

# A2G50N3300MT4

## 3300V N-Channel MOSFET



### Features

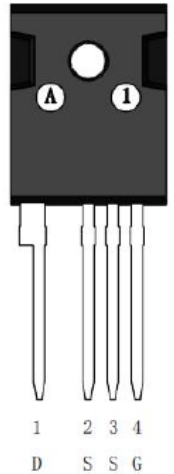
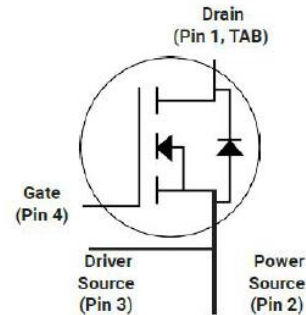
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low  $R_{DS(on)}$
- Optimized package with separate driver source pin
- Easy to parallel and simple to drive
- ROHS Compliant, Halogen free

### Application

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

### Product Summary

$V_{DS}$	3300V
$I_D$	50A



### Ordering Information

Part Number	Marking	Package	Packaging
A2G50N3300MT4	A2G50N3300MT4	TO-247-4	Tube

### Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage	3300	V
$I_D$	Drain Current (continuous) at $T_C=25^\circ\text{C}$	50	A
$I_D$	Drain Current (continuous) at $T_C=100^\circ\text{C}$	40	A
$I_{DM}$	Drain Current (pulsed)	230	A
$V_{GS}$	Gate-Source Voltage	-10/+22	V
$P_D$	Power Dissipation $T_C=25^\circ\text{C}$	536	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	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	3300			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=3300\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$			100	$\mu\text{A}$
$I_{GSS}$	Gate-body Leakage Current	$V_{DS}=0\text{V}, V_{GS}=-10$ to $22\text{V}$			150	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=20\text{mA}$	2		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	$V_{GS}=18\text{V}, I_D=20\text{A}$		48	55	$\text{m}\Omega$
		$V_{GS}=18\text{V}, I_D=20\text{A}, T_J=175^\circ\text{C}$		80		$\text{m}\Omega$

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Typical Performance-Dynamic						
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =1000V, f=1MHz V <sub>AC</sub> =25mV		7305		pF
C <sub>oss</sub>	Output Capacitance			128		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			12.5		pF
g <sub>fs</sub>	Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =40A		15.7		S
E <sub>oss</sub>	C <sub>oss</sub> Stored Energy	V <sub>DS</sub> =1000V, f=1MHz		83.7		uJ
E <sub>on</sub>	Turn-On Energy (Body Diode)	V <sub>DS</sub> =1700V V <sub>GS</sub> =-5/20V, I <sub>D</sub> =50A L=60uH, T <sub>J</sub> =25°C		1234		uJ
E <sub>off</sub>	Turn-Off Energy (Body Diode)			538		uJ
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =1000V		339		nC
Q <sub>gs</sub>	Gate-source Charge	V <sub>GS</sub> =-5/20V		123		nC
Q <sub>gd</sub>	Gate-Drain Charge	I <sub>D</sub> =40A		101		nC
R <sub>G(int)</sub>	Internal Gate Resistance	f=1MHz, V <sub>AC</sub> =25mV		1.3		Ω
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =1700V V <sub>GS</sub> =-5/20V, I <sub>D</sub> =50A L=60uH, R <sub>ext</sub> =3Ω		76		ns
t <sub>r</sub>	Rise Time			38		ns
t <sub>d(off)</sub>	Turn-off Delay Time			31		ns
t <sub>f</sub>	Fall Time			17		ns

Typical Performance-Reverse Diode (T <sub>J</sub> =25°C unless otherwise specified)						
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>FSD</sub>	Forward Voltage	V <sub>GS</sub> =0V, I <sub>F</sub> =20A, T <sub>J</sub> =25°C		4.2	6	V
		V <sub>GS</sub> =0V, I <sub>F</sub> =20A, T <sub>J</sub> =175°C		3.5	6	V
I <sub>S</sub>	Continuous Diode Forward Current	V <sub>GS</sub> =0V, T <sub>C</sub> =25°C		55		A
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =-5V, I <sub>F</sub> =50A		202		ns
Q <sub>rr</sub>	Reverse Recovery Charge	V <sub>R</sub> =1700V		2838		nC
I <sub>rrm</sub>	Peak Reverse Recovery Current	di/dt=500A/μs, T <sub>J</sub> =175°C		38		A

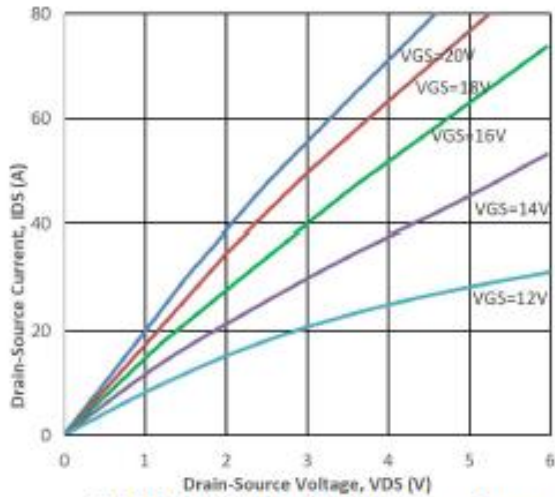
Thermal Characteristics			
Symbol	Parameter	Value	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	0.28	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	40	°C/W

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<sub>J</sub>(max)=175°C.

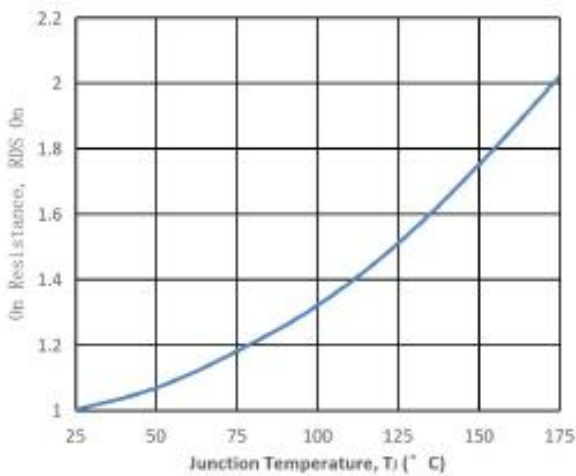
# A2G50N3300MT4

## Electrical Characteristics

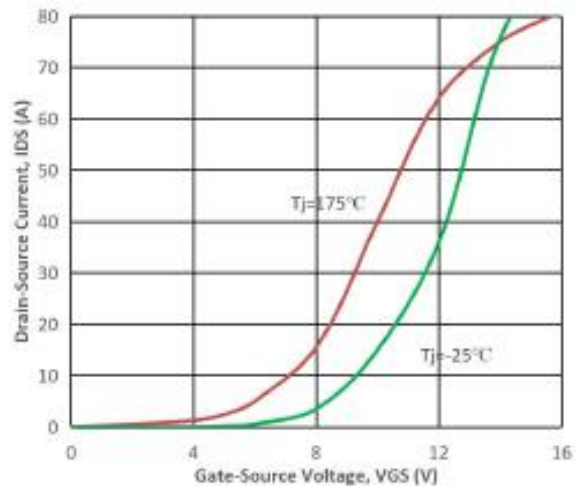
**Fig1. Output characteristics ( $T_J = 25\text{ }^\circ\text{C}$ )**



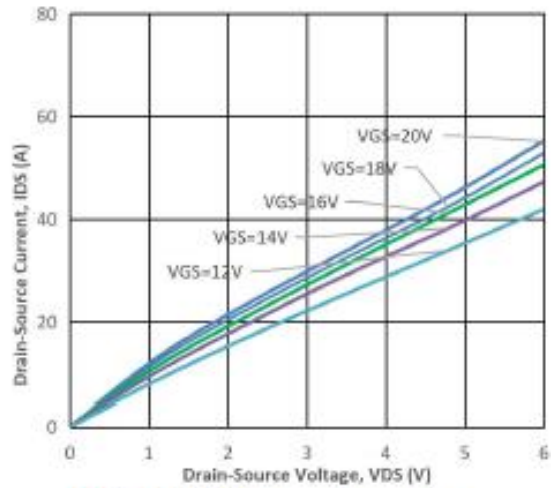
**Fig3. Normalized On-Resistance vs. Temperature**



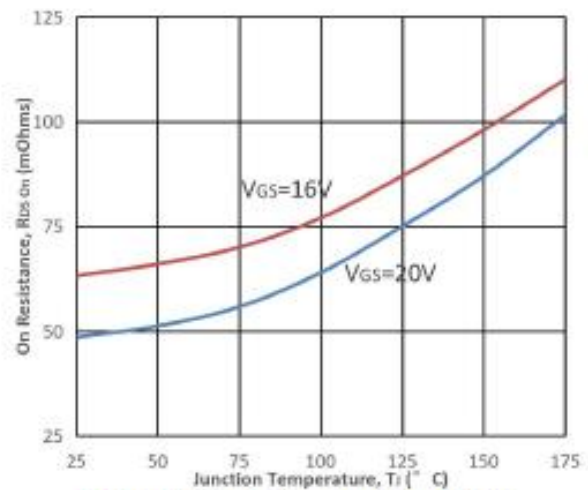
**Fig5. Transfer Characteristic**



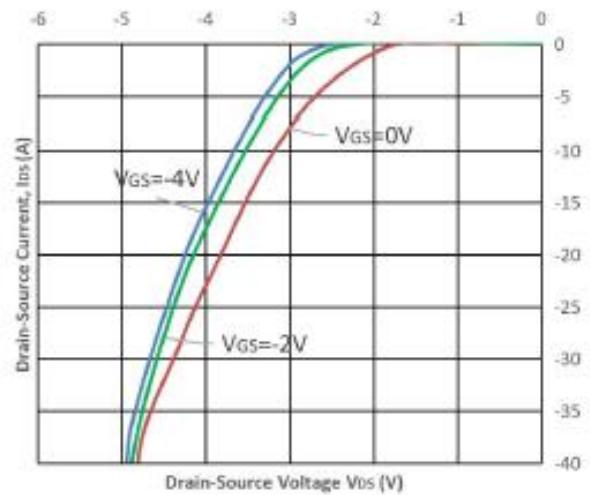
**Fig2. Output characteristics ( $T_J = 175\text{ }^\circ\text{C}$ )**



**Fig4. On-Resistance vs. Temperature**

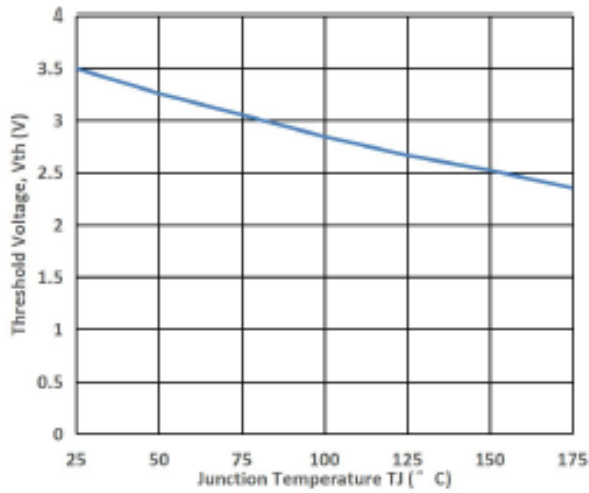


**Fig6. Body Diode Characteristic at 25 °C**

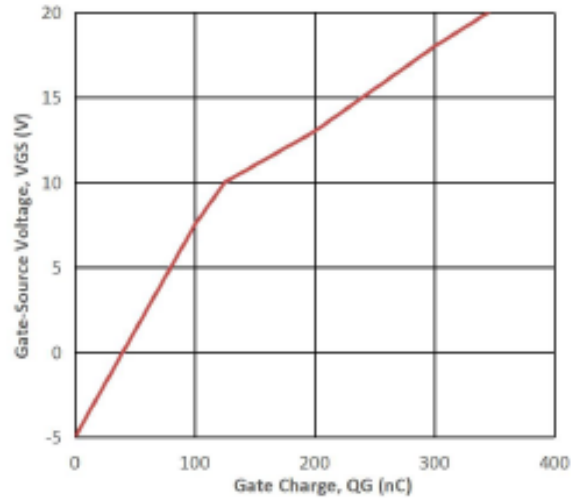


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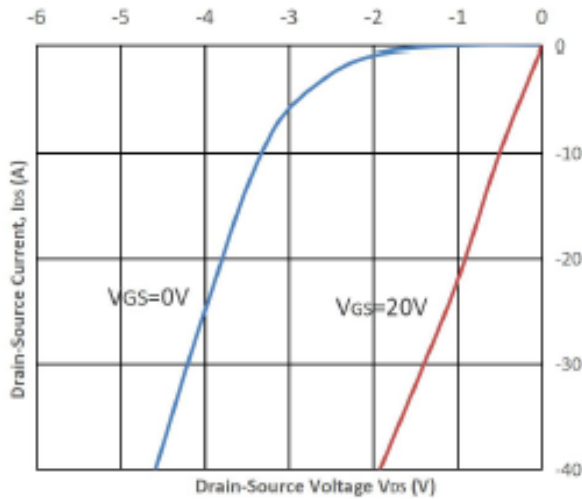
**Fig7. Threshold Voltage vs. Temperature**



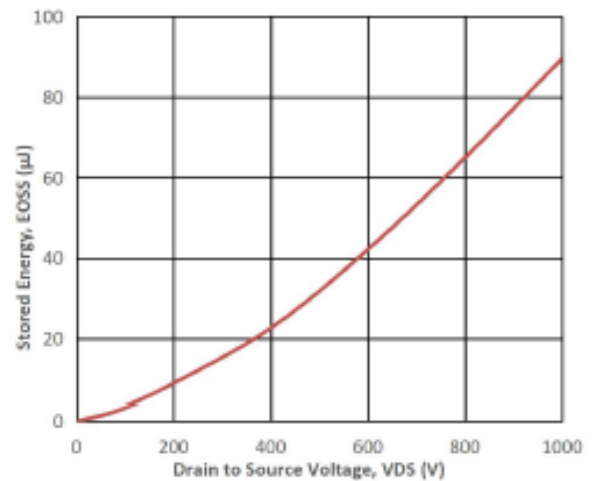
**Fig8. Gate Charge Characteristics**



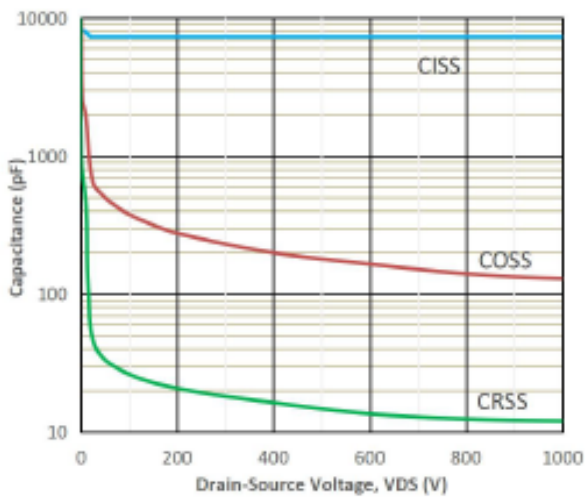
**Fig9. 3rd Quadrant Characteristic at 25  $^{\circ}C$**



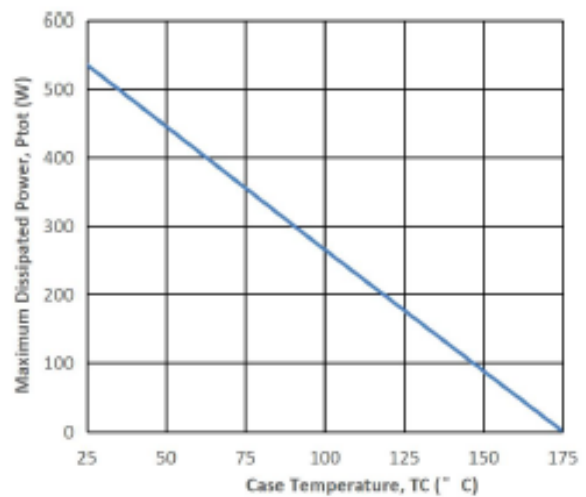
**Fig10. Output Capacitor Stored Energy**



**Fig11. Capacitances vs. Drain-Source**

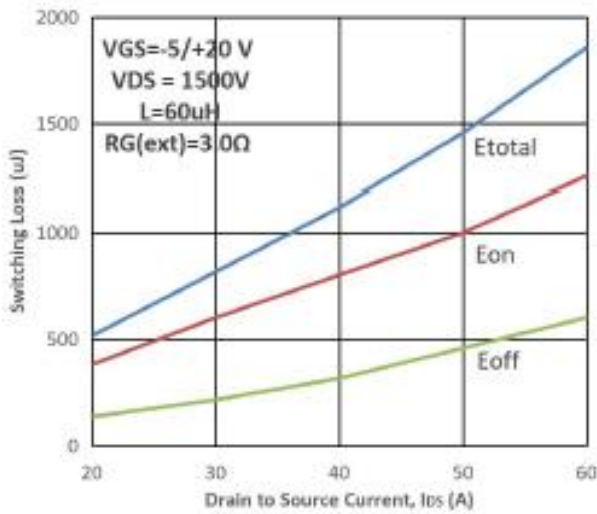


**Fig12. Max Power Dissipation Derating Vs  $T_c$**

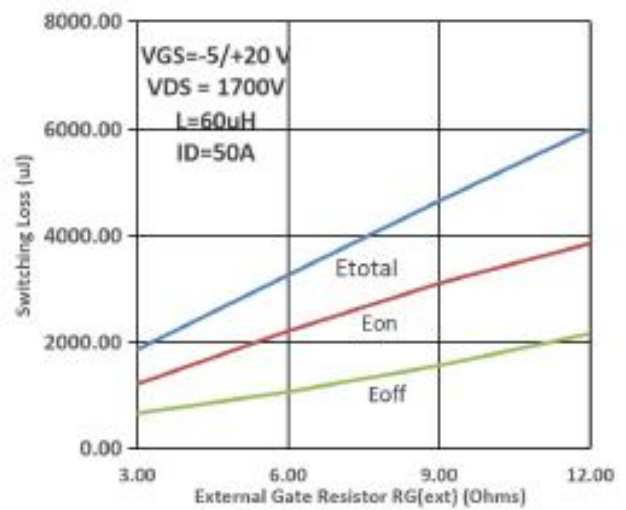


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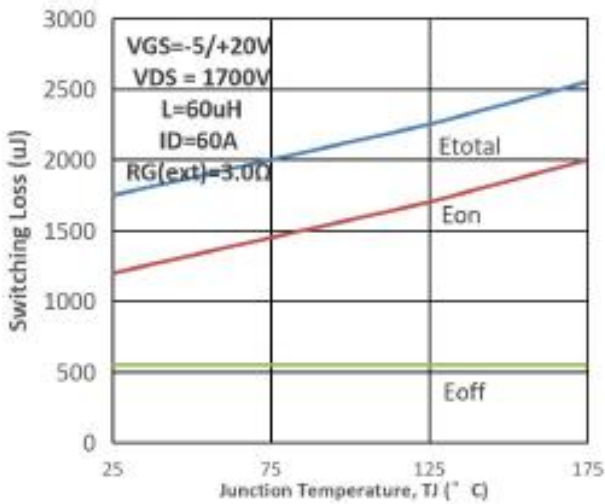
**Fig13. Switching Energy vs. Drain Current**



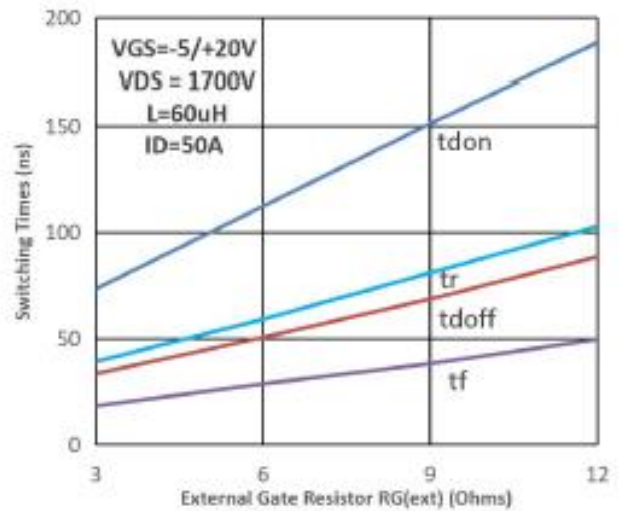
**Fig14. Switching Energy vs. RG(ext)**



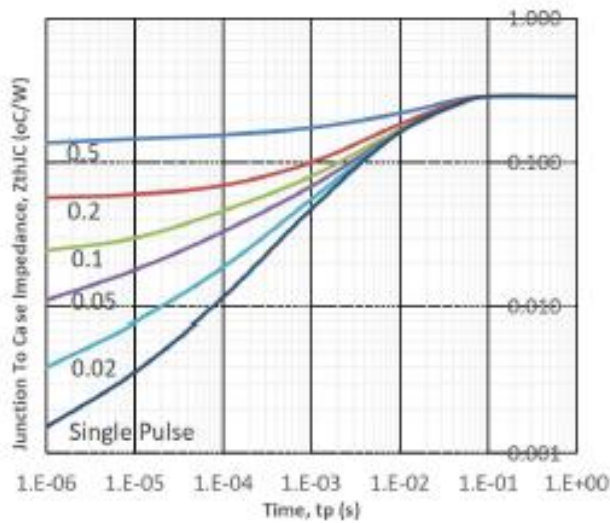
**Fig15. Switching Energy vs. Temperature**



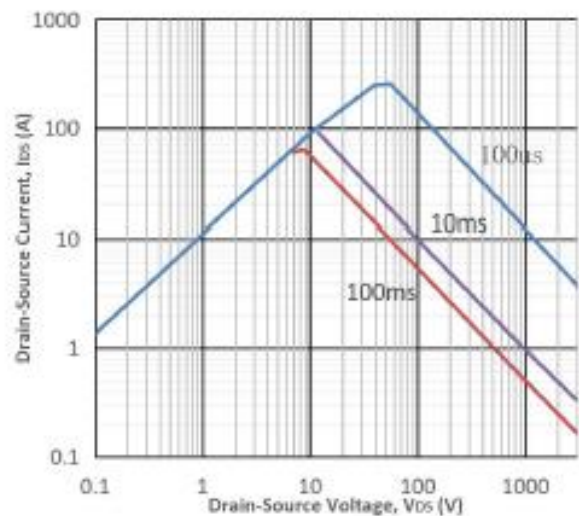
**Fig16. Switching Times vs. RG(ext)**



**Fig17. Transient Thermal Impedance**

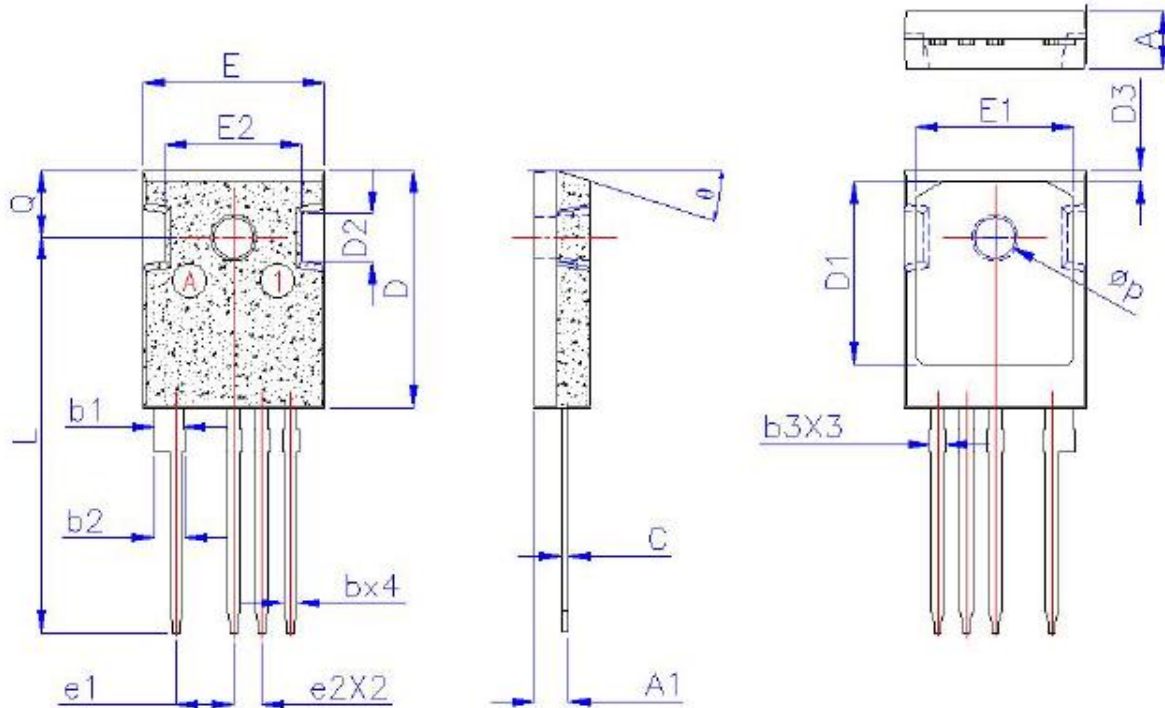


**Fig18. Safe Operating Area**



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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
$\phi P$	3.45	3.60	3.75	0.136	0.142	0.148
$\theta$	17.5°			0.689°		

Revision version	Description	Date
1	Initial	03.2024