

Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- Revolutionary semiconductor material Silicon Carbide
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant

Product Summary			
V _{DS}	R _{DS(on)} (mΩ)Typ	I _D (A)	Q _g (Typ)
1500V	20 @ 18V 60A	90	103nc

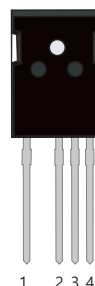
Mechanical Data

- Case:TO-247-4L Package

Application

- Switch mode power supplies
- Renewable energy
- Motor drives
- High voltage DC/DC converters

TO-247-4L



Block Diagram

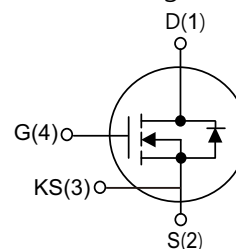


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	1500	V
Gate-Source Voltage(Max)	V _{GS(max)}	-10/+22	V
Continuous Drain Current	I _D	90	A
		61	
Pulsed Drain Current (Note 1)	I _{DM}	329	A
Power Dissipation T _C =25°C	P _D	350	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC20N150P4	Unit
Thermal resistance Junction to Case,Typ	R _{θJC}	0.428	°C/W
Thermal resistance Junction to Ambient,Typ	R _{θJA}	40	°C/W

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V,I _D =100μA	1500	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =1500V,V _{GS} =0V	-	1	50	μA
Gate- Source Leakage Current	I _{GSS}	V _{GS} = -10/+22V,V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =16mA	2.0	3.3	4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =18V,I _D =60A,T _J =25°C	-	20	25	mΩ
		V _{GS} =18V,I _D =60A,T _J =175°C	-	36.4	-	
Gate Resisitance	R _G	f=1MHz	-	1.8	-	Ω
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{DS} =1200V,V _{GS} =0V, f=1MHz,V _{AC} =30mV	-	4133	-	pF
Output Capacitance	C _{OSS}		-	129	-	pF
Reverse Transfer Capacitance	C _{RSS}		-	5.6	-	pF
Coss Stored Energy	E _{OSS}	V _{DS} =1200V,I _D =60A V _{GS} = -5/+18V,R _G =2.5Ω, T _J =25°C	-	121	-	μJ
Turn-on switching energy	E _{ON}		-	881	-	μJ
Turn-off switching energy	E _{OFF}		-	49.5	-	μJ
Turn-On Delay Time	td(on)		-	35	-	ns
Turn-On Rise Time	t _R		-	18	-	ns
Turn-Off Delay Time	td(off)		-	46	-	ns
Turn-Off Fall Time	t _f		-	11	-	ns
Total Gate Charge	Q _G	V _{DD} =1000V,I _D =60A, V _{GS} = -5/18V	-	103	-	nC
Gate-Source Charge	Q _{GS}		-	38	-	nC
Gate-Drain Charge	Q _{GD}		-	28	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = -5V,I _S =30A	-	3.9	-	V
Continuous Diode Forward Current	I _S	V _{GS} = -5V,T _J =25°C	-	87	-	A
Reverse Recovery Time	trr	V _{GS} = -5V, V _R =1000V, I _{SD} =60A,diF/dt=2350A/μs T _J =25°C	-	25	-	ns
Recovered charge	Q _{rr}		-	450	-	nC
Peak reverse recovery current	I _{rrm}		-	28	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

2 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

Typical Characteristics Diagrams

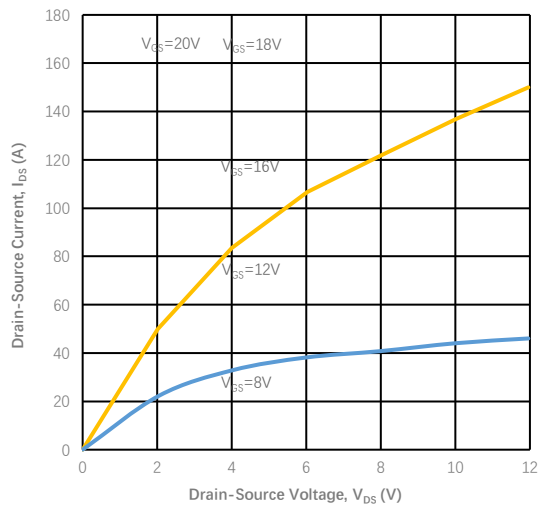


Figure 1

Output Characteristics ($T_J = 25^\circ\text{C}$)

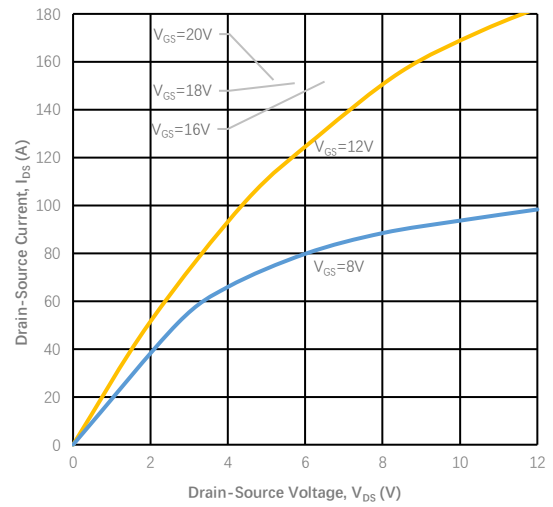


Figure 2

Output Characteristics ($T_J = 175^\circ\text{C}$)

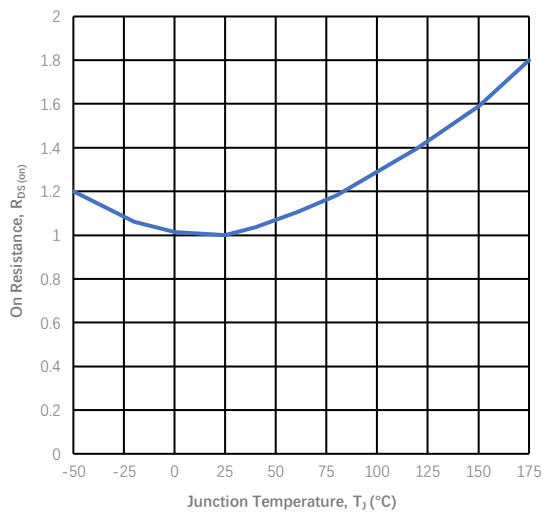


Figure 3

Normalized On-Resistance vs. Temperature

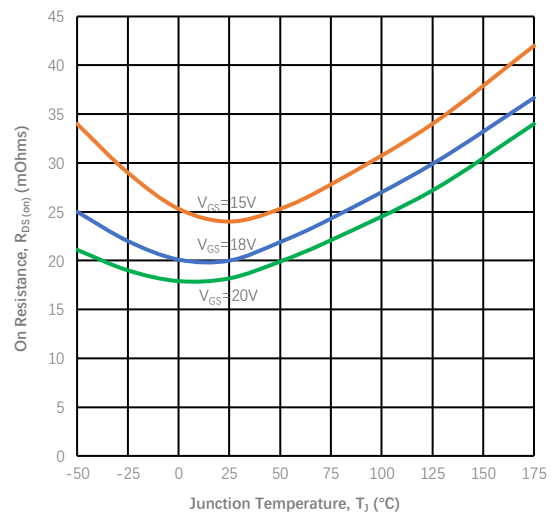


Figure 4

On-Resistance vs. Temperature

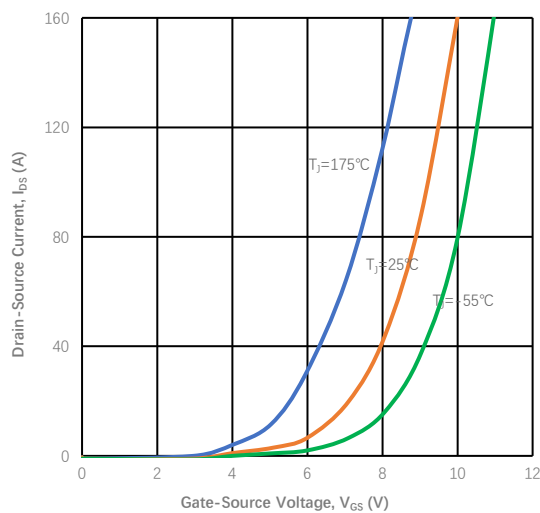


Figure 5

Transfer Characteristic

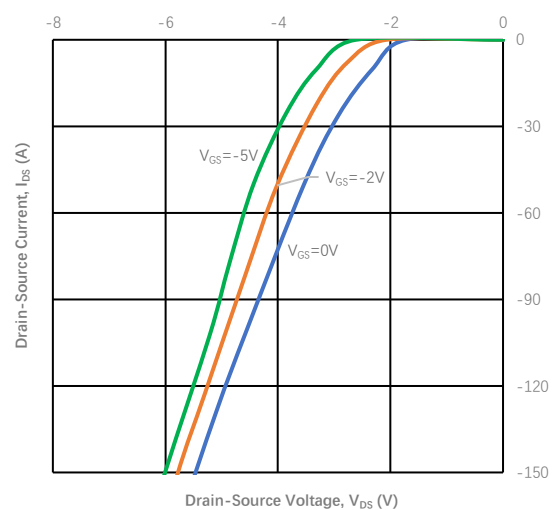


Figure 6

Body Diode Characteristic at 25°C

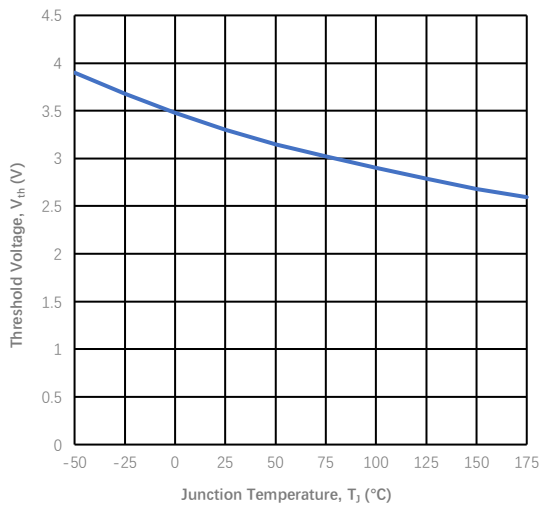


Figure 7

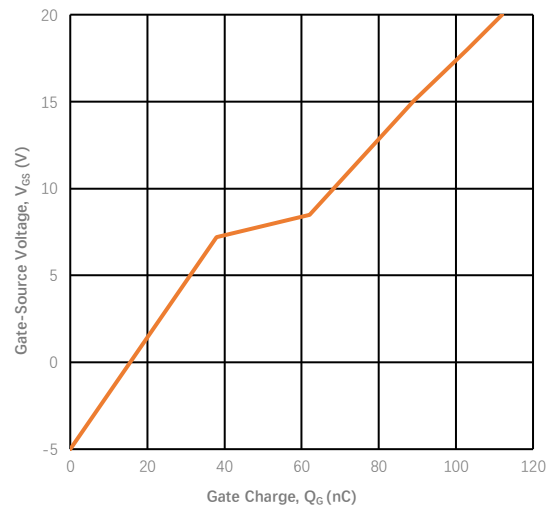


Figure 8

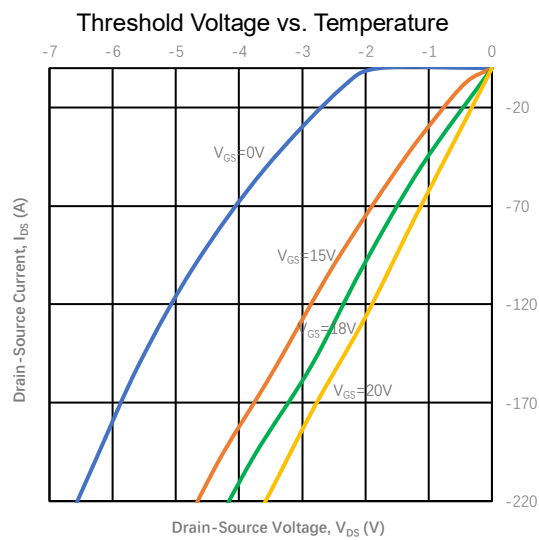


Figure 9

3rd Quadrant Characteristic at 25°C

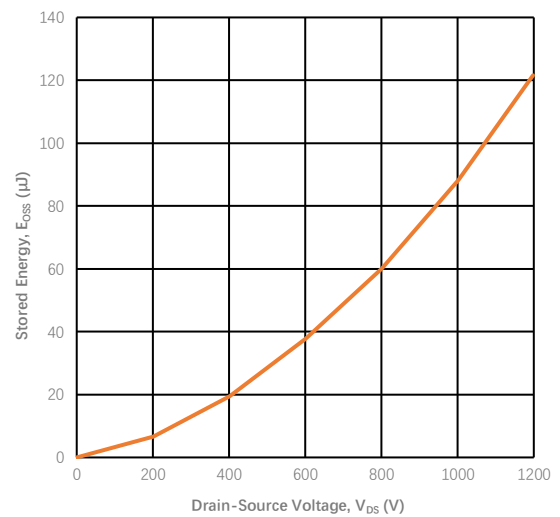


Figure 10

Output Capacitor Stored Energy

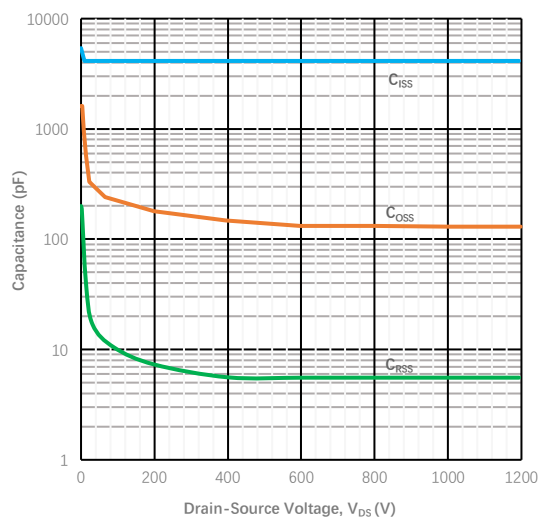


Figure 11

Capacitances vs. Drain-Source

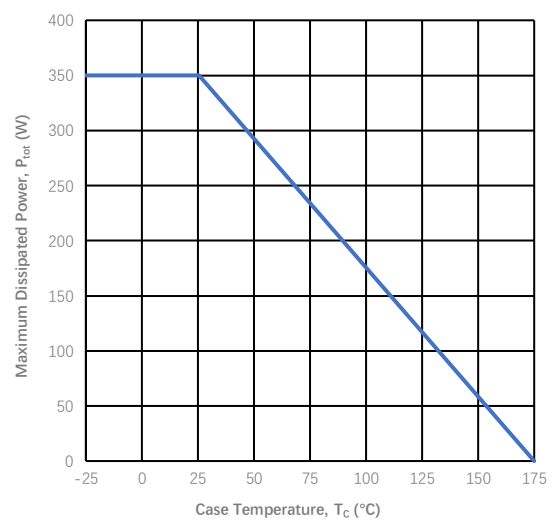


Figure 12

Max Power Dissipation Derating vs T_c

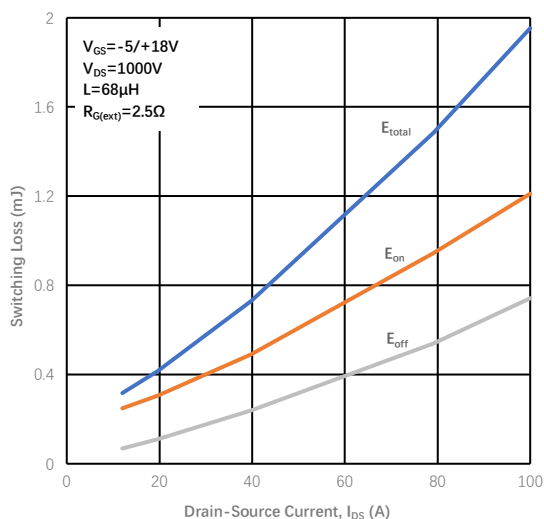


Figure 13

Switching Energy vs. Drain Current

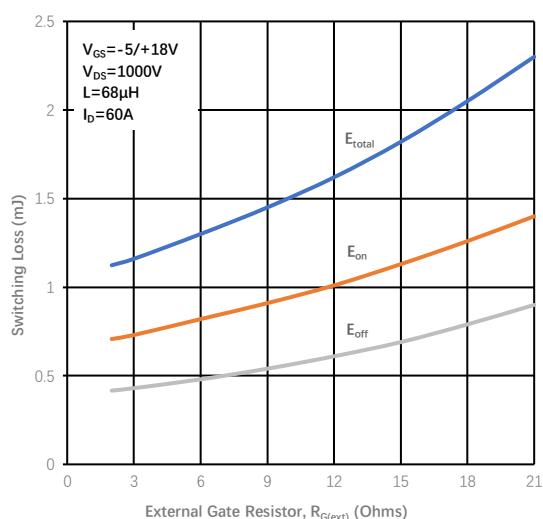


Figure 14

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

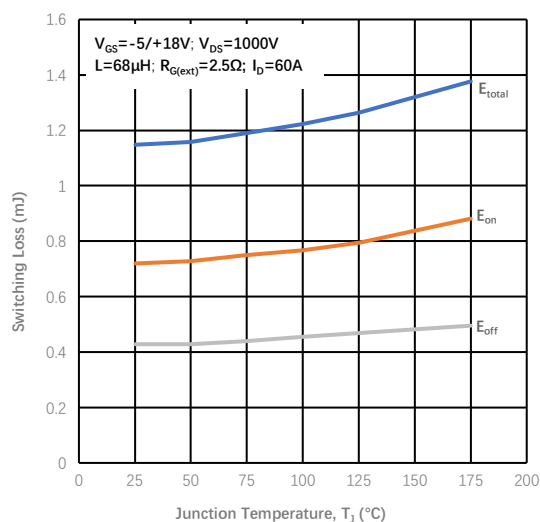


Figure 15

Switching Energy vs. Temperature

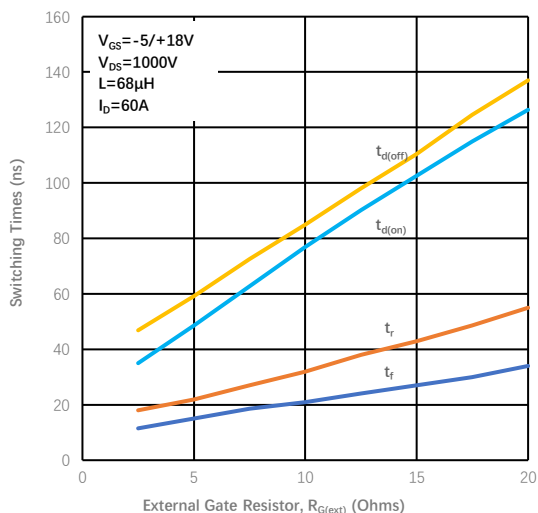


Figure 16

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

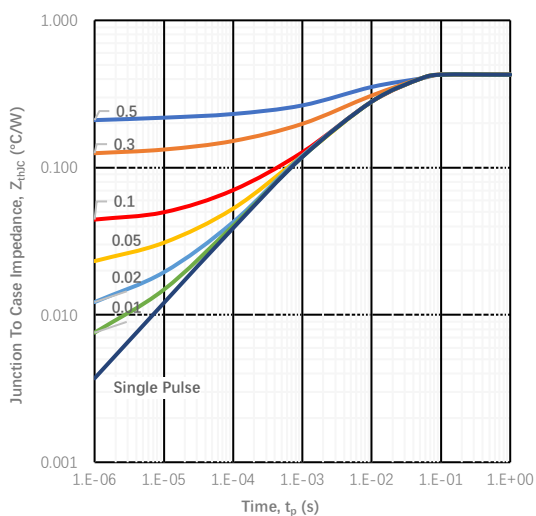


Figure 17

Transient Thermal Impedance

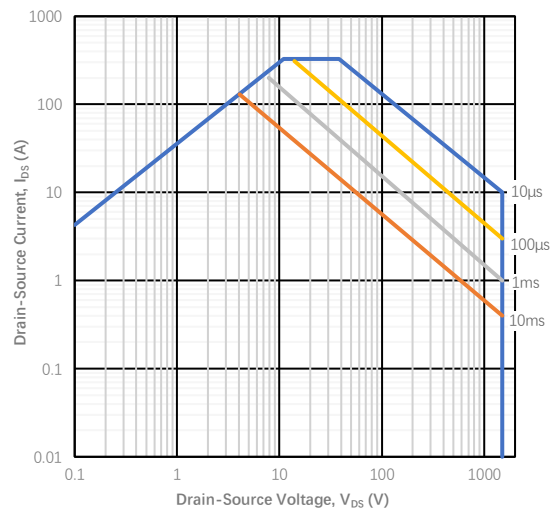
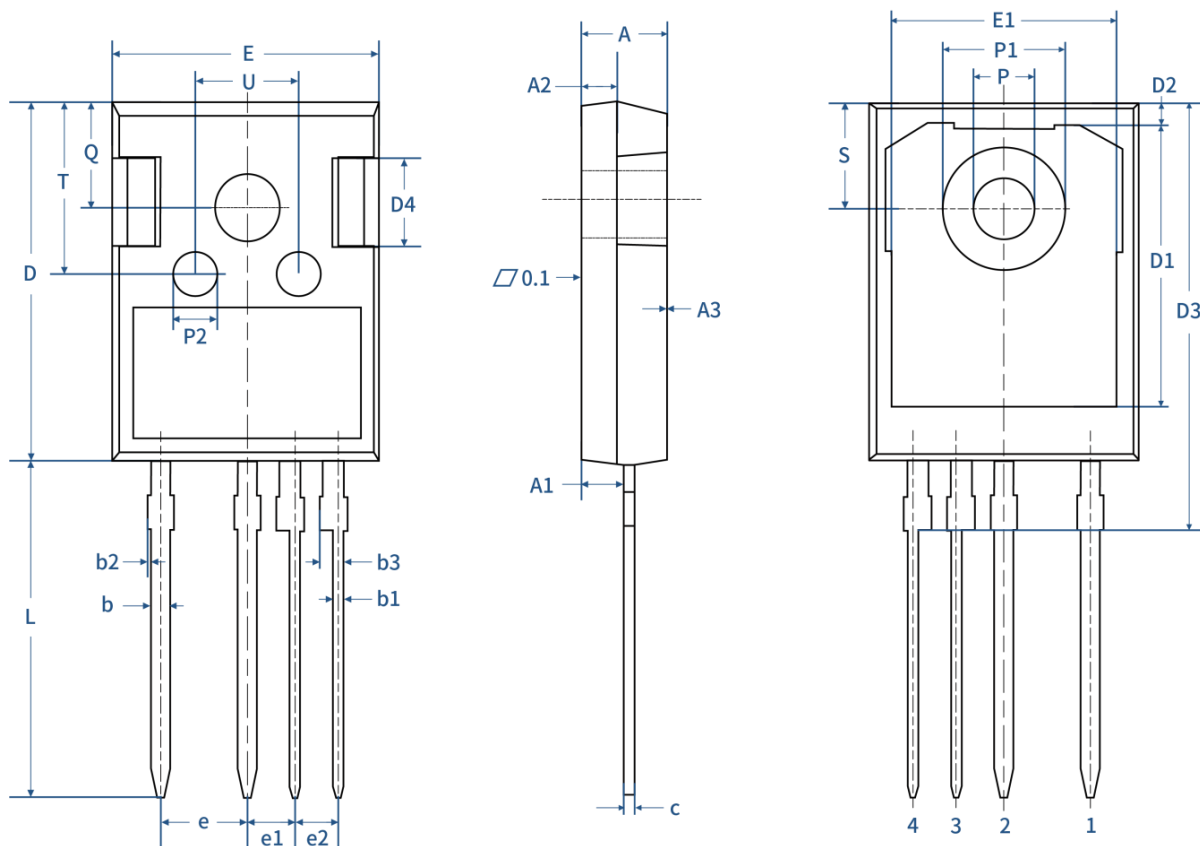


Figure 18

Safe Operating Area

Dimensions

TO-247-4L package



Symbol	Millimeters		Symbol	Millimeters	
	Min.	Max.		Min.	Max.
A	4.9	5.1	E	15.7	15.9
A1	2.31	2.51	E1	13.1	13.5
A2	1.9	2.1	e	5.08	
A3	0.05	0.25	e1	2.79	
b	1.1	1.3	e2	2.54	
b1	0.65	0.79	L	19.8	20.1
b2	-	0.2	P	3.5	3.7
b3	1.34	1.44	P1	7	7.4
c	0.58	0.66	P2	2.4	2.6
D	20.9	21.1	Q	5.6	6
D1	16.25	16.85	S	6.15	-
D2	1.05	1.35	T	9.8	10.2
D3	24.97	25.27	U	6	6.4
D4	4.9	5.1			

Pin	Symbol	Description
1, Tab	D	Drain
2	S	Power Source
3	S	Driver Source
4	G	Gate

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.

Friendship Reminder

- JiNan JingHeng (hereinafter referred to as JH) reserves the right to make changes to this document and its products and specifications at anytime without notice.
- Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.
- JH makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does JH assume any liability for application assistance or customer product design.
- JH does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.
- No license is granted by implication or otherwise under any intellectual property rights of JH.
- JH's products are not authorized for use as critical components in life support devices or systems without express written approval of JH.