ACM065R060TD

N-Channel Silicon Carbide Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D@25℃
650V	60mΩ@18V	41A

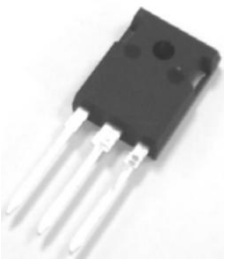
Feature

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive

Application

- Solar and UPS inverters
- EV motor drive
- High voltage DC/DC converters
- Switched mode power supplies
- Load switch

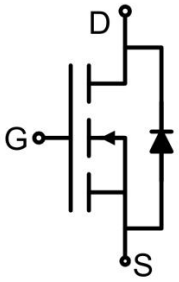
Package



TO-247-3L

Marking

Circuit diagram



Absolute maximum ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	V_{DSmax}	V_{GS} =0V, I_D =100μA	650	V
Gate-Source Voltage	V_{GSmax}	Absolute maximum values	-10/+23	V
Gate-Source Voltage	V_{GSOP}	Recommended operational values	-5/+18	V
Continuous Drain Current	I_D	V_{GS} =18V	41	A
	I_D	V_{GS} =18V, T_C =100℃	31	A
Pulsed Drain Current	$I_{D,pulse}$	Pulse with t_p limited by T_{jmax}	99	A
Power Dissipation	P_D	T_J =175℃	150	W
Thermal Resistance（Typ）	$R_{\theta JC}$	Junction to Case	0.99	℃/W
Operating Junction Temperature	T_J		-55 ~ +175	℃
Storage Temperature	T_{STG}		-55 ~ +175	℃

Electrical characteristics (T_C=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =1mA	650			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V, V_{GS} =0V			50	μA
Gate-Source leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =23V			100	nA
	I_{GSS-}	V_{DS} =0V, V_{GS} =-10V			100	
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =5mA	2	2.7	4	V
		V_{DS} =V_{GS}, I_D =5mA, T_J =175℃		2		
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =18V, I_D =13.2A	42	60	79	mΩ
		V_{GS} =18V, I_D =13.2A, T_J =175℃		75		
Transconductance	g_{fs}	V_{GS} =20V, I_D =13.2A		9		S
		V_{GS} =20V, I_D =13.2A, T_J =175℃		9		
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =600V, V_{GS} =0V V_{AC} =25mV, f =1MHz		1100		pF
Output Capacitance	C_{oss}			100		
Reverse Transfer Capacitance	C_{rss}			7		
C_{oss} Stored Energy	E_{oss}			17		μJ
Total Gate Charge	Q_g	V_{DS} =400V, V_{GS} =-5V/18V I_D =13.2A		54		nC
Gate-Source Charge	Q_{gs}			15		
Gate-Drain Charge	Q_{gd}			7		
Internal Gate Resistance	$R_{G(int)}$	V_{AC} =25mV, f =1MHz		2.3		Ω
Source-Drain Diode characteristics						
Diode Forward Current	I_S	V_{GS} =-5V		23		A
Diode Forward voltage	V_{SD}	V_{GS} =-5V, I_{SD} =6.6A		3.8		V
		V_{GS} =-5V, I_{SD} =6.6A, T_J =175℃		3.4		
Reverse Recovery Time	T_{rr}	V_R =400V, I_{SD} =13.2A		28		nS
Reverse Recovery Charge	Q_{rr}			47		nC
Peak Reverse Recovery Current	I_{rrm}			3		A

Typical Characteristics

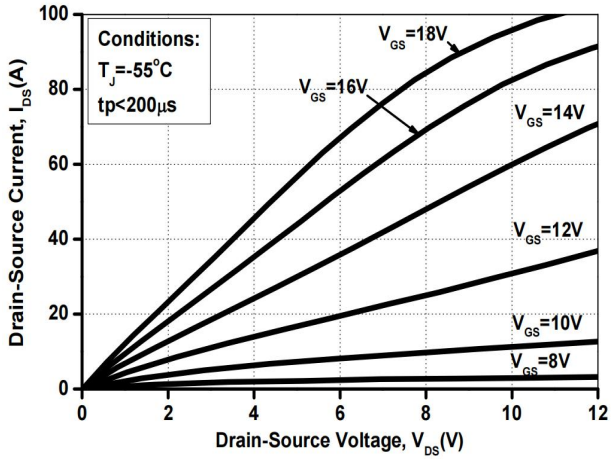


Figure 1. Output Characteristics T_J = -55℃

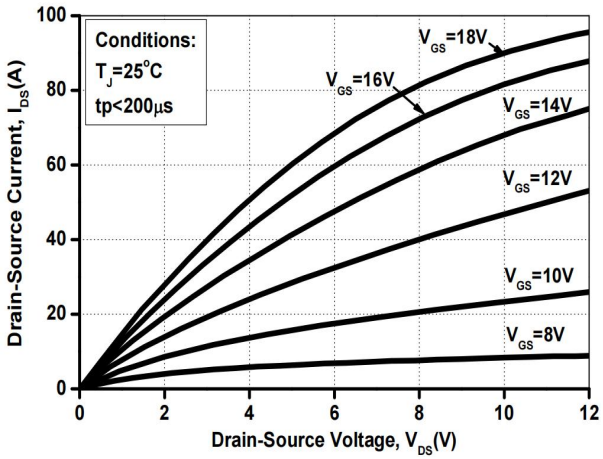


Figure 2. Output Characteristics T_J = 25℃

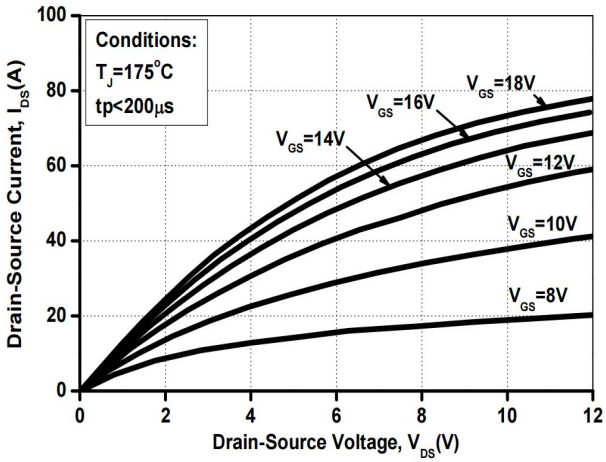


Figure 3. Output Characteristics T_J = 175℃

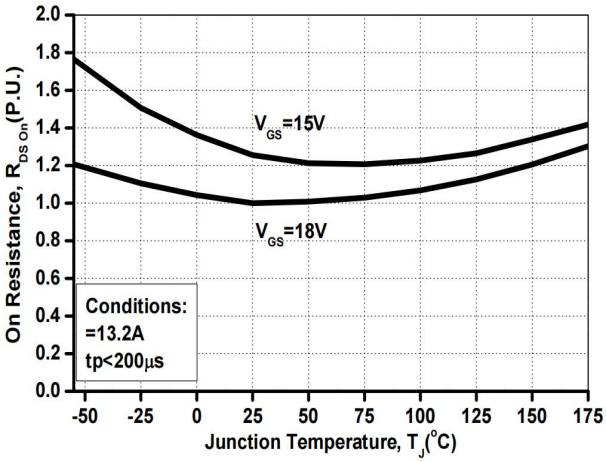


Figure 4. Normalized On-Resistance vs. Temperature

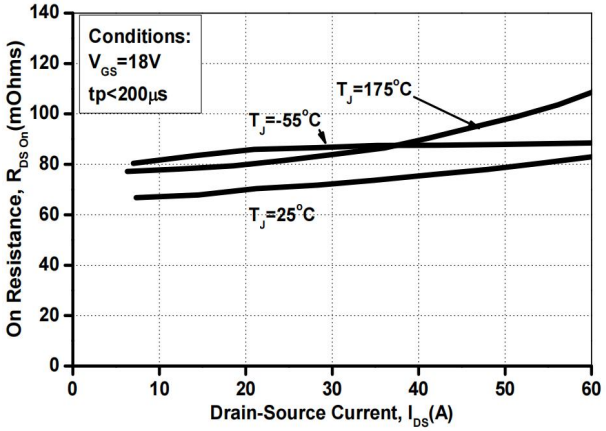


Figure 5. On-Resistance vs. Drain Current
For Various Temperatures

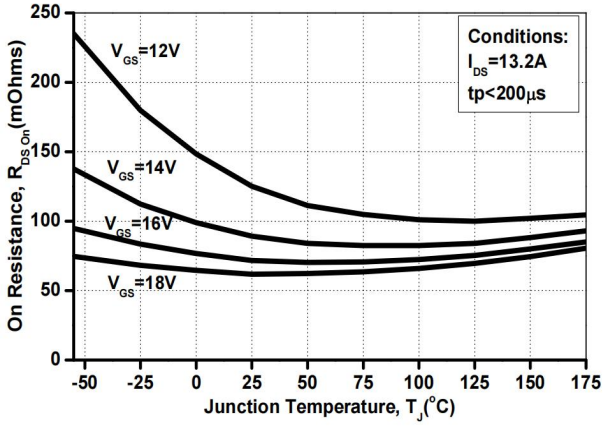


Figure 6. On-Resistance vs. Temperature
For Various Gate Voltage

Typical Characteristics

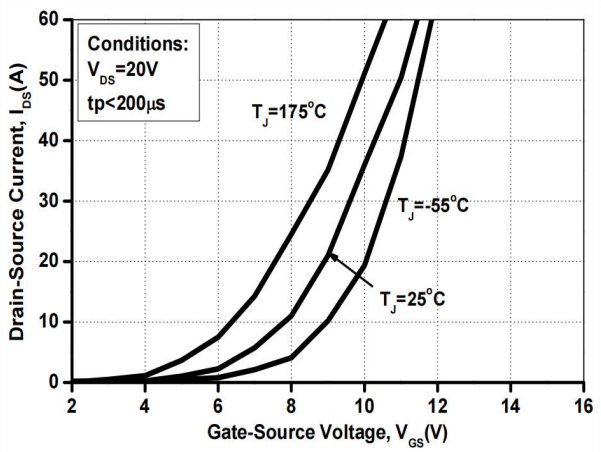


Figure 7. Transfer Characteristic for Various Junction Temperatures

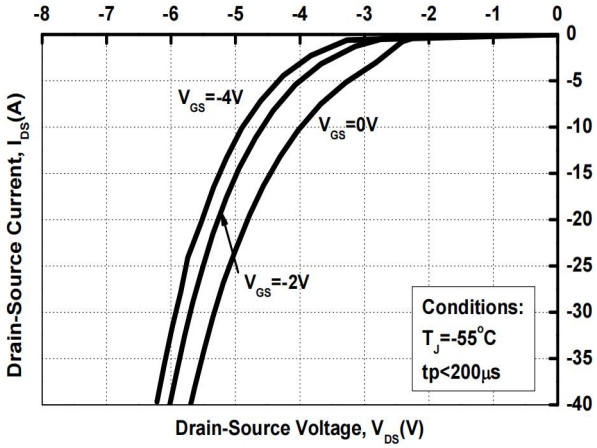


Figure 8. Body Diode Characteristic at -55°C

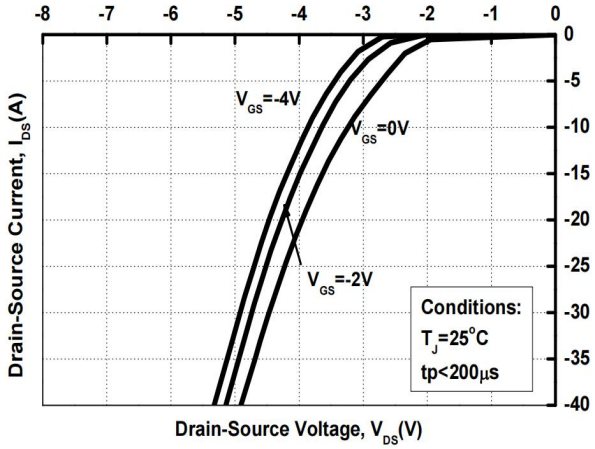


Figure 9. Body Diode Characteristic at 25°C

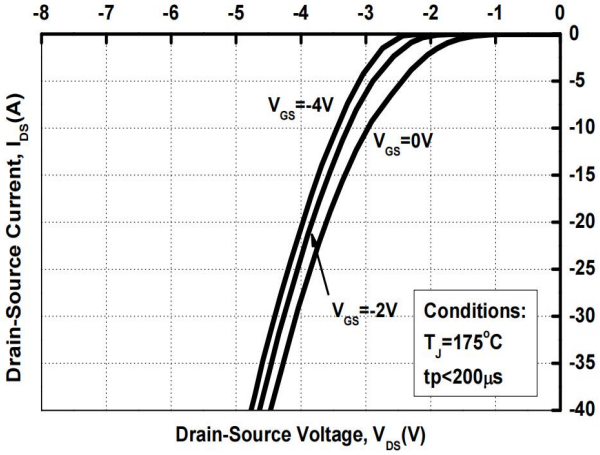


Figure 10. Body Diode Characteristic at 150°C

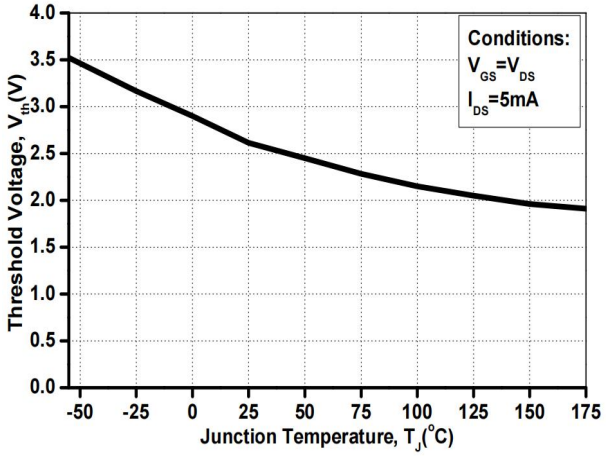


Figure 11. Threshold Voltage vs. Temperature

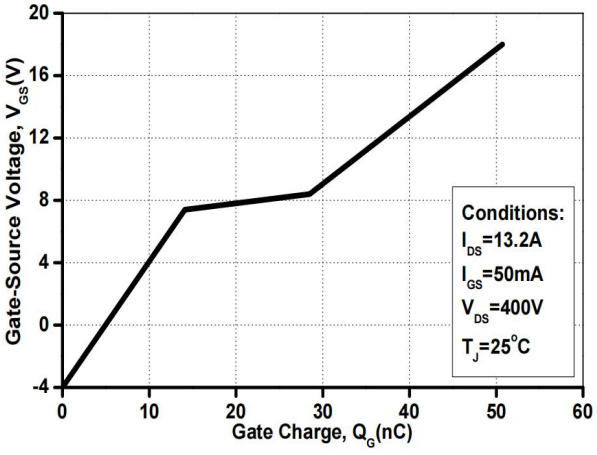


Figure 12. Gate Charge Characteristics

Typical Characteristics

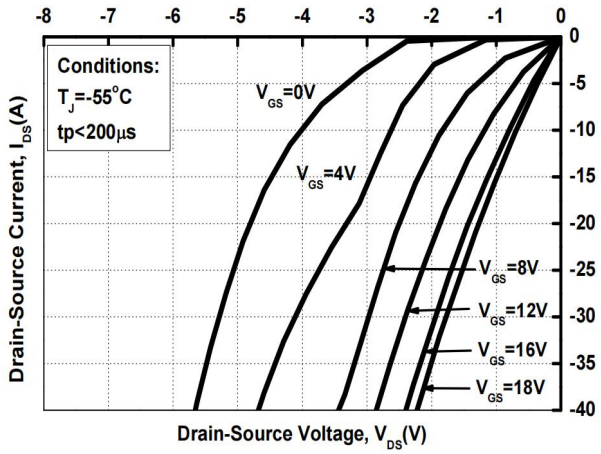


Figure 13. 3rd Quadrant Characteristic at -55˚C

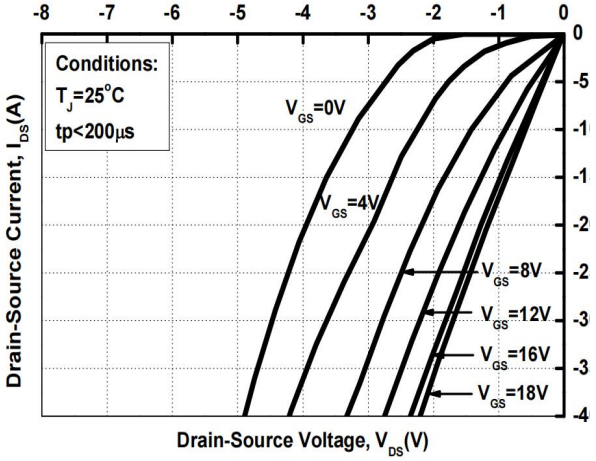


Figure 14. 3rd Quadrant Characteristic at 25˚C

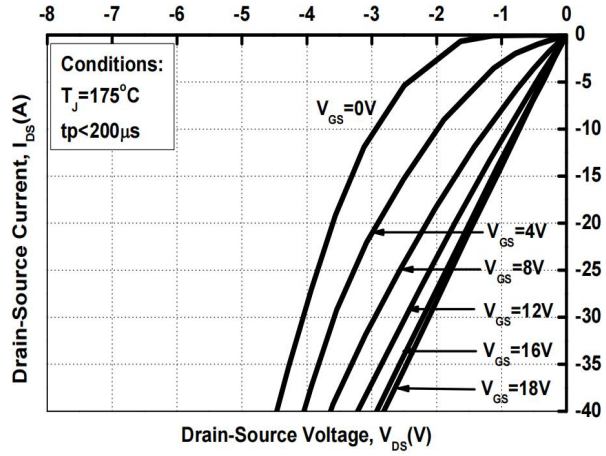


Figure 15. 3rd Quadrant Characteristic at 175˚C

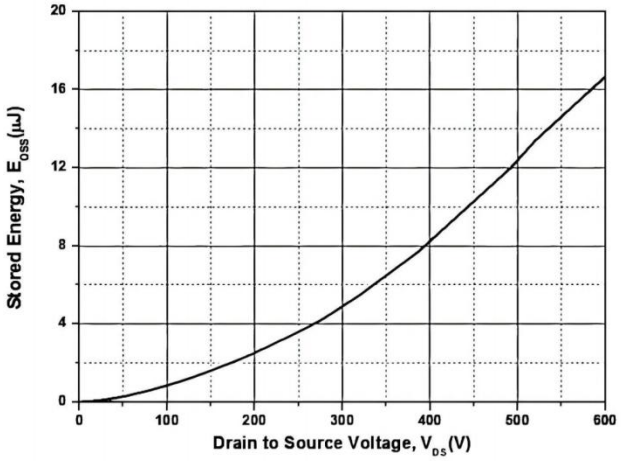


Figure16. Output Capacitor Stored Energy

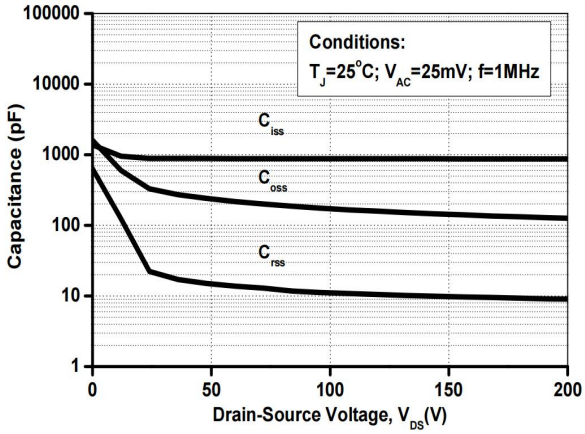


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

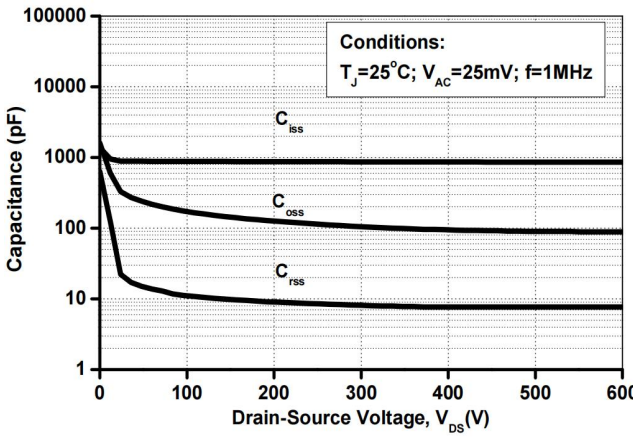


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 600V)

Typical Characteristics

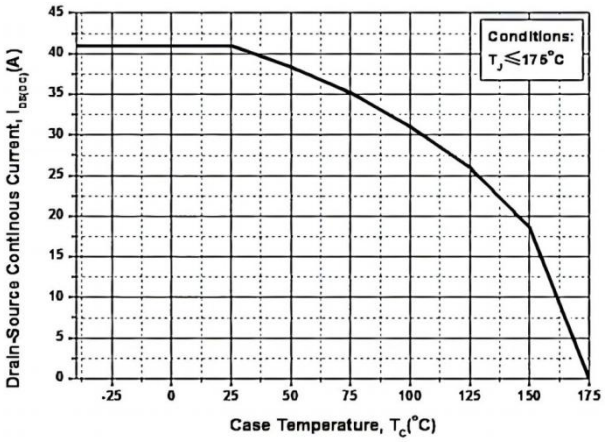


Figure 19. Continuous Drain Current Derating vs. Case Temperature

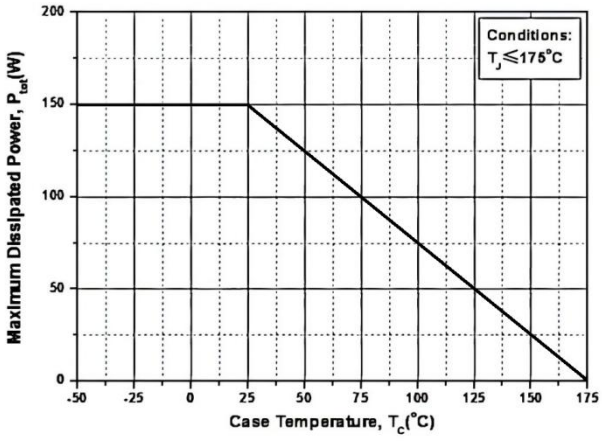


Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

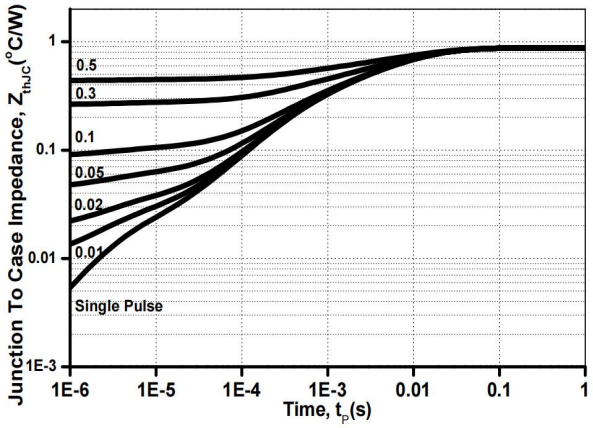


Figure 21. Transient Thermal Impedance (Junction - Case)

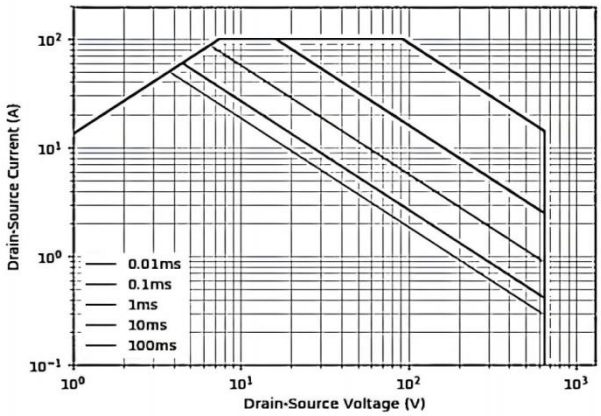
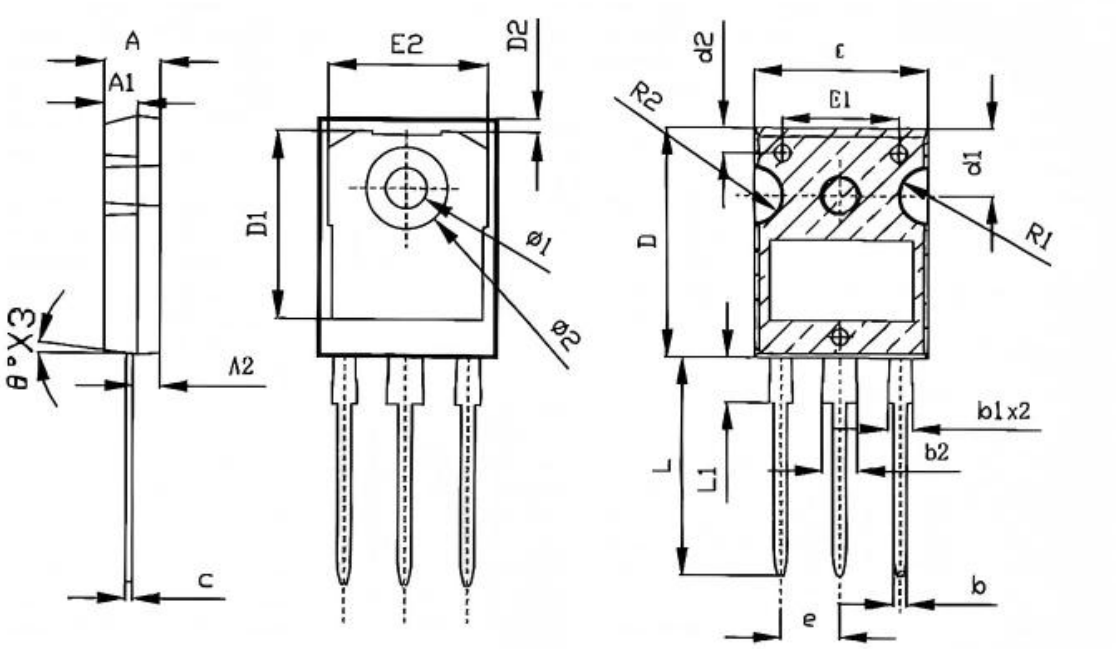


Figure22. Safe Operating Area

TO-247-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.900	5.100	0.193	0.201
A1	2.900	3.100	0.114	0.122
A2	2.310	2.410	0.091	0.095
b	1.160	1.260	0.046	0.050
b1	2.050	2.200	0.081	0.087
b2	3.050	3.200	0.120	0.126
c	0.580	0.660	0.023	0.026
D	20.900	21.100	0.823	0.831
D1	16.460	16.760	0.648	0.660
D2	1.170 REF.		0.046 REF.	
d1	6.050	6.250	0.238	0.246
E	15.700	15.900	0.618	0.626
E2	14.020 REF.		0.552 REF.	
e	5.440 BSC.		0.214 BSC.	
L	19.820	20.020	0.780	0.788
L1	1.880	2.080	0.074	0.082
Φ1	3.600 REF.		0.142 REF.	
Φ2	7.190 REF.		0.283 REF.	