SEMICONDUCTOR

SC26N170P

1700V 100A N-Channel SIC Power MOSFET

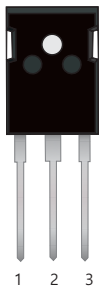
Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- High operating junction temperature capability
- Kelvin gate input easing driver circuit design

Product Summary			
V_{DS}	$R_{DS(on)}$(mΩ)Typ	I_D(A)	Qg(Typ)
1700V	26 @ 18V 50A	100	168nc

TO-247

SC26N170P4



Mechanical Data

- Case:TO-247 Package

Application

- Motor drivers
- Solar inverters
- Automotive DC/DC converters
- Automotive compressor inverters
- Switch mode power supplies

Pin Definition:

1. **Gate**
2. **Drain**
3. **Source**

Block Diagram

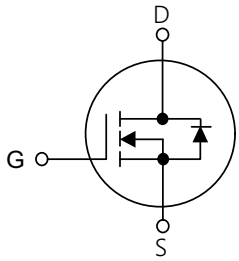


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	1700	V
Gate-Source Voltage(Max)		$V_{GS(max)}$	-10/+22	V
Recommend Gate-Source Voltage		V_{GSop}	-5/+18	V
Continuous Drain Current	T_C=25°C	I_D	100	A
	T_C=100°C		75	
Pulsed Drain Current (Note 1)		I_{DM}	200	A
Power Dissipation	T_C=25°C	P_D	500	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC26N170P	Unit
Thermal resistance Junction to Case, Max	$R_{\theta JC}$	0.30	°C/W
Thermal resistance Junction to Ambient,Max	$R_{\theta JA}$	40	°C/W

Table 3. Electrical Characteristics (T_J=25°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=250μA	1700	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=1700V,V_{GS}=0V	-	5	100	μA
			V_{DS}=1700V,V_{GS}=0V,T_J=175°C	-	-	3.5	mA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=22V,V_{DS}=0V	-	-	250	nA
	Reverse		V_{GS}=-10V,V_{DS}=0V	-	-	-250	nA
On Characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=10mA	2.0	2.9	4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=18V,I_D=50A,T_J=25°C	-	26	33	mΩ
			V_{GS}=18V,I_D=50A,T_J=175°C	-	44	-	
Gate Resisitance		R_G	f=1MHz	-	2.5	-	Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=1200V,V_{GS}=0V, f=1MHz,V_{AC}=25mV	-	6460	-	pF
Output Capacitance		C_{OSS}		-	198	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	16	-	pF
Coss stored energy		E_{OSS}		-	152	-	μJ
Turn-on switching energy		E_{ON}	V_{DS}=1200V,I_D=50A,V_{GS}=-5/18V, R_G=2.5Ω,L=150μH,T_J=175°C	-	2.12	-	mJ
Turn-off switching energy		E_{OFF}		-	0.75	-	mJ
Turn-On Delay Time		td(on)	V_{DS}=1200V,I_D=50A V_{GS}=-5/18V,R_G=2.5Ω, L=150μH,T_J=25°C	-	54	-	ns
Turn-On Rise Time		t_R		-	35	-	ns
Turn-Off Delay Time		td(off)		-	65	-	ns
Turn-Off Fall Time		tf		-	23	-	ns
Total Gate Charge		Q_G	V_{DD}=1200V,I_D=50A, V_{GS}=-5/18V	-	168	-	nC
Gate-Source Charge		Q_{GS}		-	52	-	nC
Gate-Drain Charge		Q_{GD}		-	50	-	nC
Drain-Source Diode Characteristics and Maximum Ratings (Note 2)							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_F=37.5A	-	3.2	-	V
Continuous Diode Forward Current		I_S	V_{GS}=0V,T_C=25°C	-	100	-	A
Reverse Recovery Time		trr	V_R=1200V,V_{GS}=-5V,I_F=50A di/dt=1900A/μs,T_J=175°C	-	102	-	ns
Recovered charge		Qrr		-	718	-	nC
Peak reverse recovery current		Irrm		-	20	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

2 Pulse Test: Pulse width ≤300μS,Duty cycle≤2%

Typical Characteristics Diagrams

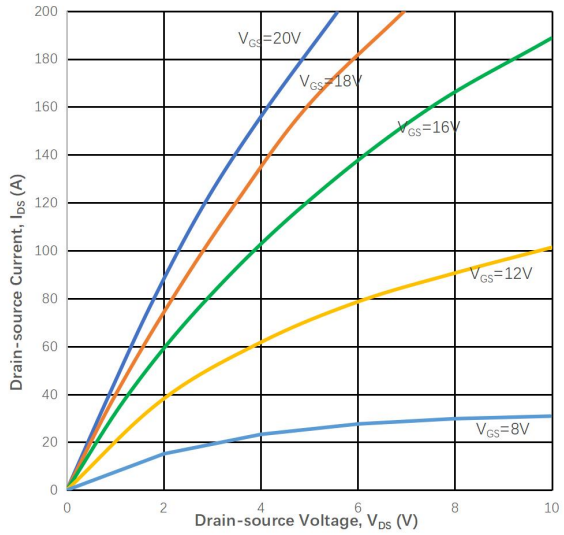


Figure 1

Output Characteristics (T_J=25 °C)

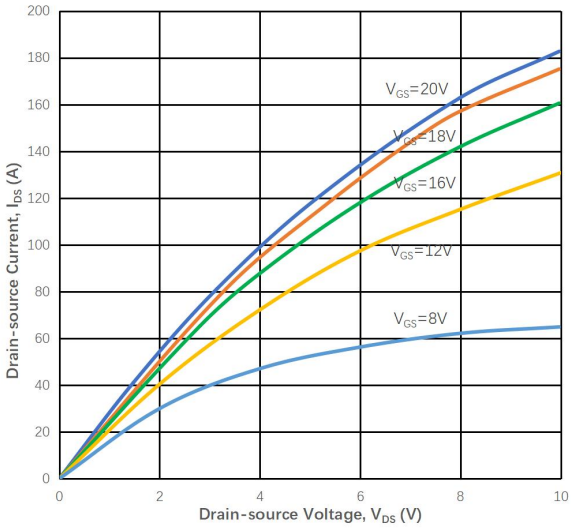


Figure 2

Output Characteristics (T_J=175°C)

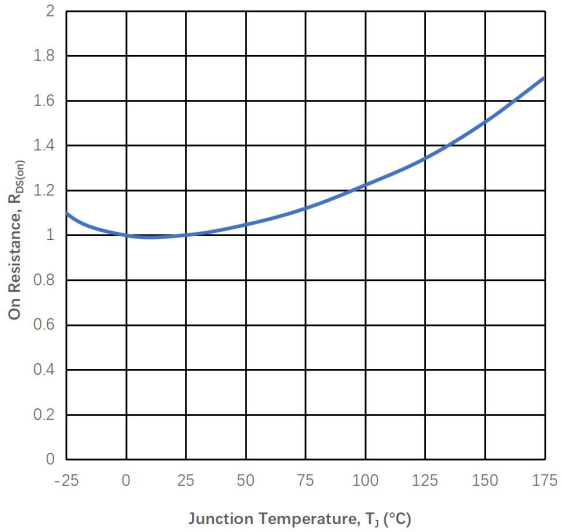


Figure 3

Normalized On-resistance vs. Temperature

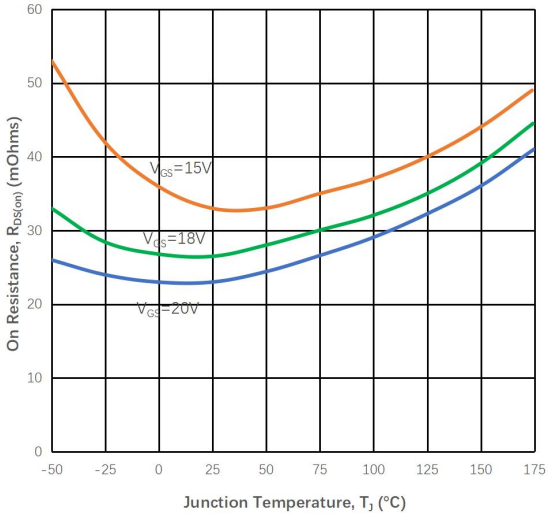


Figure 4

On-resistance vs. Temperature

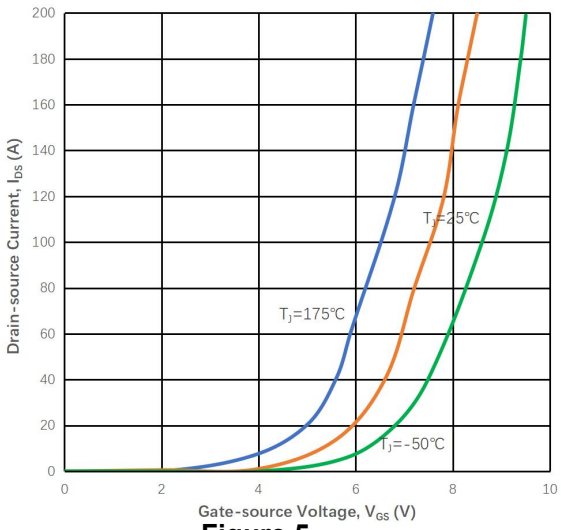


Figure 5

Transfer Characteristic

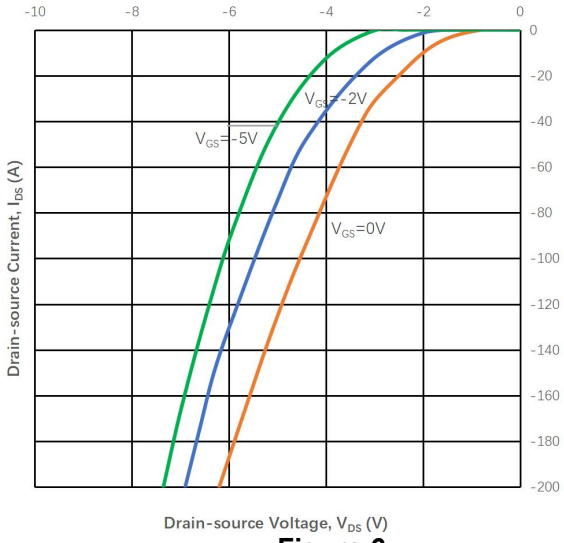


Figure 6

Body Diode Characteristic at 25°C

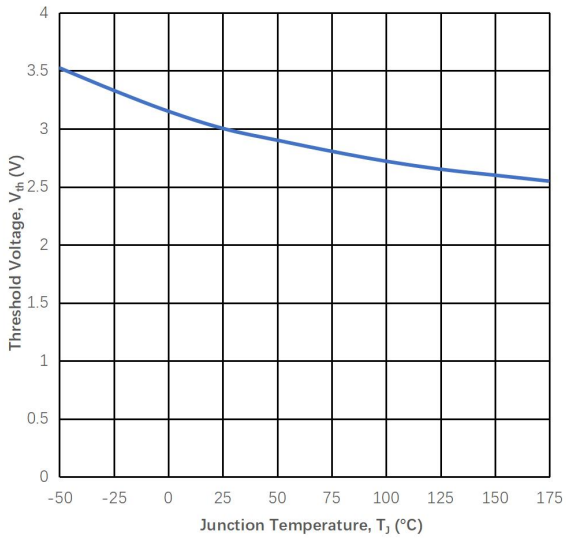


Figure 7

Threshold Voltage vs. Temperature

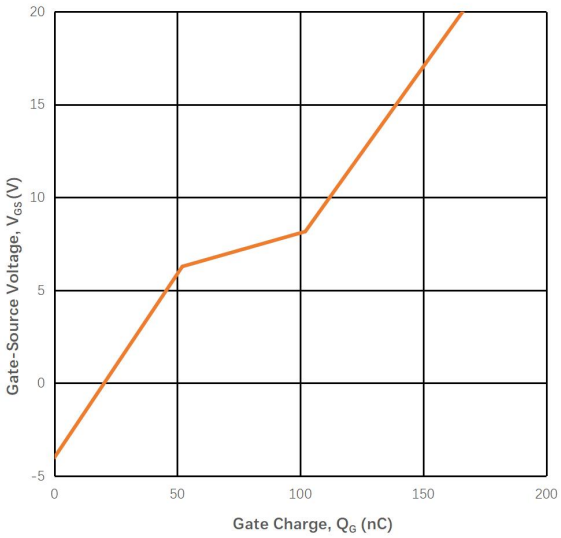


Figure 8

Gate Charge Characteristics

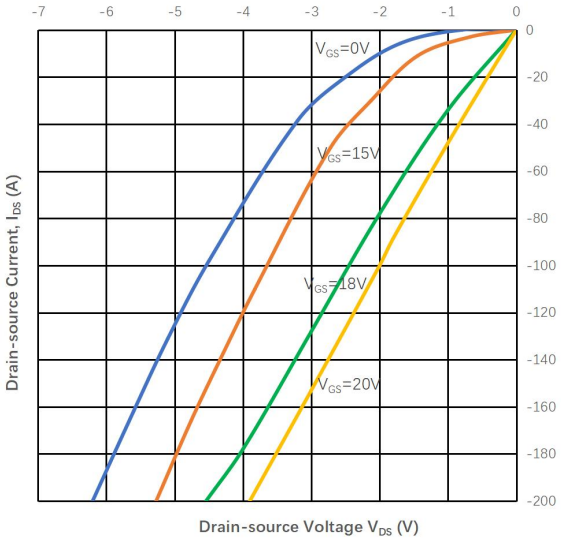


Figure 9

3rd Quadrant Characteristic at 25°C

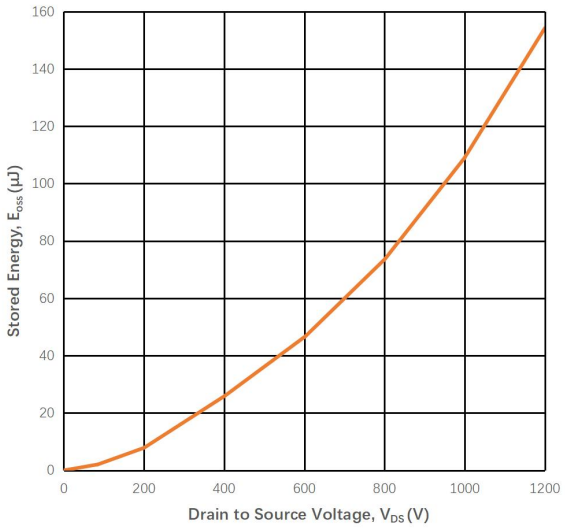


Figure 10

Output Capacitor Stored Energy

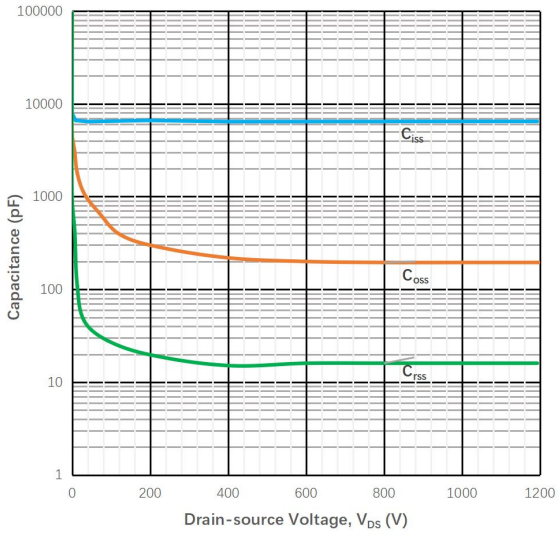


Figure 11

Capacitances vs. Drain-source

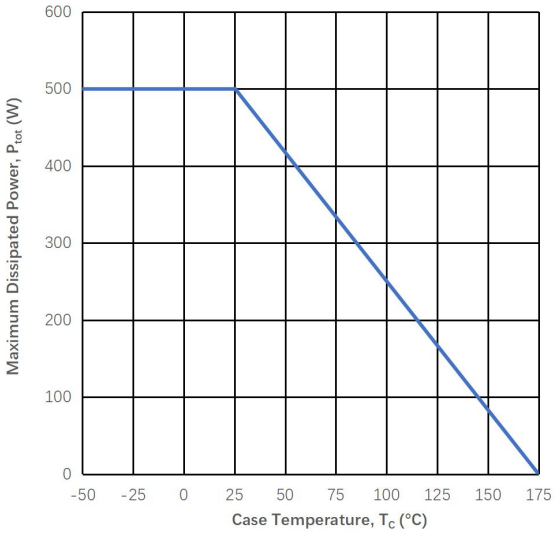


Figure 12

Max Power Dissipation Derating vs T_C

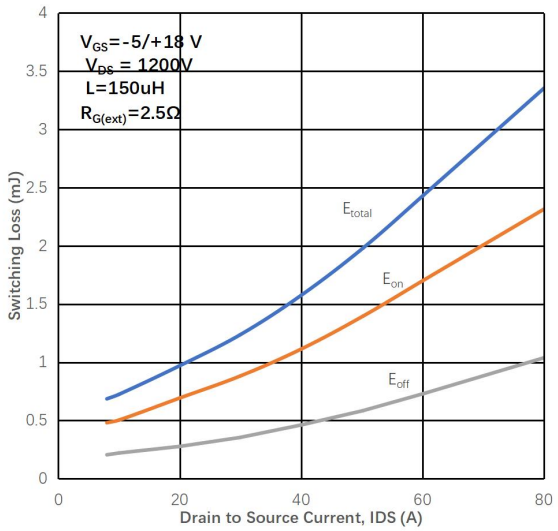


Figure 13

Switching Energy vs. Drain Current

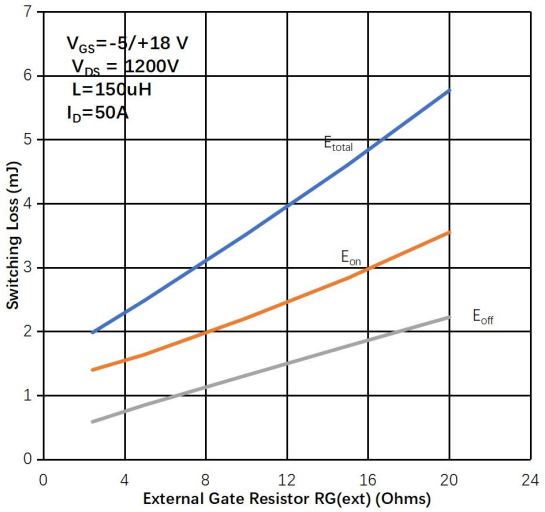


Figure 14

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

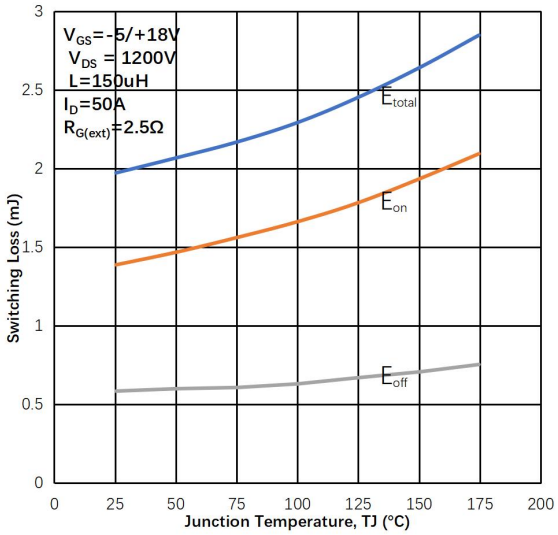


Figure 15

Switching Energy vs. Temperature

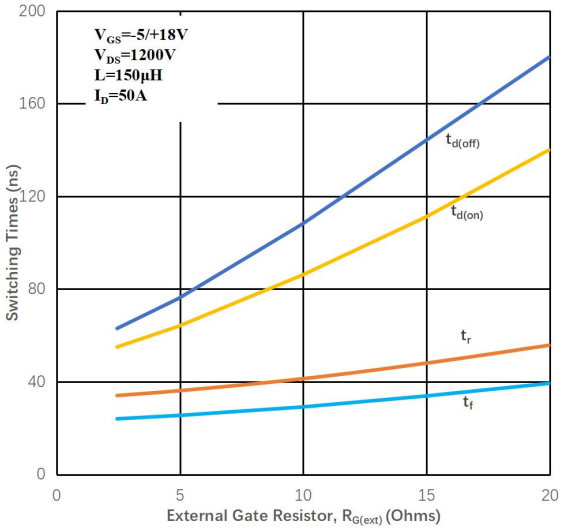


Figure 16

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

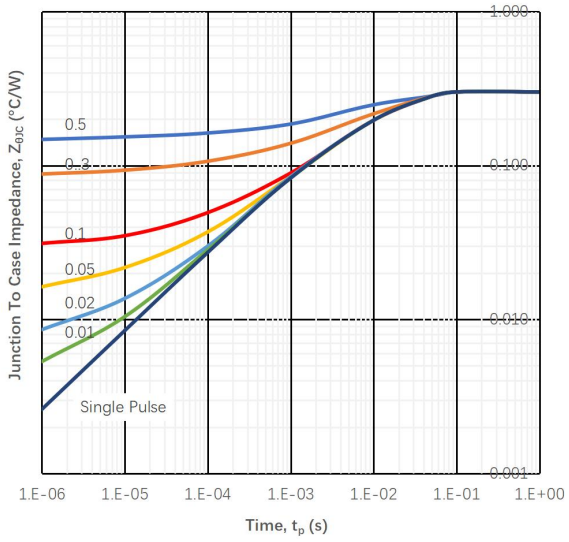


Figure 17

Transient Thermal Impedance

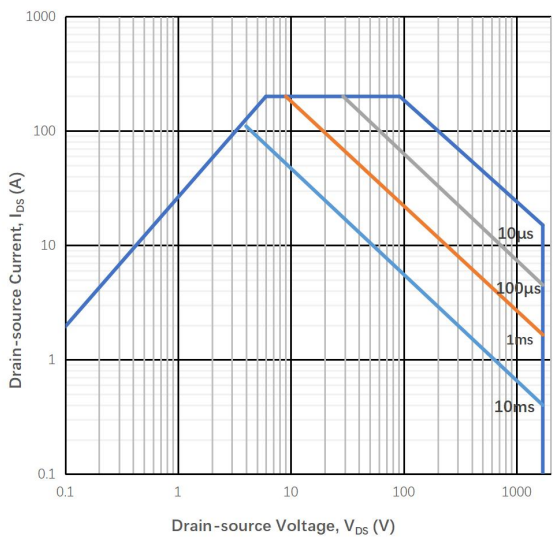
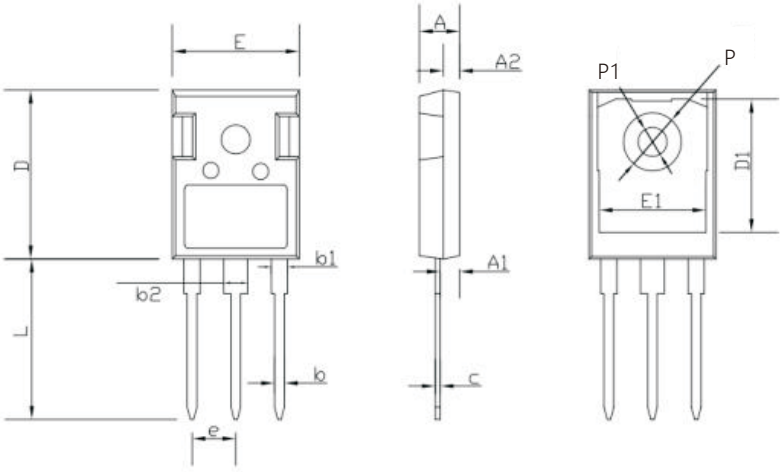


Figure 18

Safe Operating Area

Dimensions

TO-247 package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	4.90	5.10	0.193	0.201
A1	2.31	2.51	0.091	0.099
A2	1.90	2.10	0.075	0.083
b	1.16	1.26	0.046	0.050
b1	1.96	2.06	0.0772	0.0812
b2	2.96	3.06	0.117	0.121
c	0.59	0.66	0.0232	0.0260
D	20.90	21.10	0.8235	0.8313
D1	16.25	16.85	0.6403	0.6639
E	15.70	15.90	0.6186	0.6265
E1	13.10	13.50	0.5161	0.5319
e	5.44		0.2143	
L	19.80	20.10	0.7801	0.7919
ΦP	3.50	3.70	0.1379	0.1458
ΦP1	0	7.30	0	0.2876

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