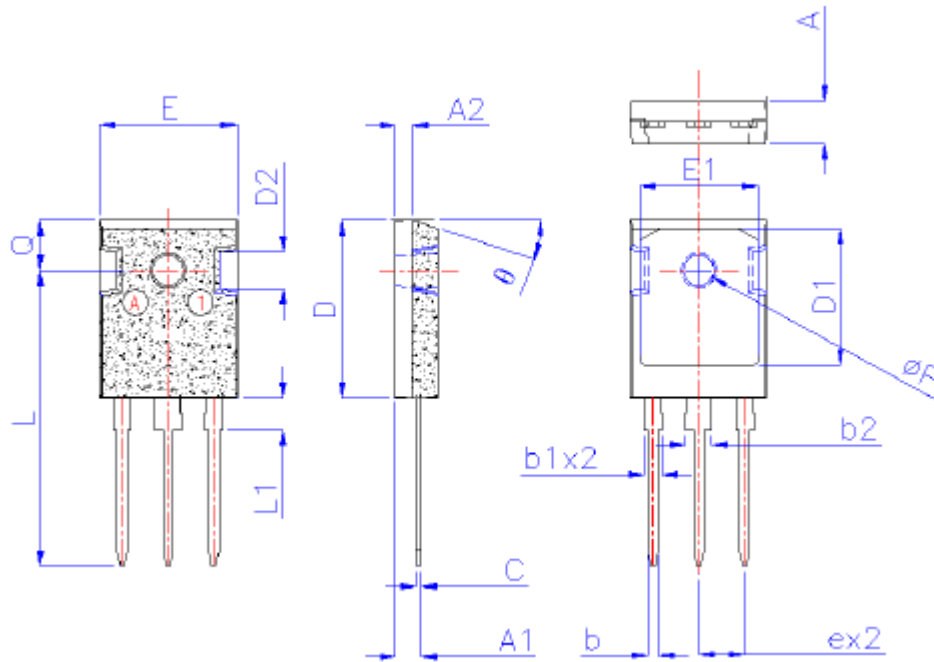


Fig18. Safe Operating Area



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Package Drawing



Dimensions (Unit: mm)

Symbols	Dimensions in millimeters			Dimensions in inches		
	Min.	Type	Max.	Min.	Type	Max.
A	4.80	5.00	5.20	0.189	0.197	0.205
A1	2.85	3.00	3.15	0.112	0.118	0.124
b	1.16	1.22	1.27	0.046	0.048	0.050
b1	2.03	2.06	2.10	0.080	0.081	0.083
b2	3.03	3.06	3.10	0.119	0.120	0.122
C	0.55	0.60	0.65	0.022	0.024	0.026
D	20.80	21.00	21.20	0.819	0.827	0.835
D1	15.94	16.24	16.54	0.628	0.639	0.651
D2	4.30 BSC			0.169 BSC		
e	5.44 BSC			0.169 BSC		
E	15.95	16.15	16.35	0.628	0.636	0.644
E1	13.82	14.02	14.26	0.544	0.552	0.561
L	34.65	35.05	35.45	1.364	1.380	1.396
L1	-	-	-	-	-	0.152
Q	5.85	5.95	6.05	0.230	0.234	0.238
ØP	3.45	3.60	3.75	0.136	0.142	0.148
θ	17.5°			0.689°		

Revision version	Description	Date
1	Initial	01.2024