

A3G30N2000MT4

2000V N-Channel MOSFET

Features

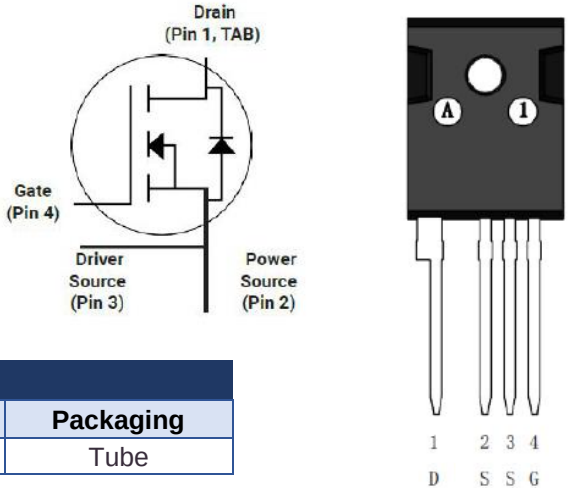
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Optimized package with separate driver source pin
- Easy to parallel and simple to drive
- ROHS Compliant, Halogen free

Application

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

Product Summary

V_{DS}	2000V
I_D	30A



Ordering Information

Part Number	Marking	Package	Packaging
A3G30N2000MT4	A3G30N2000MT4	TO-247-4	Tube

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	2000	V
I_D	Drain Current (continuous) at $T_C=25^\circ\text{C}$	30	A
I_D	Drain Current (continuous) at $T_C=100^\circ\text{C}$	20	A
I_{DM}	Drain Current (pulsed)	78	A
V_{GS}	Gate-Source Voltage	-10/+22	V
P_D	Power Dissipation $T_C=25^\circ\text{C}$	258	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	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	2000			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=2000\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$		1	100	μA
I_{GSS}	Gate-body Leakage Current	$V_{DS}=0\text{V}, V_{GS}=-10\text{ to }20\text{V}$		10	250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=20\text{mA}$	1.8	2.6	3.5	V
$V_{GS(on)}$	Recommended turn-on Voltage	Static		15		V
$V_{GS(off)}$	Recommended turn-off Voltage			-3		V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS}=15\text{V}, I_D=20\text{A}$		98	125	$\text{m}\Omega$
		$V_{GS}=15\text{V}, I_D=20\text{A}, T_J=175^\circ\text{C}$		172		$\text{m}\Omega$
		$V_{GS}=18\text{V}, I_D=20\text{A}$		88		$\text{m}\Omega$

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Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C _{iss}	Input Capacitance	V _{DS} =1000V, f=1MHz V _{AC} =25mV		2865		pF
C _{oss}	Output Capacitance			97		pF
C _{rss}	Reverse Transfer Capacitance			3		pF
g _{fs}	Transconductance	V _{DS} =10V, I _D =40A		15.7		S
E _{oss}	C _{oss} Stored Energy	V _{DS} =1000V, f=1MHz		50.7		uJ
E _{on}	Turn-On Energy (Body Diode)	V _{DS} =1200V V _{GS} =-3/15V, I _D =20A L=150uH, T _J =175°C		495		uJ
E _{off}	Turn-Off Energy (Body Diode)			121		uJ
Q _g	Total Gate Charge	V _{DS} =1200V		62		nC
Q _{gs}	Gate-source Charge	V _{GS} =-3/15V		18		nC
Q _{gd}	Gate-Drain Charge	I _D =20A		16		nC
R _{G(int)}	Internal Gate Resistance	f=1MHz, V _{AC} =25mV		2.6		Ω
t _{d(on)}	Turn-on Delay Time	V _{DS} =1200V V _{GS} =-3/15V, I _D =20A L=150uH, R _{ext} =2.5Ω		42		ns
t _r	Rise Time			20		ns
t _{d(off)}	Turn-off Delay Time			27		ns
t _f	Fall Time			11		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 =10A, T _J =25°C		3.9	6	V
		V _{GS} =0V, I _F =10A, T _J =175°C		3.5	6	V
I _S	Continuous Diode Forward Current	V _{GS} =0V, T _C =25°C		20		A
t _{rr}	Reverse Recovery Time	V _{GS} =-3V, I _F =10A		36		ns
Q _{rr}	Reverse Recovery Charge	V _R =1200V		285		nC
I _{rrm}	Peak Reverse Recovery Current	di/dt=900A/μs, T _J =175°C		13.5		A

Thermal Characteristics

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	0.58	°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

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

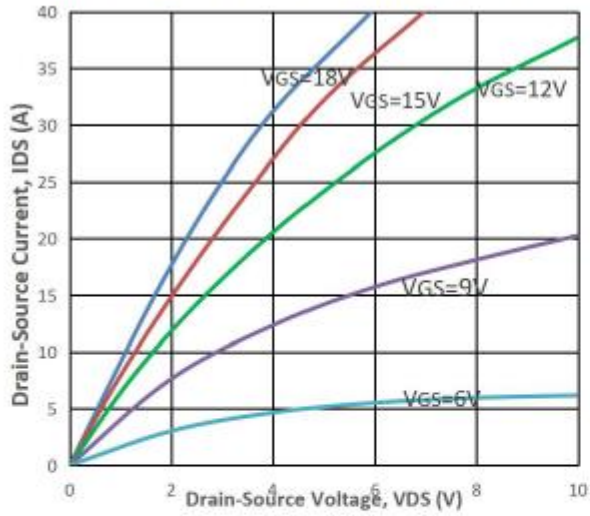


Fig2. Output characteristics ($T_J = 175^\circ\text{C}$)

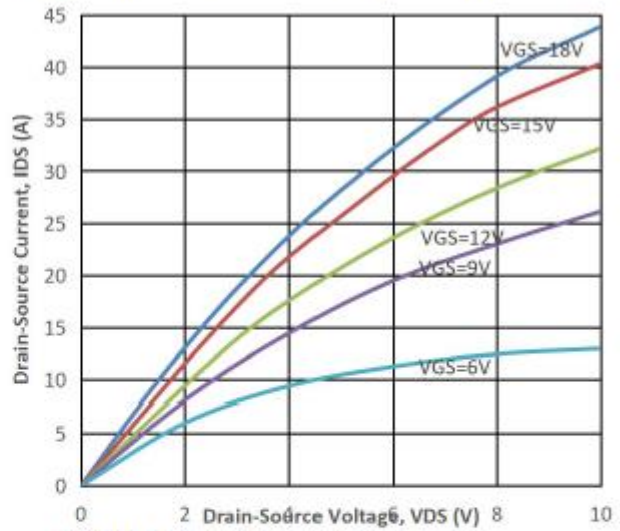


Fig3. Normalized On-Resistance vs. Temperature

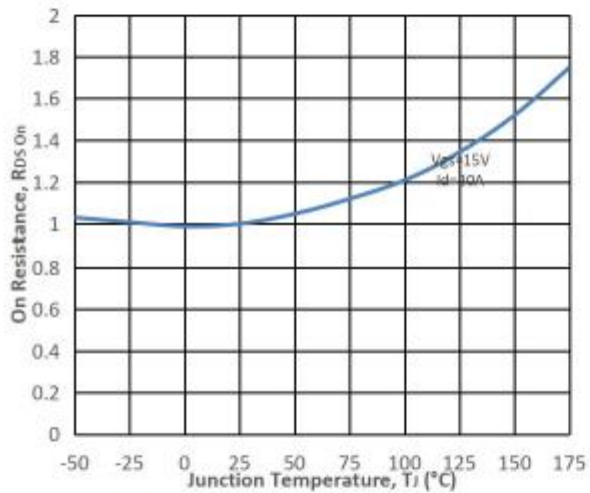


Fig4. On-Resistance vs. Temperature

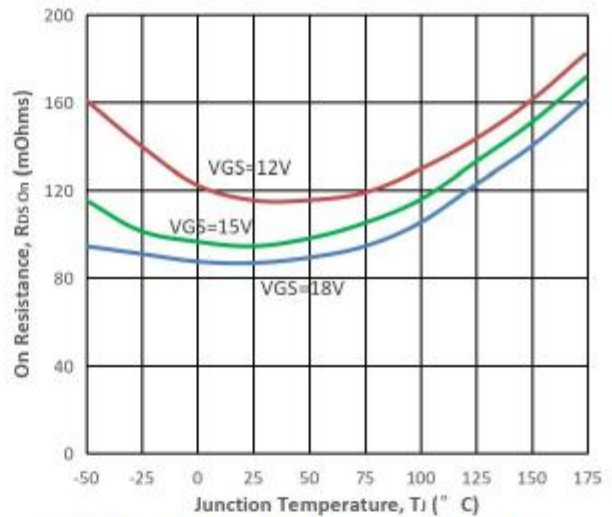


Fig5. Transfer Characteristic

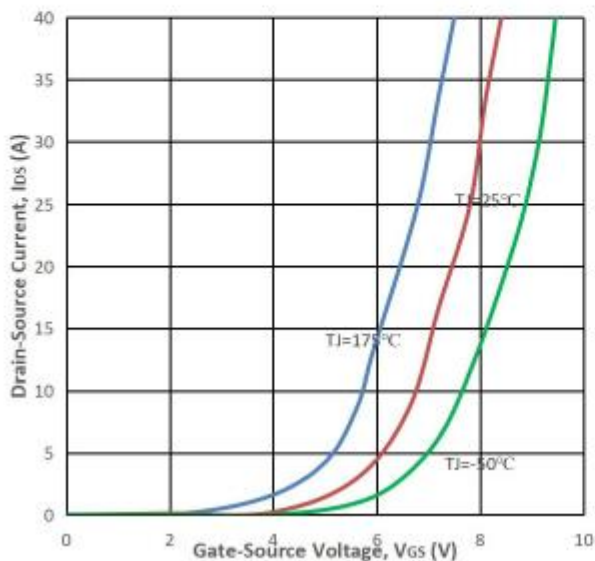
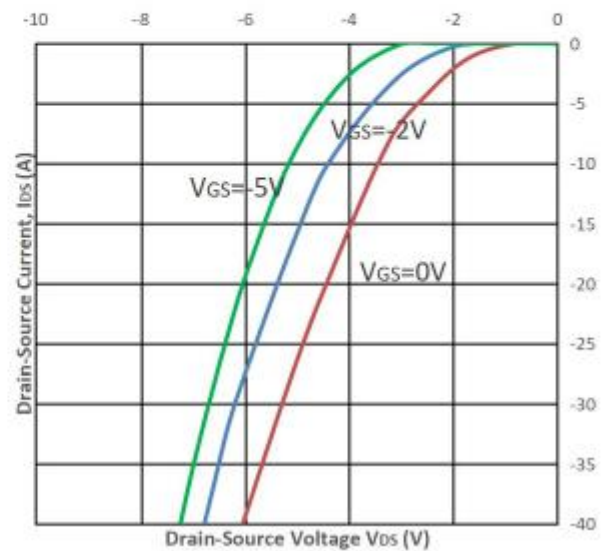


Fig6. Body Diode Characteristic at 25°C



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Fig7. Threshold Voltage vs. Temperature

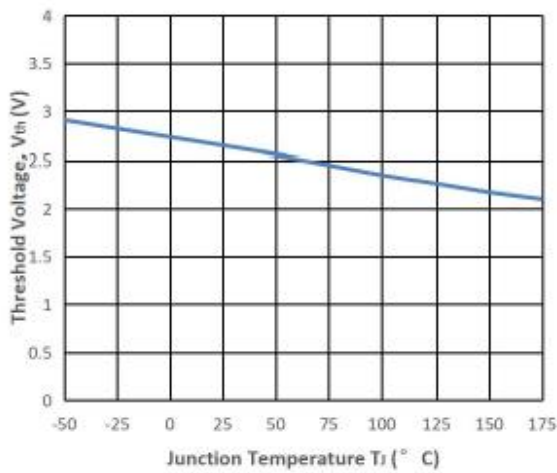


Fig8. Gate Charge Characteristics

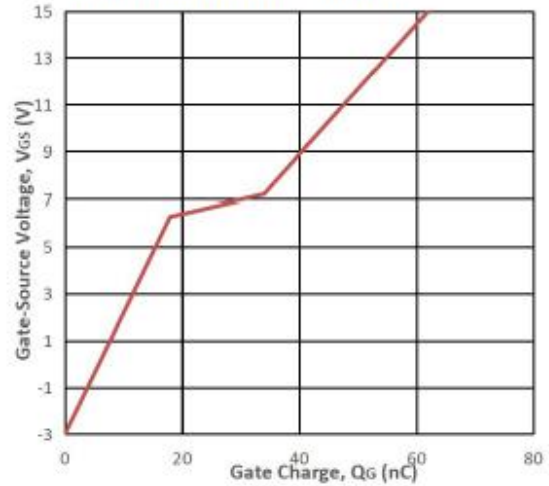


Fig9. 3rd Quadrant Characteristic at 25 °C

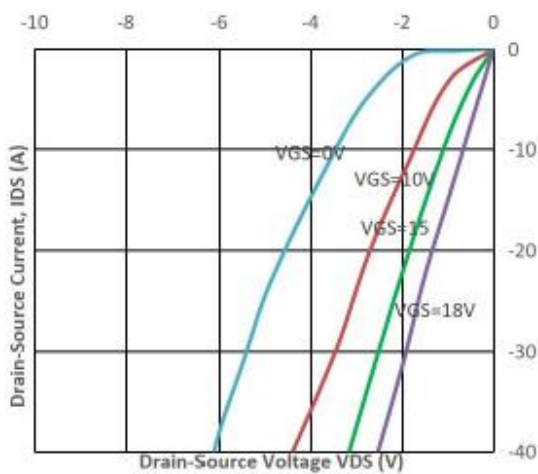


Fig10. Output Capacitor Stored Energy

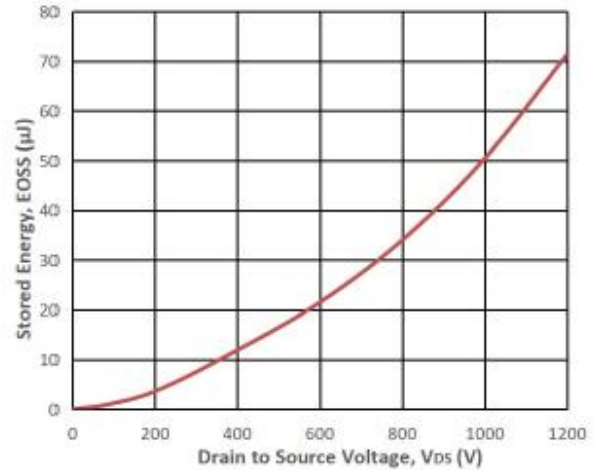


Fig11. Capacitances vs. Drain-Source

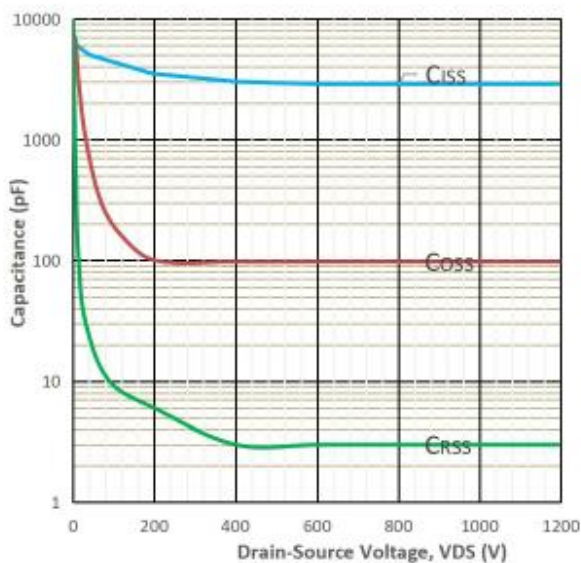
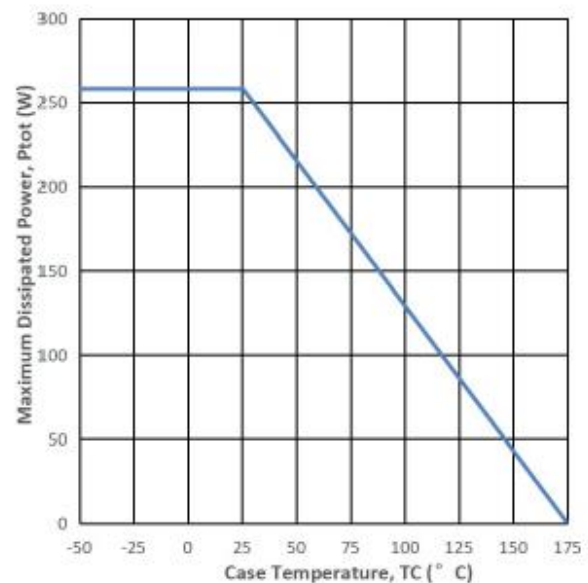


Fig12. Max Power Dissipation Derating Vs T_c



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Fig13. Switching Energy vs. Drain Current

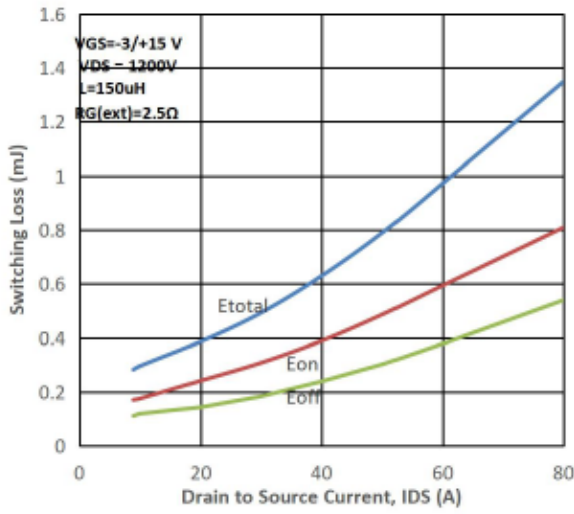


Fig14. Switching Energy vs. $R_{G(ext)}$

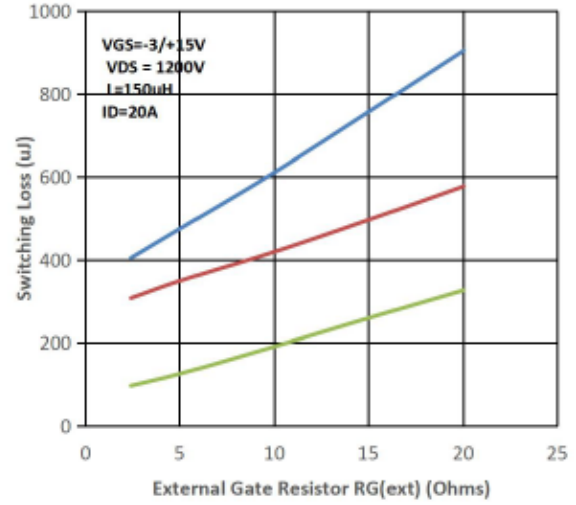


Fig15. Switching Energy vs. Temperature

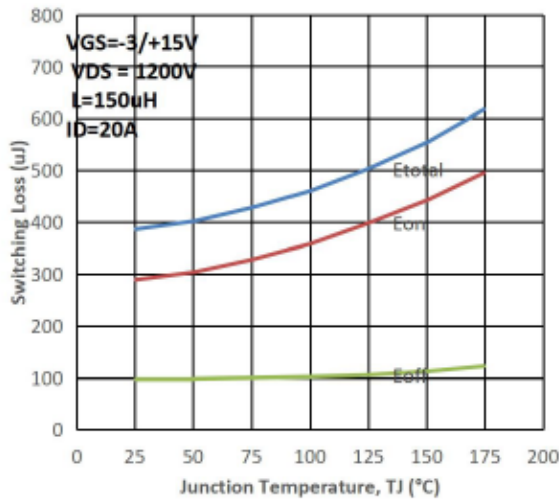


Fig16. Switching Times vs. $R_{G(ext)}$

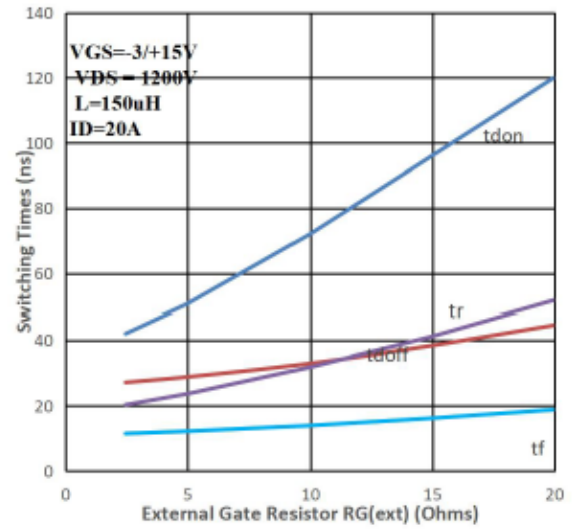


Fig17. Transient Thermal Impedance

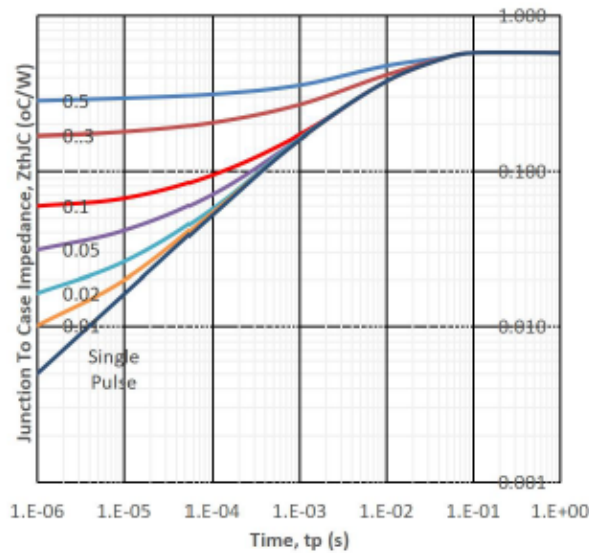
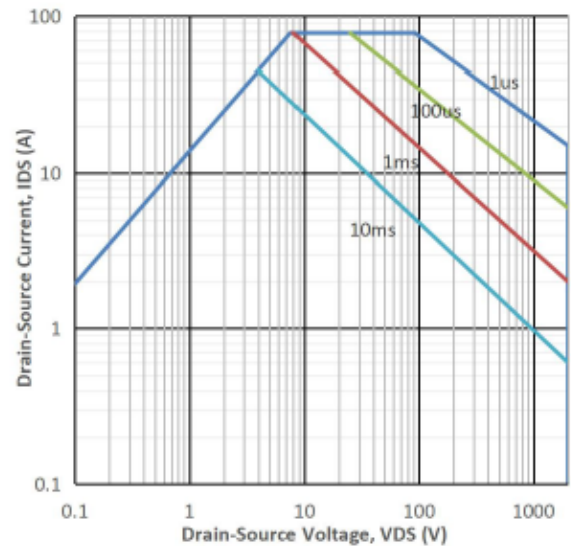
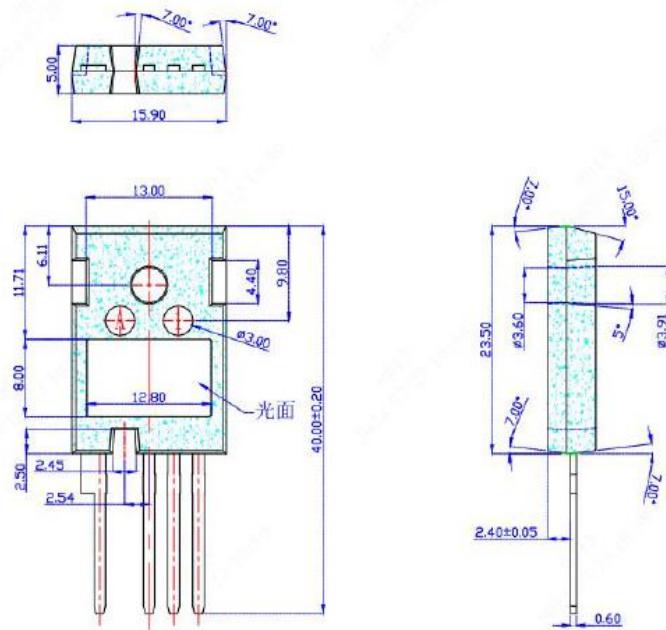


Fig18. Safe Operating Area



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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	1.15	1.20	1.25	0.045	0.047	0.049
b1	2.40	2.50	2.60	0.094	0.098	0.102
b2	2.61	2.76	2.91	0.103	0.109	0.115
b3	1.30	1.42	1.57	0.051	0.056	0.062
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	4.3TYPE			0.169TYPE		
e1	4.93	5.08	5.23	0.194	0.200	0.206
e2	2.39	2.54	2.69	0.094	0.100	0.106
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
E2	12.00	12.20	12.40		0.480	0.488
L	34.65	35.05	35.45	1.364	1.380	1.396
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	04.2025