A4G120N1700MT4L

1700V, 120A, 14mΩ, N-Channel, Silicon Carbide MOSFET

General Description

The AMG-MT4 series SiC MOSFET in TO-247-4L package ensures stable high-temperature operation for power-dense and energy-critical systems, enabling compact designs with reduced EMI.

Features

- 4th Generation SiC MOSFET Technology
- 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

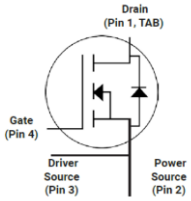
Application

- EV Charging
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Power Factor Correction Modules

Product Summary

V_{DS}	1700V
I_D	120A





Ordering Information

Part Number	Marking	Package	Packaging
A4G120N1700MT4L	A4G120N1700MT4L	TO-247-4L	Tube

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1700	V
I_D	Drain Current (continuous) at T_C=25°C	120	A
I_D	Drain Current (continuous) at T_C=100°C	85	A
I_{DM}	Drain Current (pulsed)	280	A
V_{GS}	Gate-Source Voltage	-10/+22	V
P_D	Power Dissipation T_C=25°C	555	W
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to +175	°C

Electrical Characteristics (TJ=25°C unless otherwise specified)

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	1700			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1700V, V_{GS}=0V			100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=-10 to 20V, V_{DS}=0V			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=20mA	2	2.8	4	V
$V_{GS(on)}$	Recommended Turn-on Voltage	Static		15/18		V
$V_{GS(off)}$	Recommended Turn-off Voltage			-5		V
$R_{DS(on)}$	Static Drain-Source On Resistance	V_{GS}=15V, I_D=50A		16	20	mΩ
		V_{GS}=15V, I_D=50A, T_J=175°C		26		mΩ
		V_{GS}=18V, I_D=50A		14	17.5	mΩ
		V_{GS}=18V, I_D=50A, T_J=175°C		22.6		mΩ

Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{DS}=1000V, f=1MHz V_{AC}=25mV		7280		pF
C_{oss}	Output Capacitance			288		pF
C_{rss}	Reverse Transfer Capacitance			15		pF
g_{fs}	Transconductance	V_{DS}=20V, I_D=50A		52		S
E_{OSS}	C_{oss} Stored Energy	V_{DS}=1000V, f=1MHz		168		μJ
E_{ON}	Turn-On Energy (Body Diode)	V_{DS}=1200V V_{GS}=-5/+18V, I_D=50A L=68μH, T_J=175°C, $R_{G(ext)}$=2.5Ω		1.41		mJ
E_{OFF}	Turn-Off Energy (Body Diode)			1.12		mJ
Q_G	Total Gate Charge	V_{DS}=1000V V_{GS}=-5/+18V I_D=50A		278		nC
Q_{GS}	Gate-Source Charge			80		nC
Q_{GD}	Gate-Drain Charge			92		nC
$R_{G(int)}$	Internal Gate Resistance	f=1MHz, V_{AC}=25mV		2.0		Ω
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=1200V V_{GS}=-5/+18V, I_D=50A L=68μH, $R_{G(ext)}$=2.5Ω		39		ns
t_r	Rise Time			32		ns
$t_{d(off)}$	Turn-off Delay Time			85		ns
t_f	Fall Time			21		ns

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Forward Voltage	V_{GS}=0V, I_F=38A		3.2	6	V
		V_{GS}=0V, I_F=38A, T_J=175°C		3.0	6	V
I_S	Continuous Diode Forward Current	V_{GS}=0V, T_C=25°C		120		A
t_{rr}	Reverse Recovery Time	V_{GS}=-5V, I_F=38A V_R=1200V di/dt=1300A/μs, T_J=175°C		98		ns
Q_{rr}	Reverse Recovery Charge			728		nC
I_{rrm}	Peak Reverse Recovery Current			18		A

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.27	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	°C/W

The values are based on Junction-to-Case Thermal Impedance measured with the device mounted to a large heat sink, assuming a maximum junction temperature of $T_{J(max)}$=175°C.

Electrical Characteristics

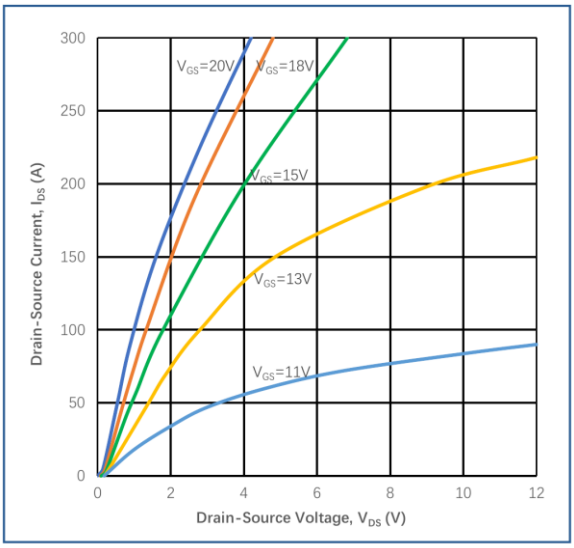


Figure 1
Output Characteristics (T_J=25 °C)

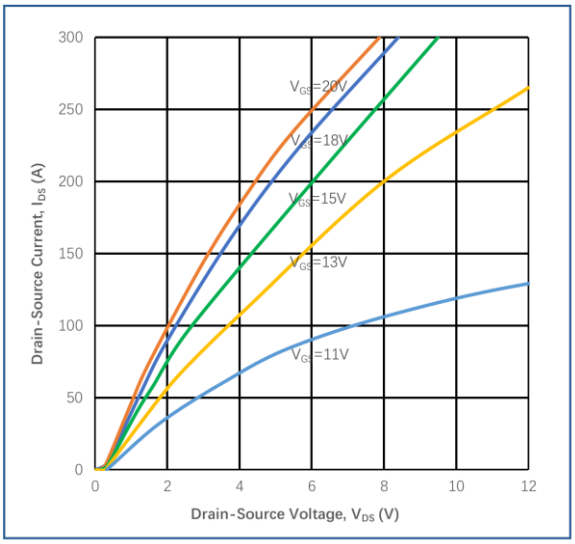


Figure 2
Output Characteristics (T_J=175°C)

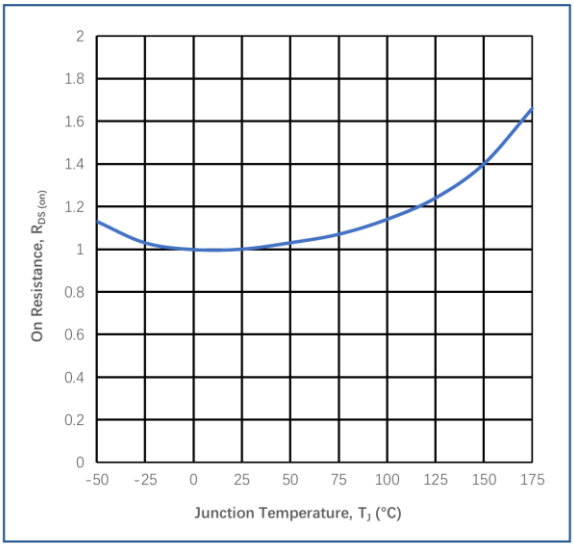


Figure 3
Normalized On-Resistance vs. Temperature

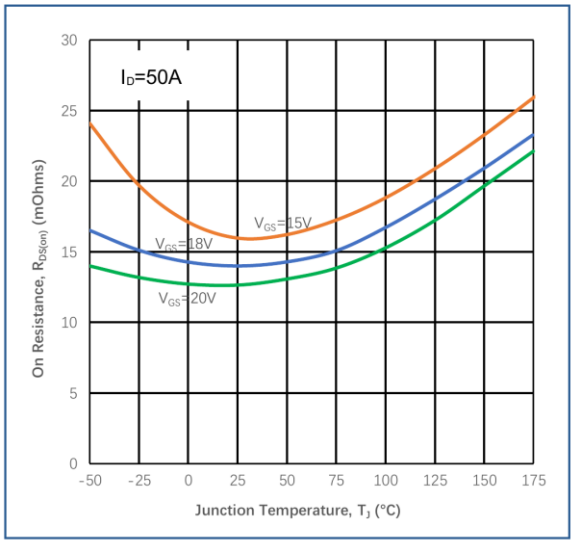


Figure 4
On-Resistance vs. Temperature

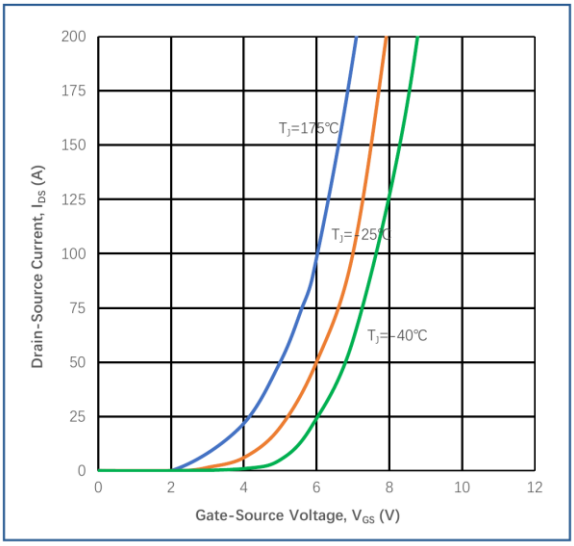


Figure 5
Transfer Characteristic

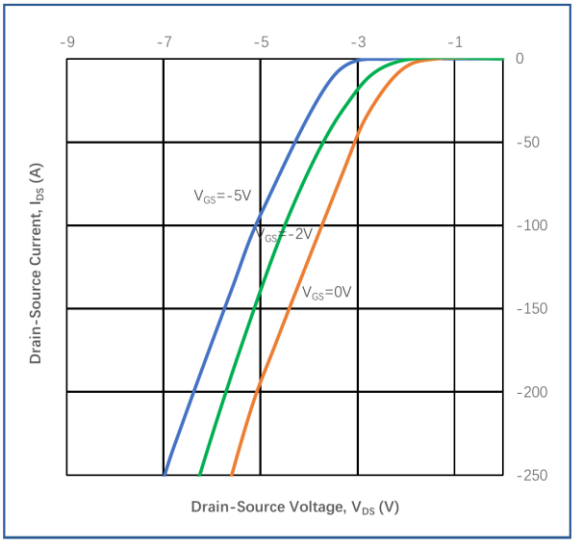


Figure 6
Body Diode Characteristic at 25°C

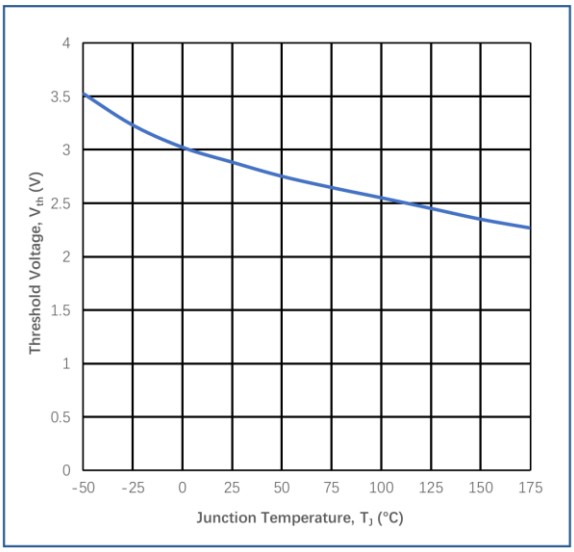


Figure 7
Threshold Voltage vs. Temperature

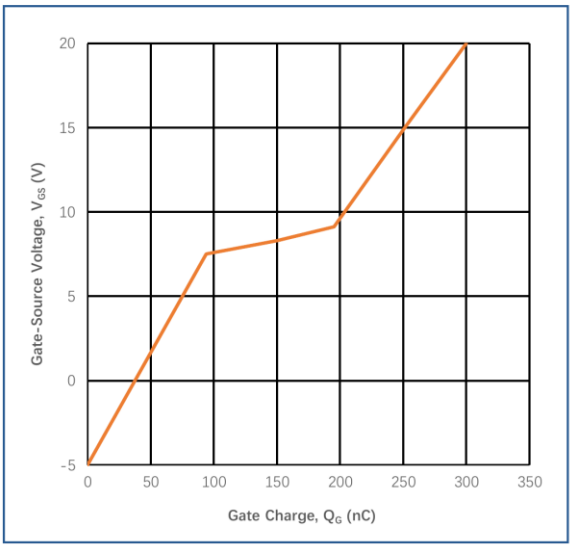


Figure 8
Gate Charge Characteristics

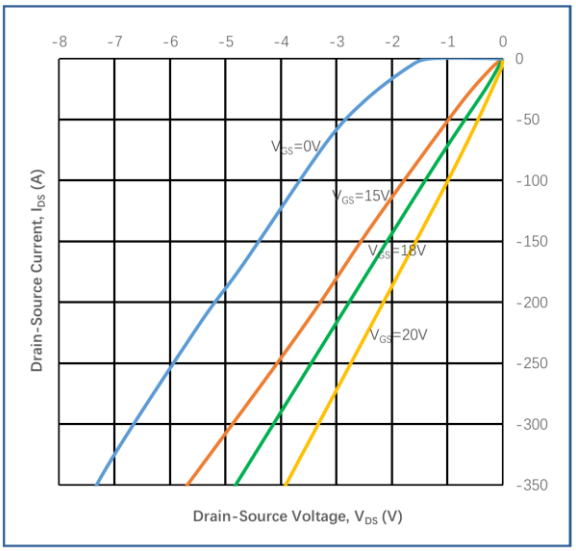


Figure 9
3rd Quadrant Characteristic at 25°C

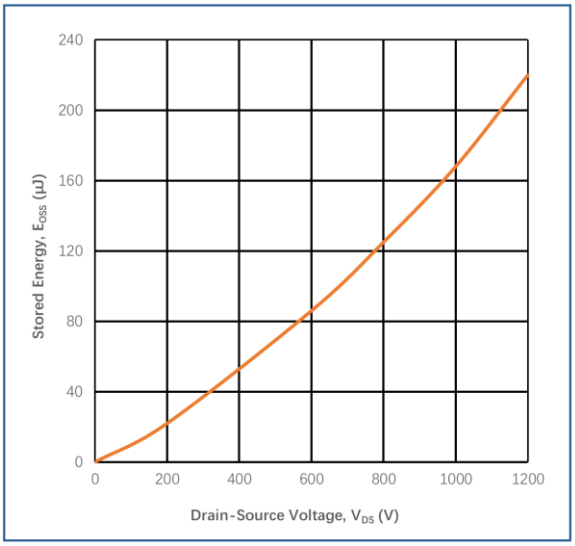


Figure 10
Output Capacitor Stored Energy

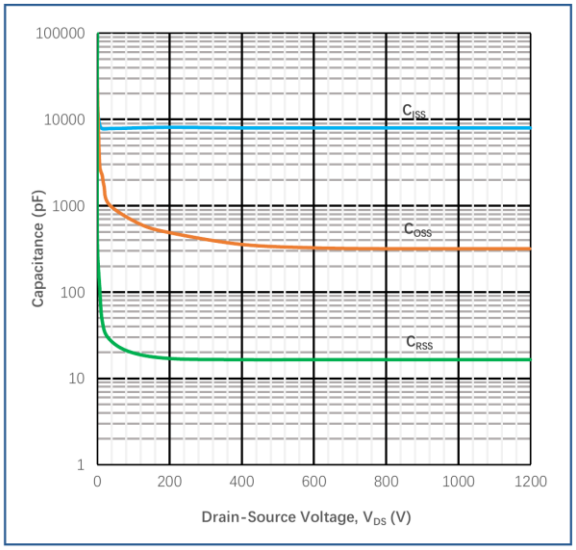


Figure 11
Capacitances vs. Drain-Source

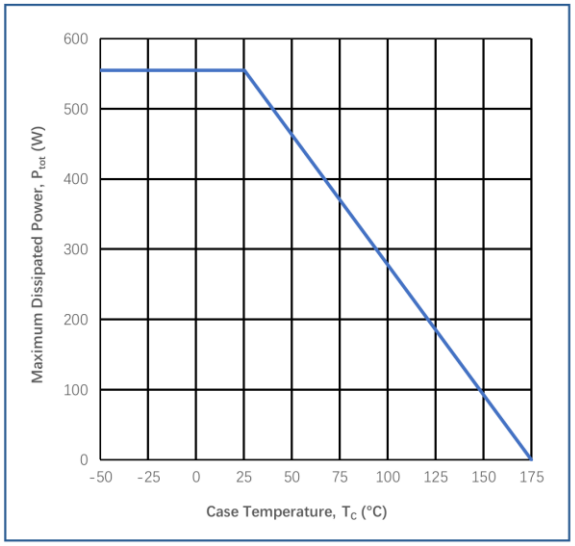


Figure 12
Max Power Dissipation Derating vs T_C

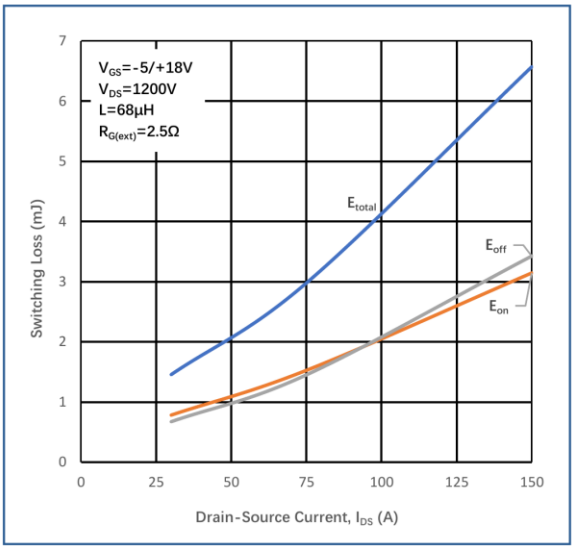


Figure 13
Switching Energy vs. Drain Current

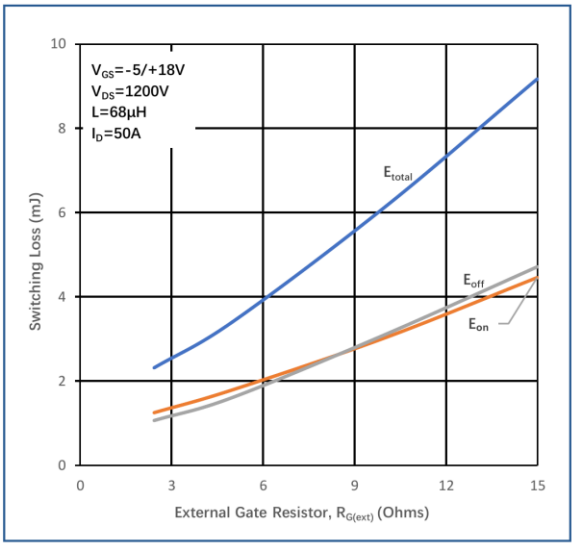


Figure 14
Switching Energy vs. $R_{G(ext)}$

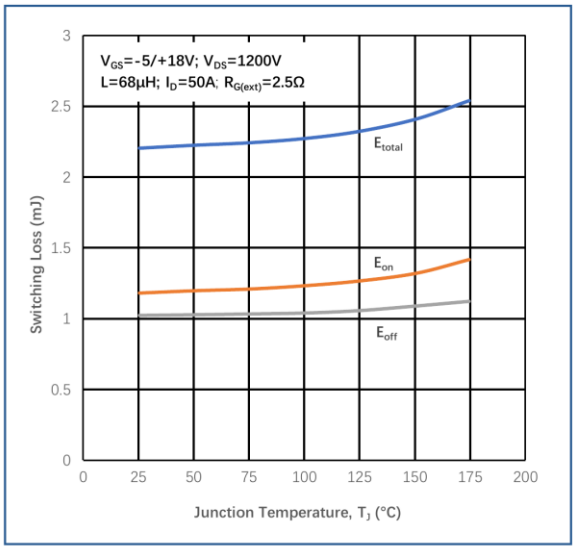


Figure 15
Switching Energy vs. Temperature

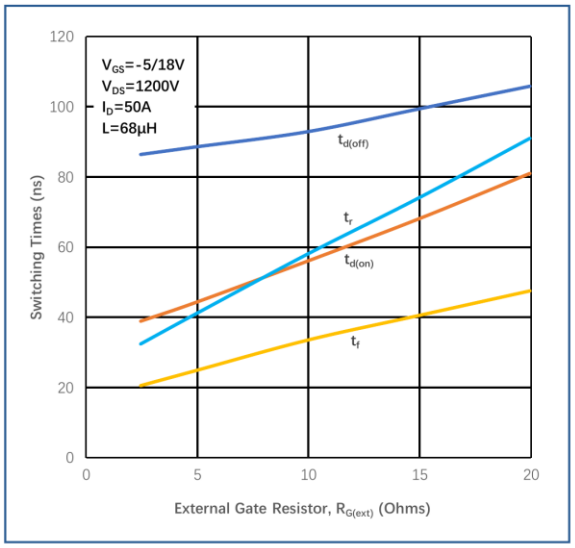


Figure 16
Switching Times vs. $R_{G(ext)}$

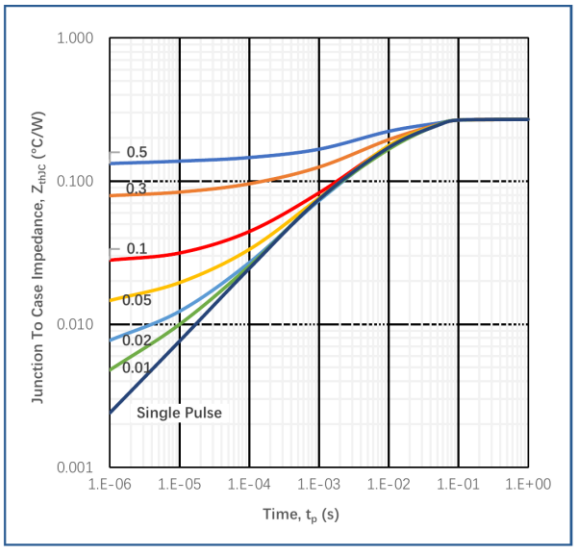


Figure 17
Transient Thermal Impedance

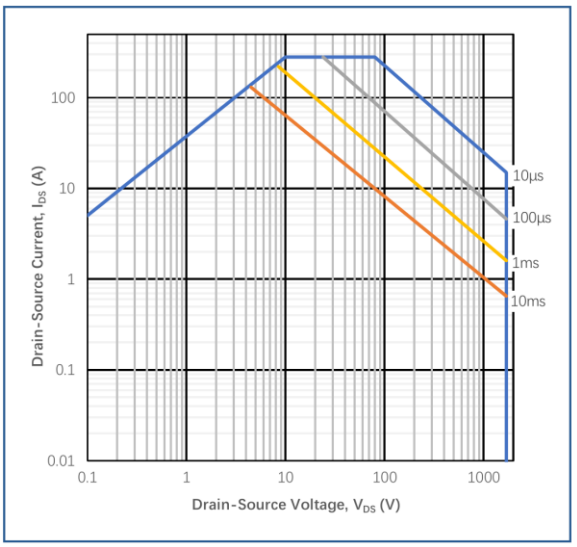
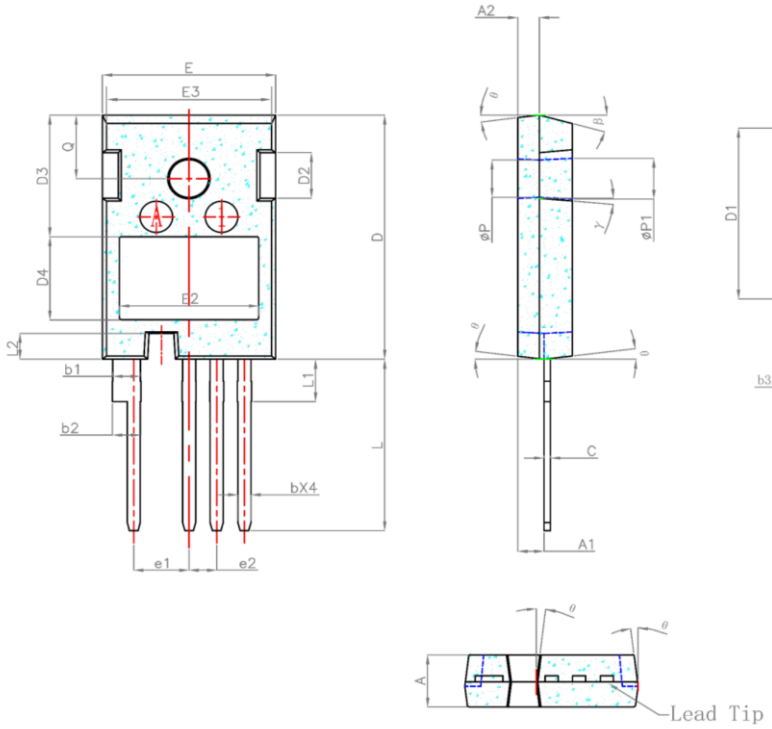


Figure 18
Safe Operating Area

Package Drawing: TO-247-4L



Dimensions (Unit: mm)

Symbol	Millimeters			Symbol	Millimeters		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.80	5.00	5.20	**e2**	2.39	2.54	2.69
A1	2.25	2.40	2.55	**E**	15.70	15.90	16.10
A2	1.85	2.00	2.15	**E1**	13.80	14.00	14.20
b	1.15	1.20	1.25	**E2**	12.80 Typ.		
b1	2.40	2.55	2.70	**E3**	12.80	13.00	13.20
b2	2.48	2.63	2.78	**L**	16.32	16.52	16.72
b3	1.13	1.28	1.43	**L1**	3.87	4.07	4.27
c	0.55	0.60	0.65	**L2**	2.30	2.50	2.70
D	-	23.50	23.70	**φP**	3.45	3.60	-
D1	16.20	16.50	16.80	**φP1**	3.90 Typ.		
D2	4.40 Typ.			**Q**	6.01	6.11	6.21
D3	11.61	11.71	11.81	**θ**	7°		
D4	8.00 Typ.			**β**	15°		
e1	4.93	5.08	5.23	**γ**	5°		

Pin Assignment

Pin	Symbol	Description
1	D	Drain
2	S	Power Source
3	S	Driver Source
4	G	Gate
mb	D	Mounting Base; Connected to Drain

Note:

1. All metal surfaces are Sn plated (matte), except area of cut.
2. Burr or mold flash size (0.5 mm) is not included in the dimensions.

Revision version	Description	Date
1	Initial	10.2026

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