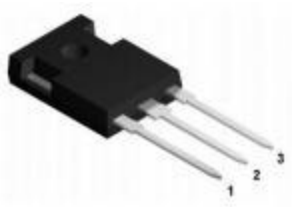
V_{DS} = **1200 V**

I_D (T_C=25℃) = **41A**

$R_{DS(on).typ}$ = **80 mΩ@ V_{GS}=20V**



TO-247-3

Features

- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant

Benefits

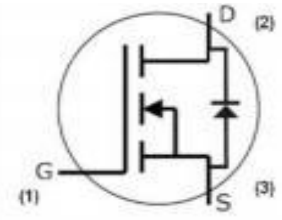
- Reduce switching losses
- Increased system Switching Frequency
- Increased power density
- Reduction of heat sink requirements

Applications

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

Package Parameters

Part Number	Marking	Package
YX120R080T3	YX120R080T3	TO-247-3



Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit	Note
V_{DSmax}	Drain- Source Voltage	V_{GS} = 0V, I_D = 100μA	1200	V	
V_{GSmax}	Gate- Source voltage	AC (f > 1 Hz)	- 10/+25	V	
V_{GSop}	Recommend Gate- Source Voltage	Static	-5/+20	V	
I_D	Continuous Drain current	V_{GS} = 20V, T_C = 25°C	41	A	Fig. 14
		V_{GS} = 20V, T_C = 100°C	28		
$I_{D,pulse}$	Pulsed Drain Current	Pulse with t_p limited by T_{jmax}	80	A	Fig. 18
P_D	Power Dissipation	T_C = 25°C, Tj = 175°C	208	W	Fig. 16
T_j	Operating junction temperature		-55~150	°C	
T_{stg}	Storage temperature		-55~150	°C	
	TO-247 mounting torque	M3 Screw	0.7	Nm	

Thermal Characteristics

Symbol	Parameter	Value			Unit	Note
		Min	Typ	Max		
$R_{th(jc)}$	Thermal resistance from Junction to Case		0.72		K/W	Fig. 15
$R_{th(ja)}$	Thermal resistance from Junction to Ambient		40		K/W	

Electrical Characteristics T_j=25°C unless otherwise specified

Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain- Source Breakdown voltage	V_{GS} = 0V, I_D = 100μA	1200			V	
$V_{GS(th)}$	Gate Threshold voltage	V_{GS} = V_{DS}, I_D = 5mA		3.0		V	Fig. 9
		V_{GS}= V_{DS}, I_D = 5mA, T_j=175°C		2.3			
I_{GSS}	Gate-Source Leakage current	V_{GS} = 20V, V_{DS} = 0V			250	nA	
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 1200V, V_{GS} = 0V, T_j = 25°C		1	50	μA	
$R_{DS(on)}$	Drain-Source On-state Resistance	V_{GS} = 20V, I_D = 20A		80	98	mΩ	Fig. 3, 4, 5
		V_{GS} = 20V, I_D = 20A, T_j = 175°C		130			
g_{fs}	Transconductance	V_{GS} = 20V, I_D = 20A		9		S	Fig. 6
		V_{GS} = 20V, I_D = 20A, T_j = 175°C		7			

Gate Charge Characteristics

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
Q_{GS}	Gate to Source Charge	V_{DS} = 800V I_D = 20A V_{GS} = -5V/20V		15		nC	Fig. 10
Q_{GD}	Gate to Drain Charge			30			
Q_G	Total Gate Charge			66			

AC Characteristics (T_j=25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 1000V f =1 MHz V_{AC} = 25mV		1374		pF	Fig. 13
C_{oss}	Output Capacitance			63		pF	
C_{rss}	Reverse Transfer Capacitance			3.5		pF	
$R_{G(int)}$	Internal Gate Resistance	f=1 MHz, V_{AC} = 25mV		2		Ω	

Reverse Diode Characteristics (T_j=25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Value			Unit	Note
			Min.	Typ.	Max.		
V_{SD}	Diode Forward Voltage	V_{GS} = -4V, I_{SD} = 10A		3.7		V	Fig. 7,8
		V_{GS} = -4V, I_{SD} = 10A, T_j = 175°C		3.1			
I_S	Continuous Diode Forward Current	V_{GS} = -4V, T_C = 25°C		35		A	
$I_{S,\ pulse}$	Diode pulse Current	V_{GS} = -4V, pulse width t_p limited by T_{jmax}		80		A	

Typical Performance

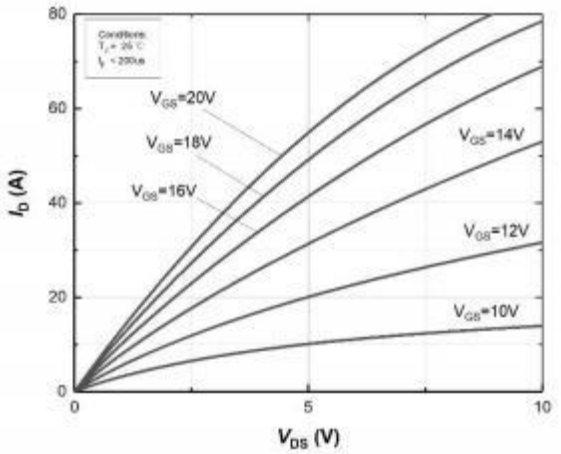


Figure 1. Output characteristics at Tj=25°C

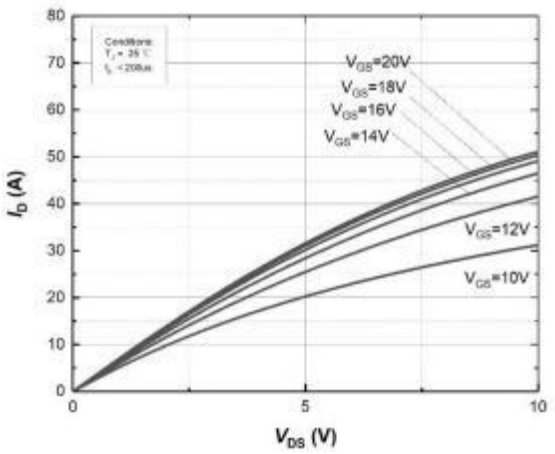


Figure 2. Output characteristics at Tj=175°C

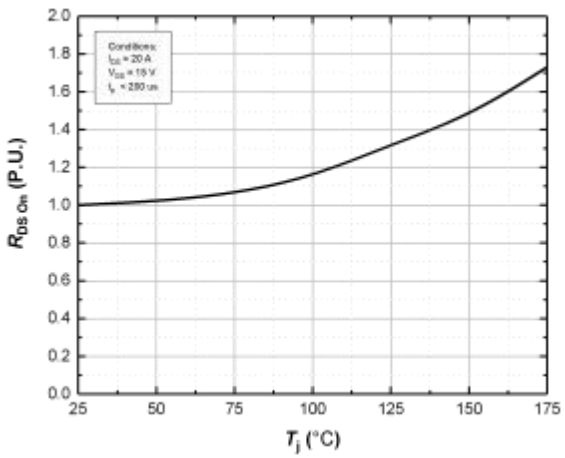


Figure 3. Normalized On-Resistance vs. Temperature

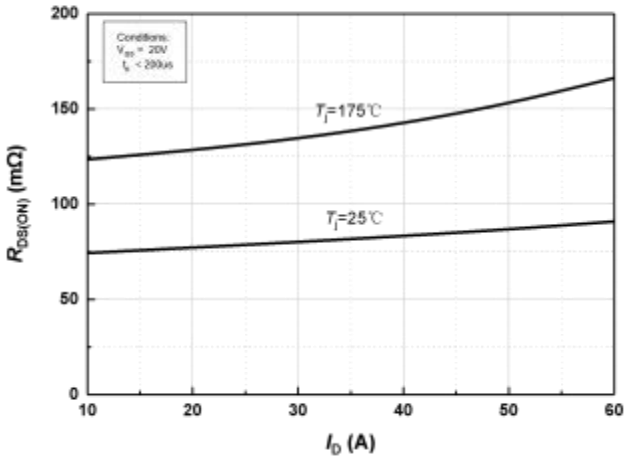


Figure 4. On-Resistance vs. Drain current for Various Temperature

Typical Performance

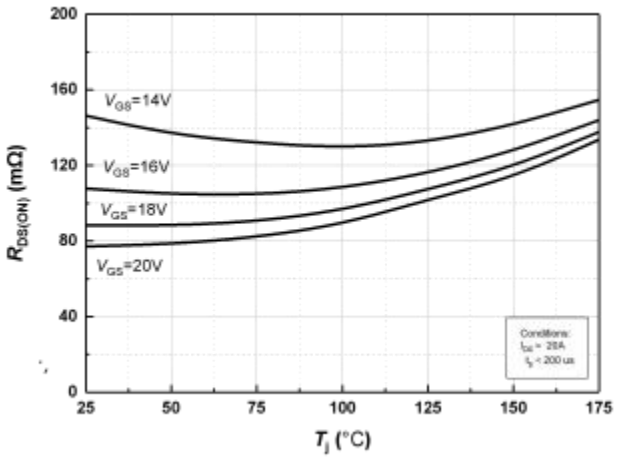


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

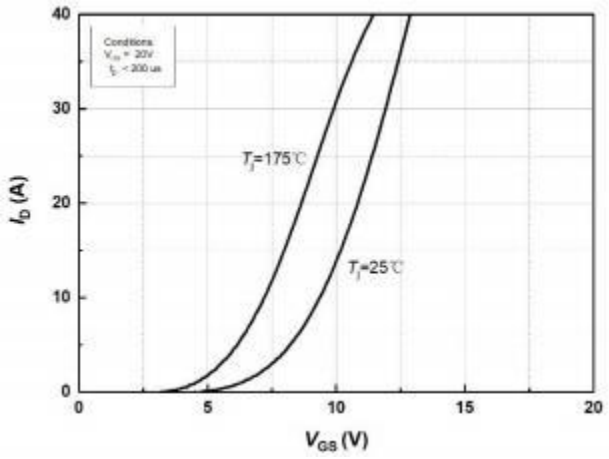


Figure 6. Transfer Characteristics for Various Junction Temperatures

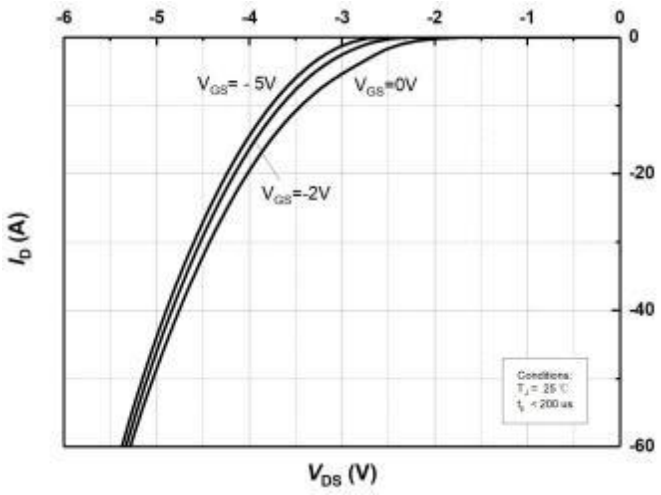


Figure 7. Body Diode Characteristics at Tj=25°C

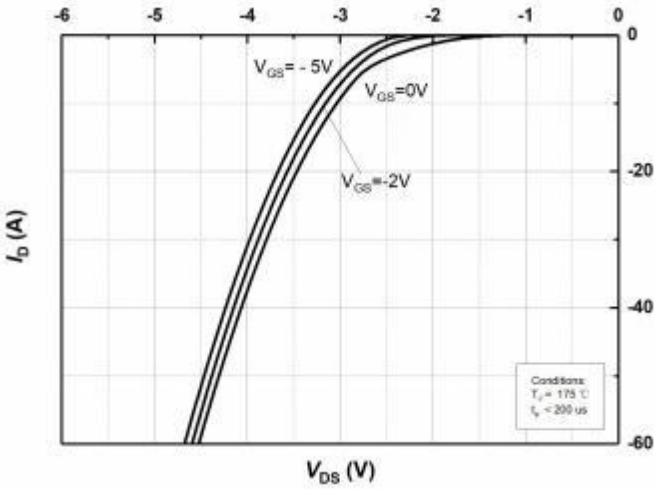


Figure 8. Body Diode Characteristics at Tj=175°C

Typical Performance

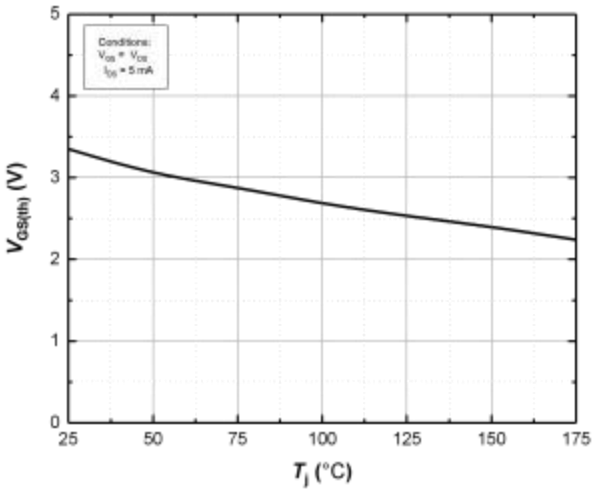


Figure 9. Threshold Voltage vs. Temperature

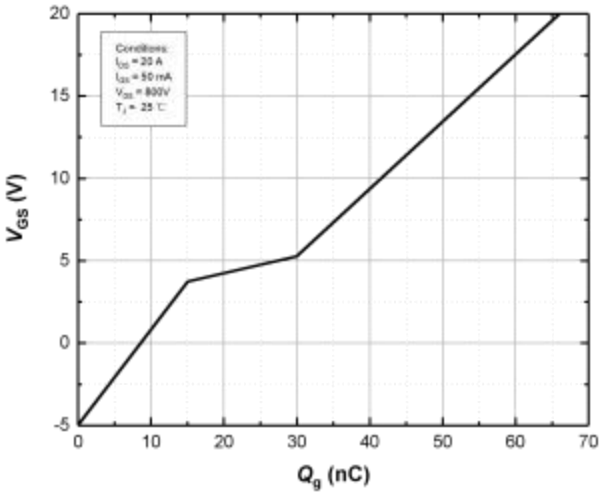


Figure 10 Gate Charge Characteristics

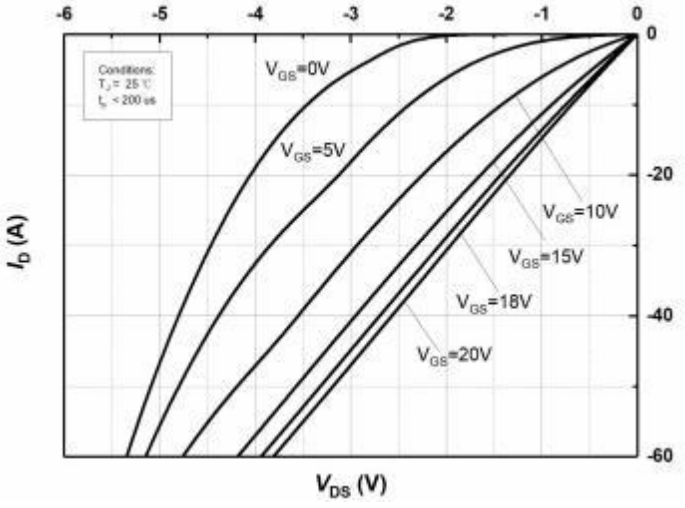


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

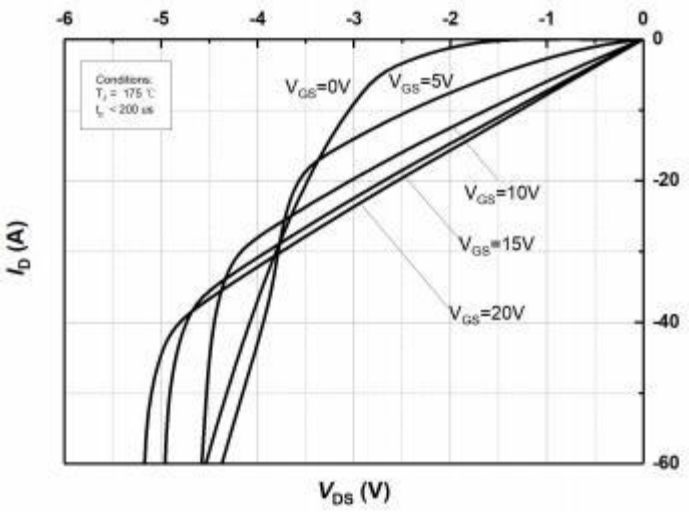


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

Typical Performance

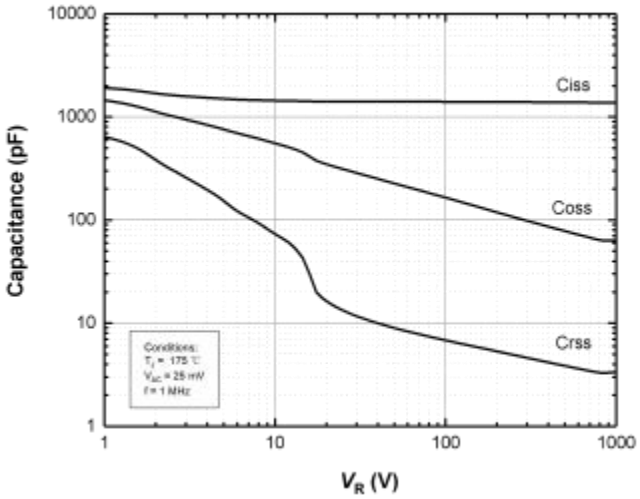


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 1000V)

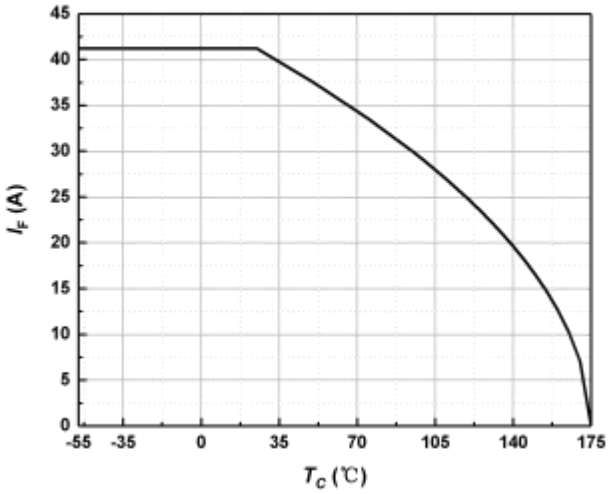


Figure 14. Continuous Drain Current Derating vs Case Temperature

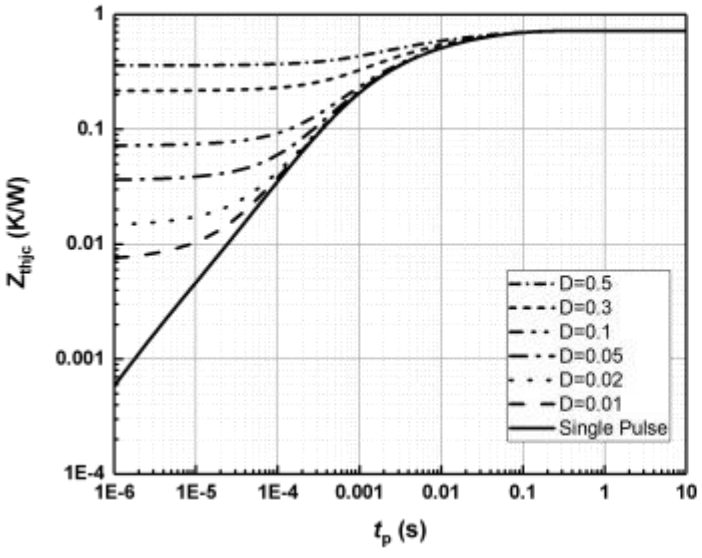


Figure 15. Transient Thermal Impedance (Junction – Case)

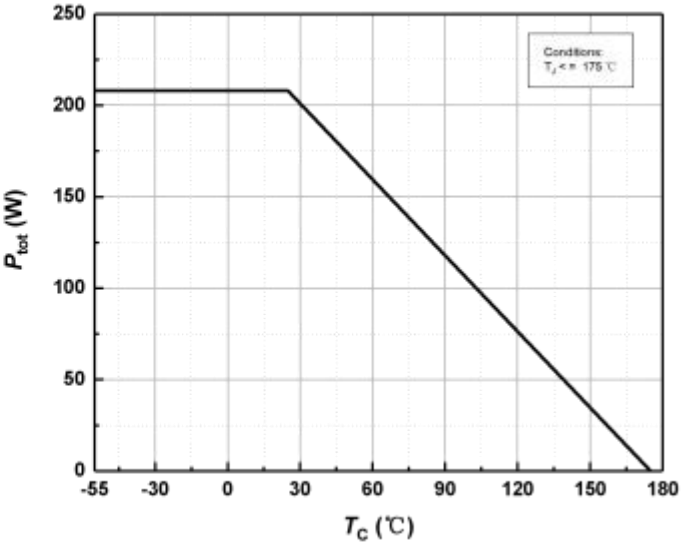


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

Typical Performance

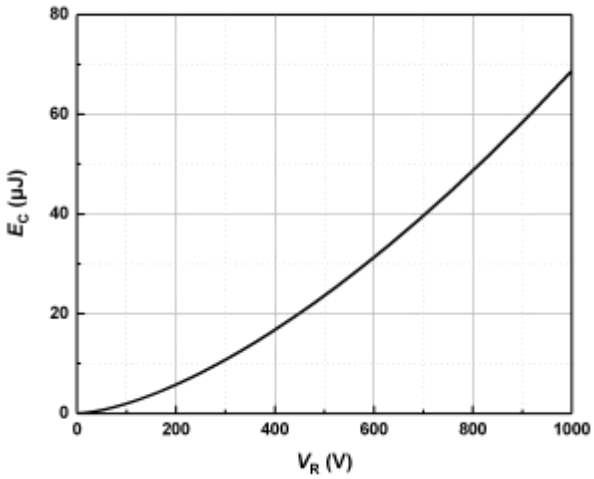


Figure 17. Output Capacitor Stored Energy

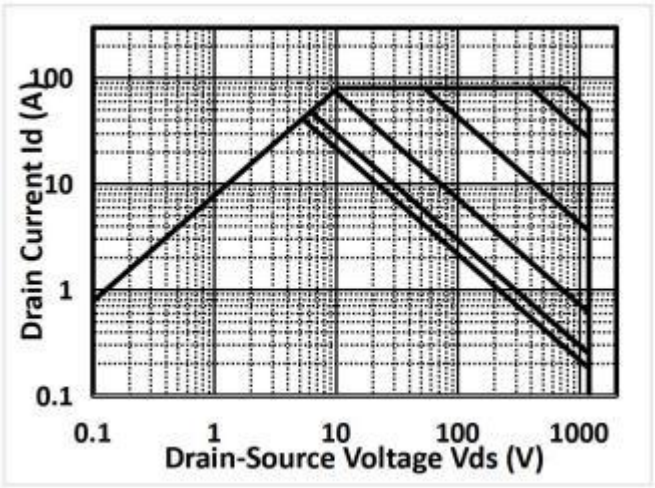
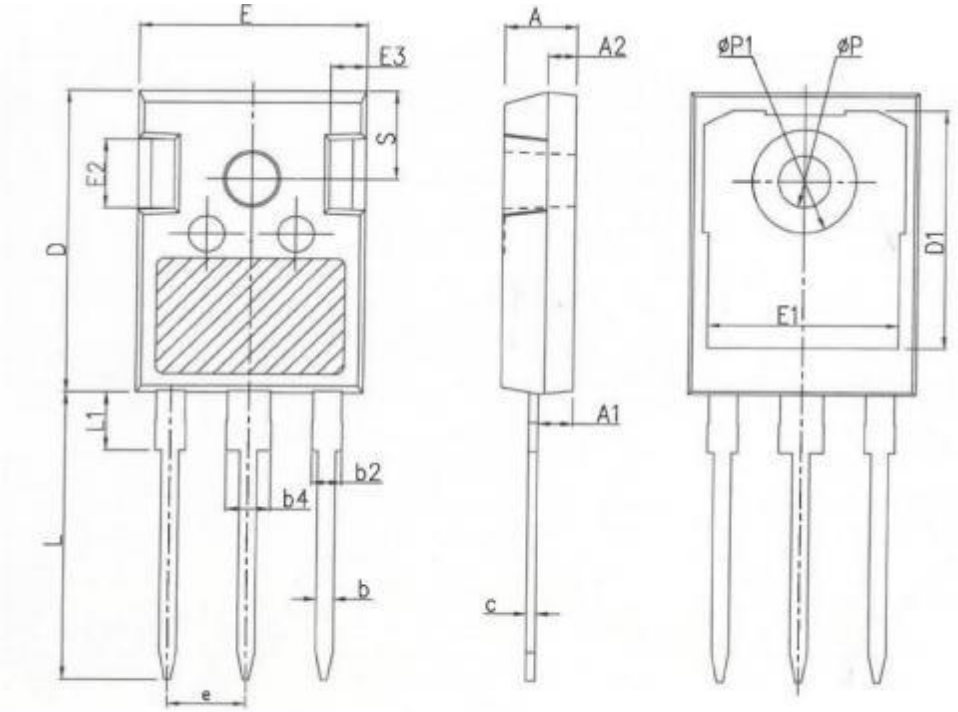


Figure 18. Safe Operating Area

Package Dimensions



SYMBOL	MM		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	NA	NA	4.30
ΦP	3.40	3.60	3.80
ΦP1	NA	NA	7.30
S	6.15BSC		

Revision History

Document Version	Date of Release	Description of Changes
Rev 1.0	2022- 11-01	Release of the datasheet.