ACM080R320TH

N-Channel Silicon Carbide Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D@25℃
800V	260mΩ@18V	16A
	320mΩ@15V	

Feature

- Wide bandgap SiC MOSFET technology
- Low On-Resistance with high blocking voltage
- Low capacitances with High-Speed switching
- Low reverse recovery(Qrr)

Application

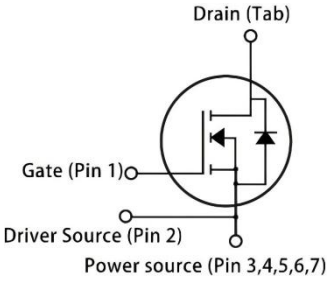
- Switch mode power supplies
- Renewable energy
- On board charger
- High voltage DC/DC converters

Package

TO-263-7L

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	800	V
Gate-Source Voltage	V_{GSmax}	tp ≤500ns, duty cycle ≤1%	-12/+22	V
Gate-Source Voltage	V_{GSOP}	Static	-4/+18	V
Maximum Gate-Source Voltage	$V_{GSOPmax}$		-5/+20	V
Continuous Drain Current[1)]	I_D	V_{GS} =18V	16	A
	I_D	V_{GS} =18V, T_C =100℃	9	A
Pulsed Drain Current[2)]	$I_{D,pulse}$	Pulse with t_p limited by T_{jmax}	34	A
Single pulse avalanche energy	E_{AS}	V_{DS}=800V, V_{DD}=50V, V_{GS}=15V, L=1mH	72	mJ
Power Dissipation	P_D	T_J =175℃	71	W
Thermal Resistance（Typ）	$R_{\theta JC}$	Junction-to-Case	2.12	℃/W
Junction Temperature	T_J		-55~ +175	℃
Storage Temperature	T_{STG}		-55~ +175	℃

Electrical characteristics (T_J=25℃, 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 =100μA	800			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =800V, V_{GS} =0V			50	μA
Gate-Source leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =18V			250	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =2.66mA	2	2.7	4	V
		V_{DS} =V_{GS}, I_D =2.66mA, T_J =175℃		1.8		
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =15V, I_D =4.5A		320		mΩ
		V_{GS} =18V, I_D =4.5A		260	390	
		V_{GS} =15V, I_D =4.5A, T_J =175℃		400		
		V_{GS} =18V, I_D =4.5A, T_J =175℃		360		
Transconductance	g_{fs}	V_{GS} =18V, I_D =4.5A		3		S
		V_{GS} =18V, I_D =4.5A, T_J =175℃		2		
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =600V, V_{GS} =0V V_{AC} =25mV, f =1MHz		184		pF
Output Capacitance	C_{oss}			22		
Reverse Transfer Capacitance	C_{rss}			3.2		
Total Gate Charge	Q_g	V_{DS} =400V, V_{GS} =-4V/18V I_D =4.5A		11.6		nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			6		
Internal Gate Resistance	$R_{G(int)}$	V_{AC} =25mV, f =1MHz		13		Ω
Source-Drain Diode characteristics						
Diode Forward Current	I_S	V_{GS} =-4V, T_C =25℃		11		A
Diode Forward voltage	V_{SD}	V_{GS} =-4V, I_{SD} =2.5A		4.2		V
		V_{GS} =-4V, I_{SD} =2.5A, T_J =175℃		3.9		

Note:

1) Repetitive Rating: Limited by maximum junction temperature.

2) Pulse Test: Pulse Width ≤ 100μs, Duty Cycle ≤ 1%.

Typical Characteristics

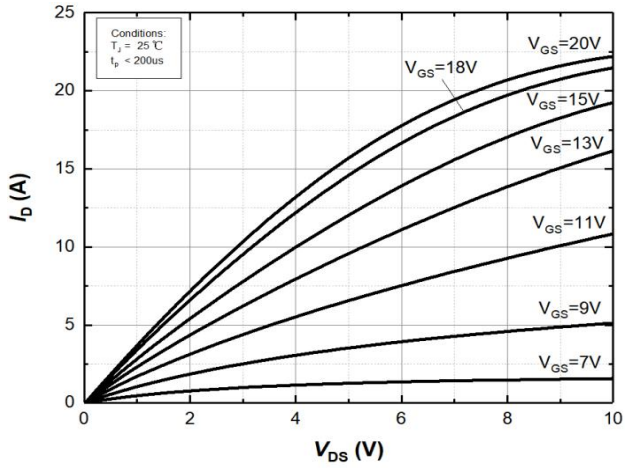


Figure 1. Output characteristics at Tj=25°C

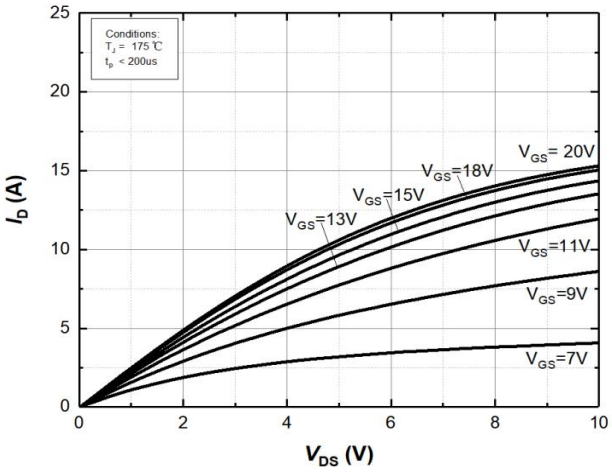


Figure 2. Output characteristics at Tj=175°C

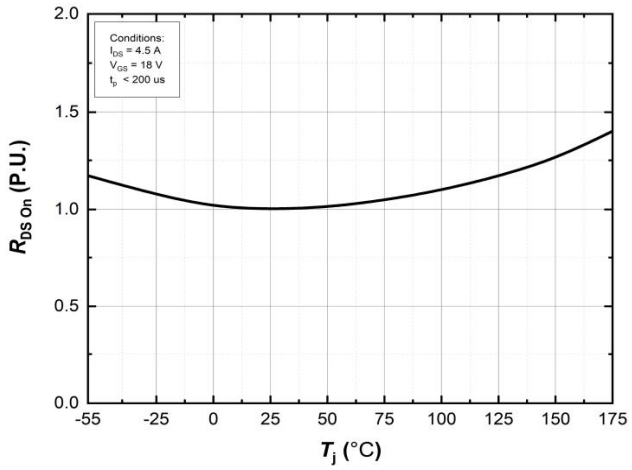


Figure 3. Normalized On-Resistance vs. Temperature

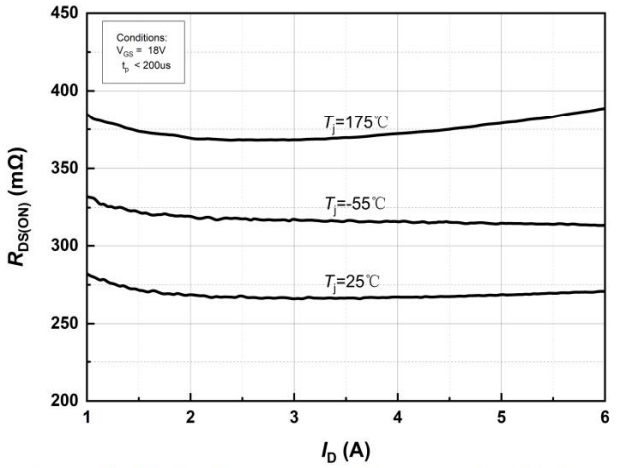


Figure 4. On-Resistance vs. Drain current for Various Temperature

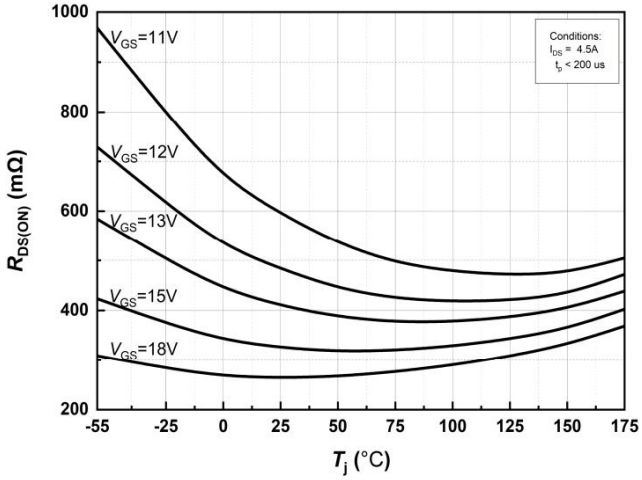


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

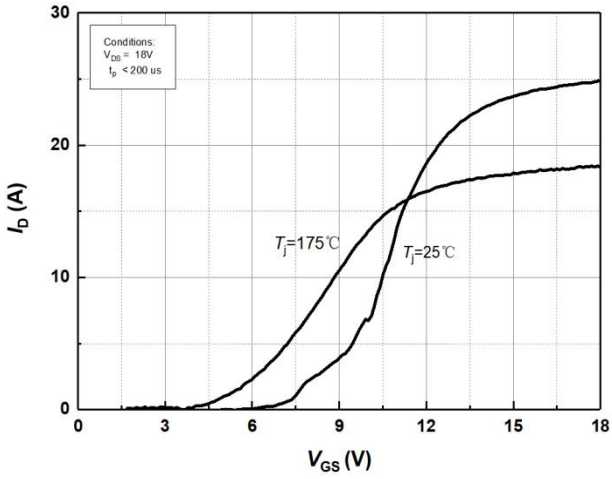


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

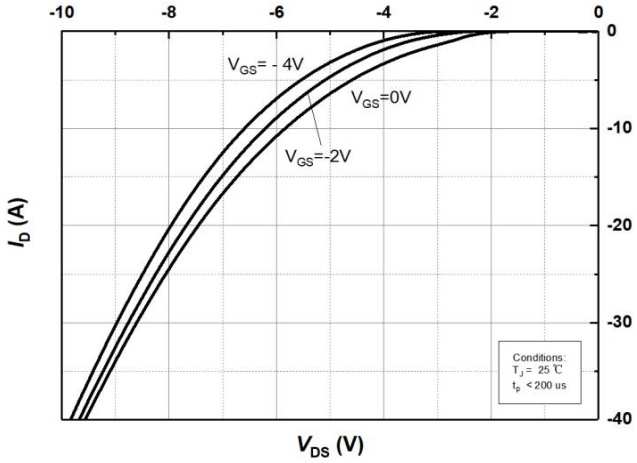


Figure 7. Body Diode Characteristics at Tj=25°C

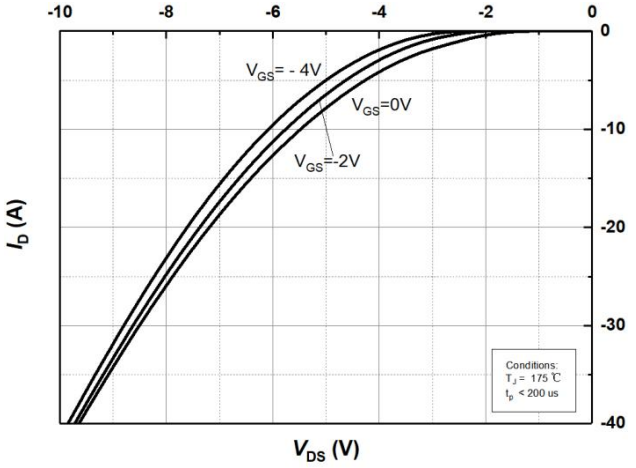


Figure 8. Body Diode Characteristics at Tj=175°C

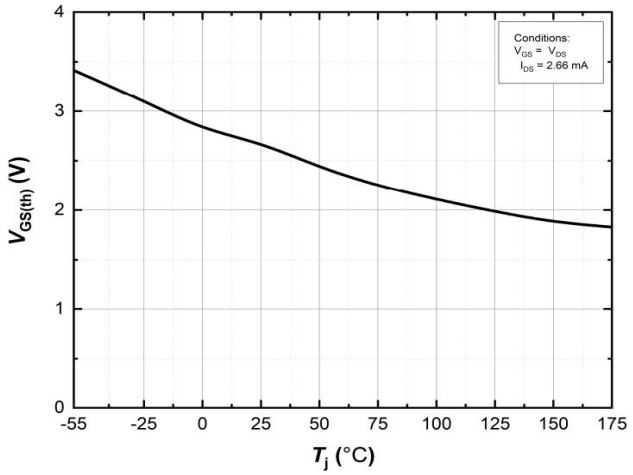


Figure 9. Threshold Voltage vs. Temperature

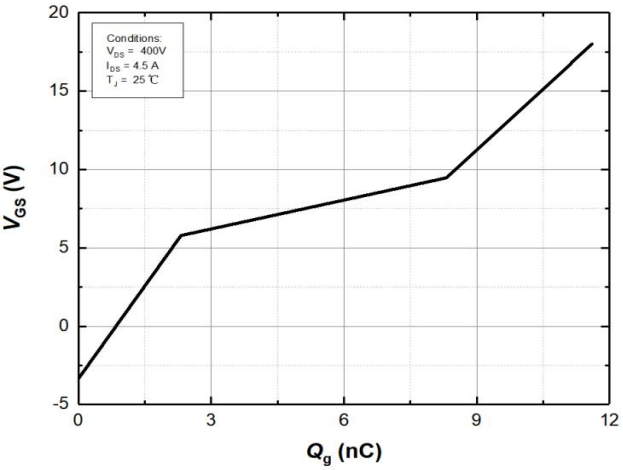


Figure 10 Gate Charge Characteristics

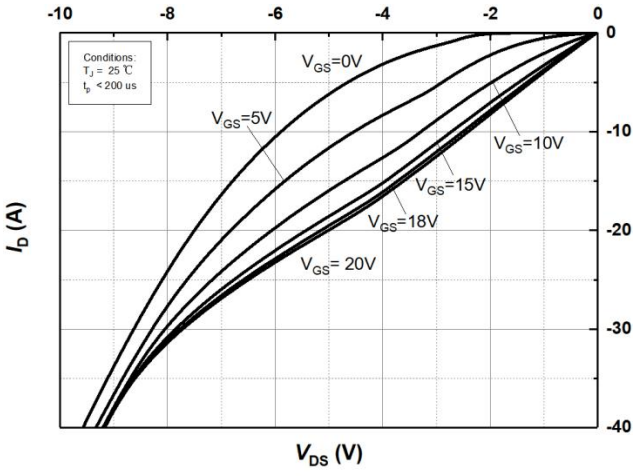


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

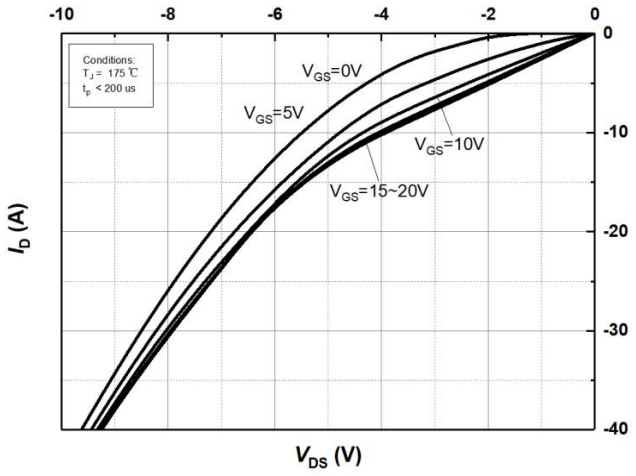


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

Typical Characteristics

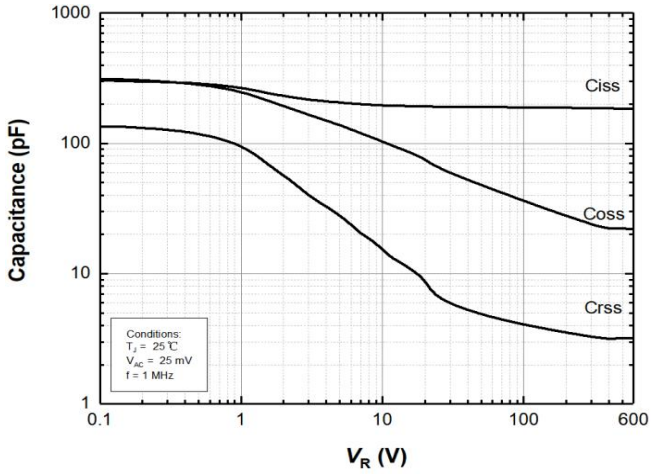


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

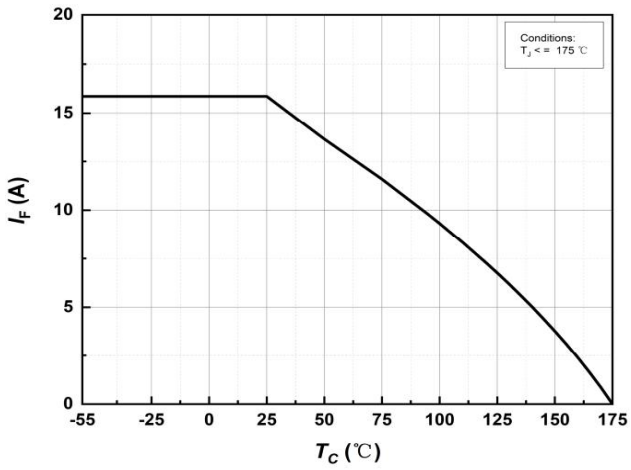


Figure 14. Continuous Drain Current Derating vs Case Temperature

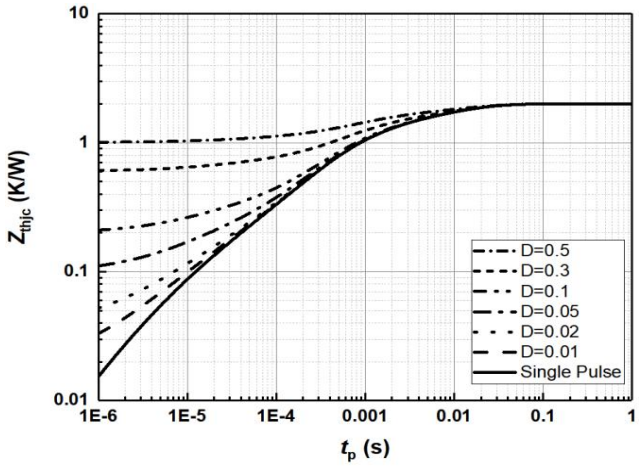


Figure 15.Transient Thermal Impedance (Junction – Case)

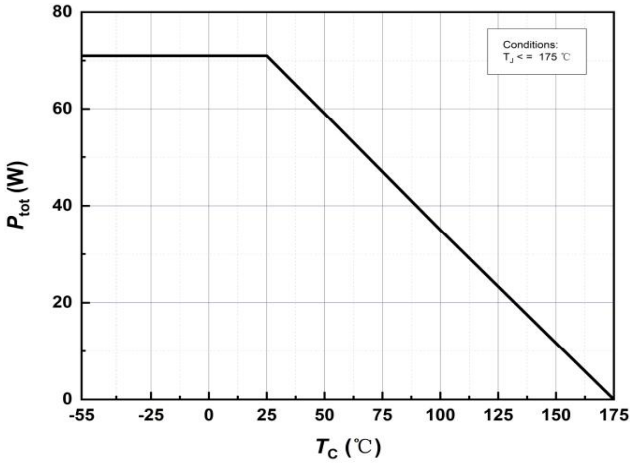


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

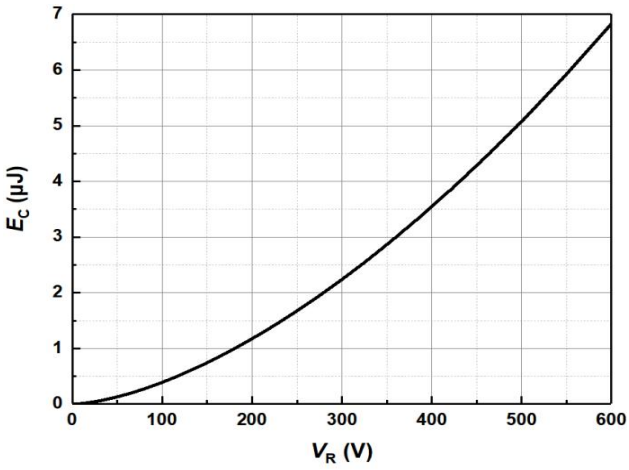


Figure 17. Output Capacitor Stored Energy

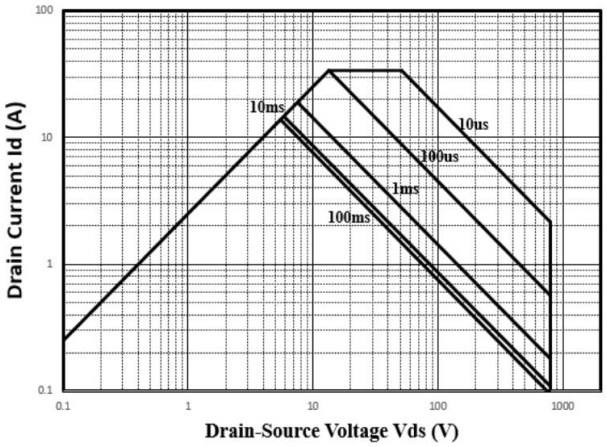
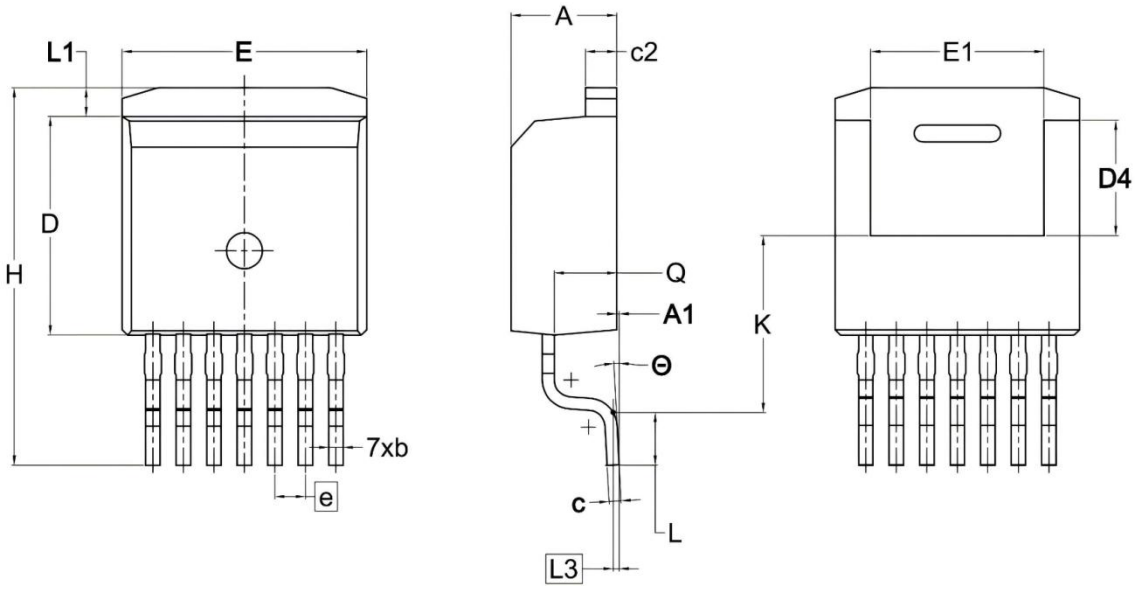


Figure 18. Safe Operating Area

TO-263-7L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.500	0.169	0.177
A1	0.000	0.250	0.000	0.010
b	0.500	0.700	0.020	0.028
c	0.450	0.600	0.018	0.024
c2	1.200	1.400	0.047	0.055
D	8.930	9.230	0.352	0.363
D4	4.650	4.950	0.183	0.195
E	10.080	10.280	0.397	0.405
E1	6.820	7.620	0.269	0.300
e	1.270 BSC.		0.050 BSC.	
H	15.000	16.000	0.591	0.630
K	7.300 BSC.		0.287 BSC.	
L	1.900	2.500	0.075	0.098
L1	1.000	1.400	0.039	0.055
L3	0.250 BSC.		0.010 BSC.	
Q	2.450	2.750	0.096	0.108
θ	0°	7°	0°	7°