

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D@25^{\circ}C$
650V	56m $\Omega@18V$	70A

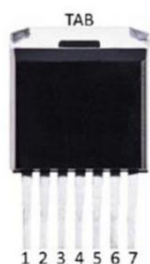
Feature

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

Application

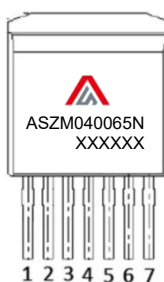
- Switch Mode Power Supplies
- Renewable Energy
- On Board Charger
- High Voltage DC/DC Converters

Package

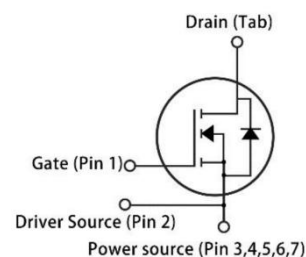


TO-263-7

Marking



Circuit diagram



Absolute maximum ratings ($T_c=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	V_{DSmax}	$V_{GS} = 0V, I_D = 100\mu A$	650	V
Gate-Source Voltage	V_{GSmax}	AC ($f > 1 \text{ Hz}$)	-10/+25	V
Gate-Source Voltage	V_{GSOP}	Static	-4/+18	V
Continuous Drain Current	I_D	$V_{GS}=18V, T_C=25^{\circ}C$	70	A
		$V_{GS}=18V, T_C=100^{\circ}C$	49	A
Pulsed Drain Current	$I_{D,pulse}$	Pulse with t_p limited by T_{Jmax}	121	A
Power Dissipation	P_D	$T_J=175^{\circ}C$	214	W
Thermal Resistance (Typ)	$R_{\theta JC}$	Junction-to-Case	0.7	$^{\circ}C/W$
Junction Temperature	T_J		-55 ~ +175	$^{\circ}C$
Storage Temperature	T_{STG}		-55 ~ +175	$^{\circ}C$

Electrical characteristics (T_j=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 =100μA	650			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =650V,V _{GS} = 0V			50	μA
Gate-Source leakage current	I _{GSS}	V _{GS} =18V, V _{DS} = 0V			250	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =12mA		2.7		V
		V _{DS} =V _{GS} , I _D =12mA ,T _J =175℃		1.9		
Drain-source on-resistance	R _{DS(on)}	V _{GS} =15V, I _D =20A		44		mΩ
		V _{GS} =18V, I _D =20A		36	56	
		V _{GS} =15V, I _D =20A,T _J = 175℃		52		
		V _{GS} =18V, I _D =20A,T _J = 175℃		47		
Transconductance	g _{fs}	V _{DS} =18V, I _D =20A		15		S
		V _{DS} =18V, I _D =20A,T _J = 175℃		14		
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =600V,V _{GS} =0V,f =1MHz V _{AC} =25mV		1525		pF
Output Capacitance	C _{oss}			115		
Reverse Transfer Capacitance	C _{rss}			3.3		
Total Gate Charge	Q _g	V _{DS} =400V,V _{GS} =-4V/18V, I _D =20A		80		nC
Gate-Source Charge	Q _{gs}			19		
Gate-Drain Charge	Q _{gd}			21		
Internal Gate Resistance	R _{G(int)}	f=1 MHz, V _{AC} = 25mV		1.4		Ω
Source-Drain Diode characteristics						
Diode Forward Current	I _S	V _{GS} =-4V,T _C =25℃		44		A
Diode Forward voltage	V _{SD}	V _{GS} =-4V, I _{SD} =10A		4.0		V
		V _{GS} =-4V, I _{SD} =10A,T _J =175℃		3.5		
Diode pulse Current	I _{S,pulse}	V _{GS} =-4V, pulse width t _p limited by T _{imax}		121		A

Typical Characteristics

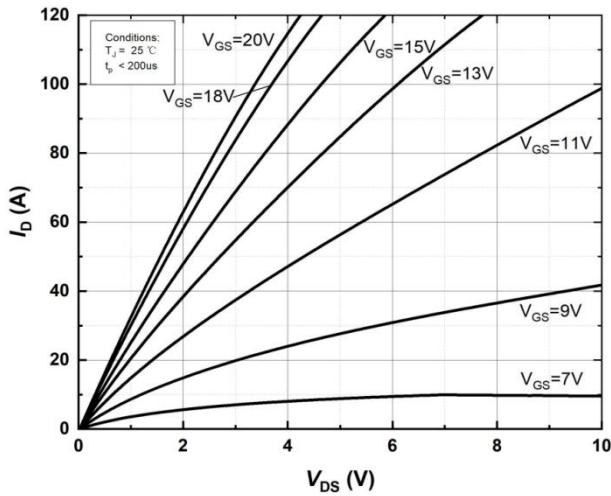


Figure 1. Output characteristics at $T_j=25^{\circ}\text{C}$

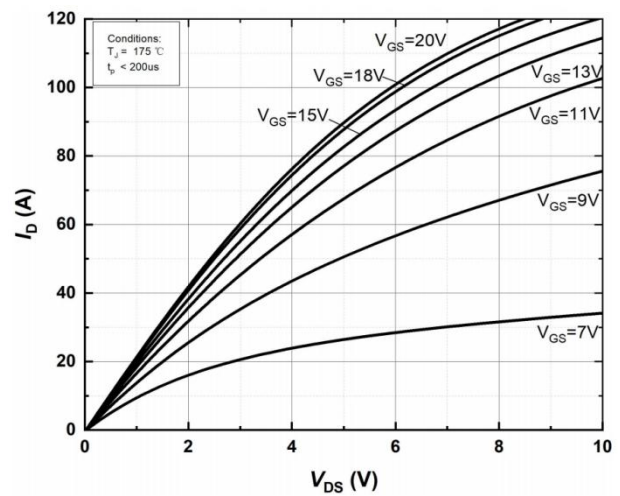


Figure 2. Output characteristics at $T_j=175^{\circ}\text{C}$

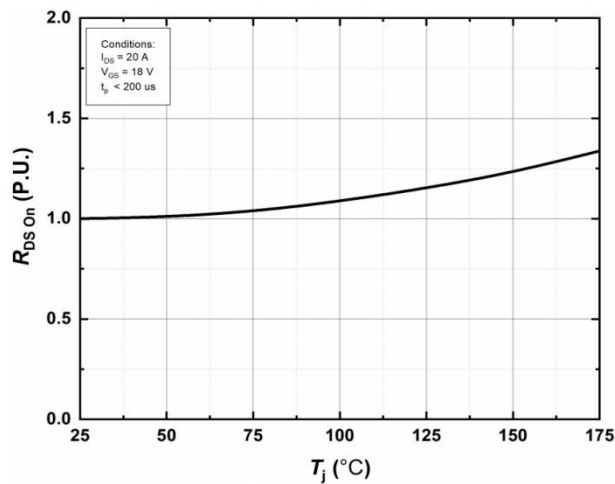


Figure 3. Normalized On-Resistance vs. Temperature

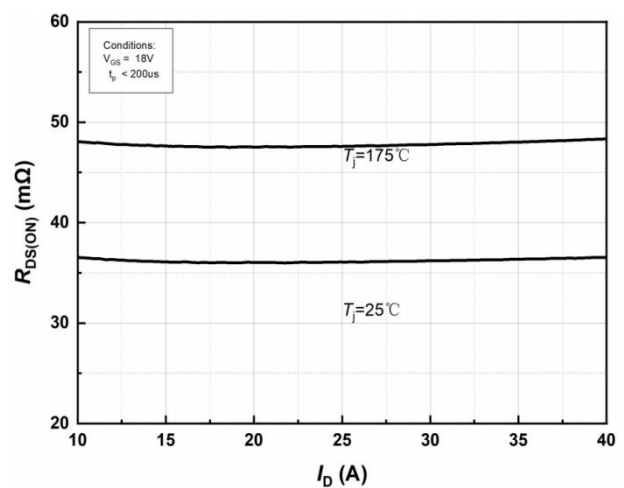


Figure 4. On-Resistance vs. Drain current for Various Temperature

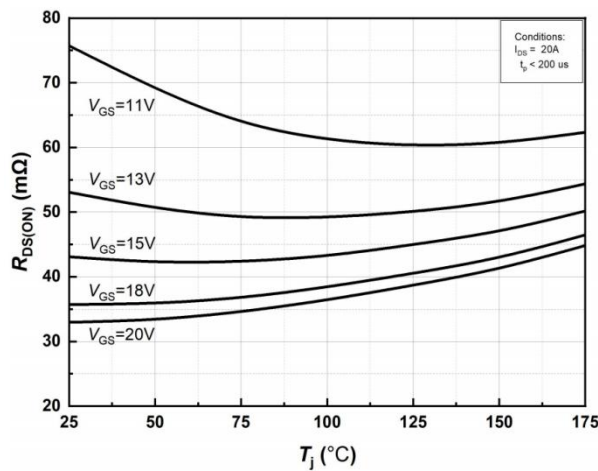


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

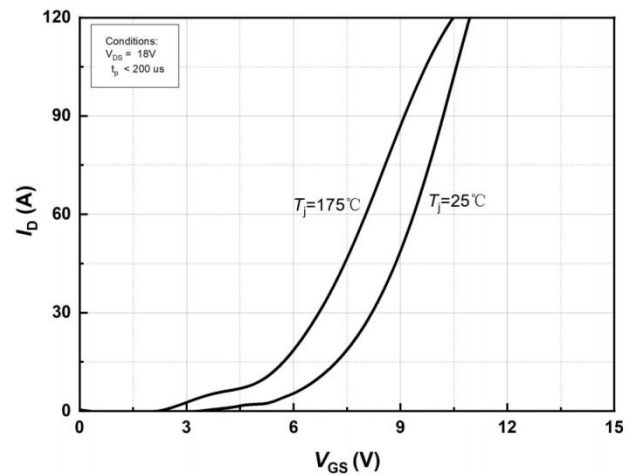


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

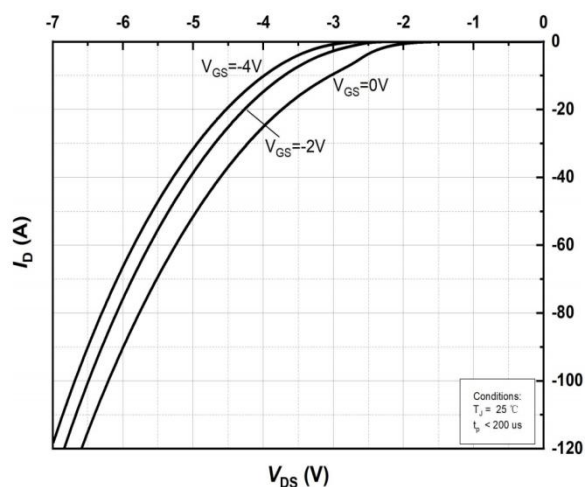


Figure 7. Body Diode Characteristics at $T_j=25^{\circ}\text{C}$

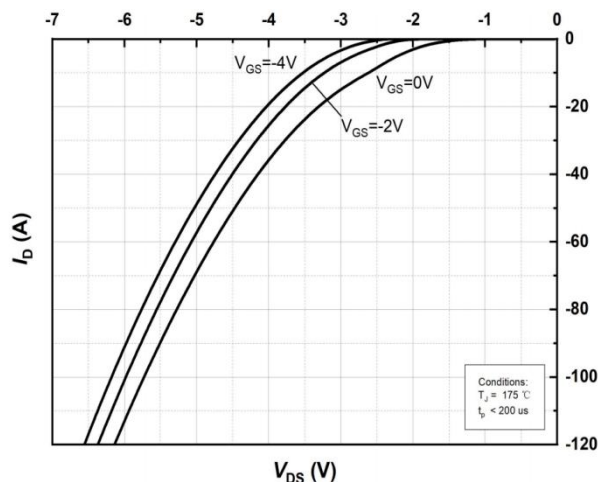


Figure 8. Body Diode Characteristics at $T_j=175^{\circ}\text{C}$

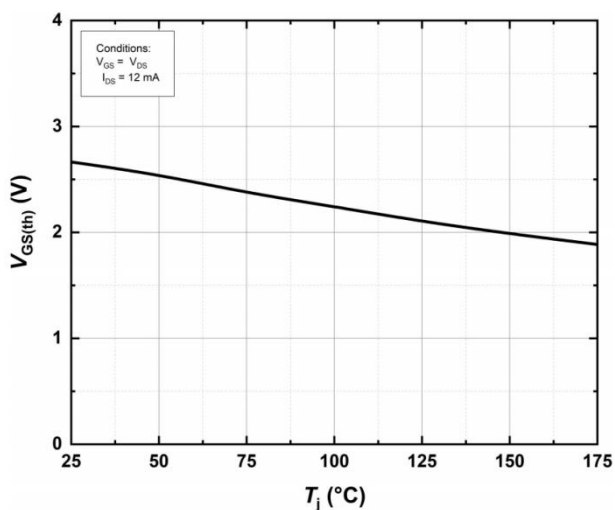


Figure 9. Threshold Voltage vs. Temperature

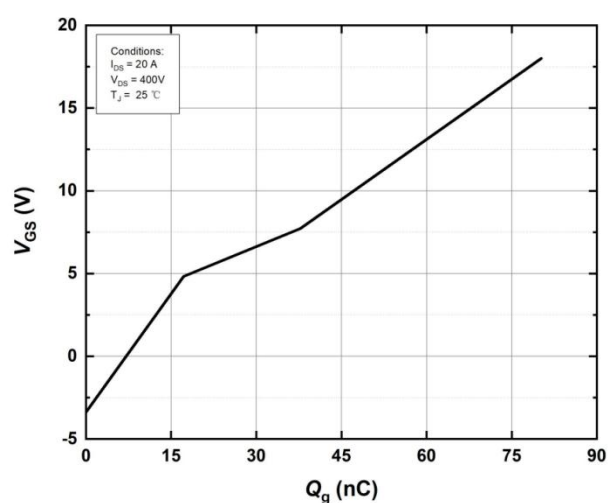


Figure 10 Gate Charge Characteristics

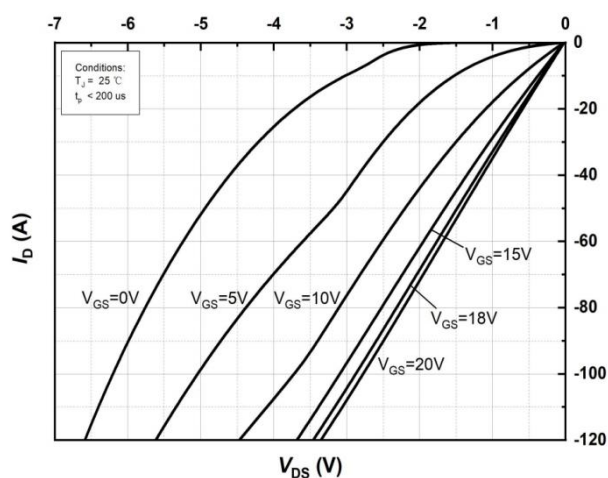


Figure 11. 3rd Quadrant Characteristic at $T_j=25^{\circ}\text{C}$

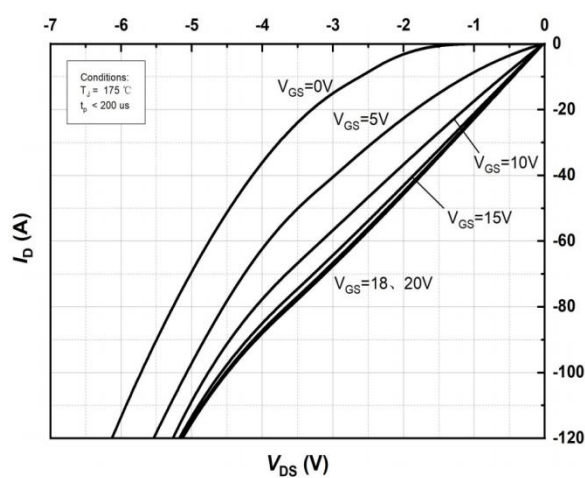


Figure 12. 3rd Quadrant Characteristic at $T_j=175^{\circ}\text{C}$

Typical Characteristics

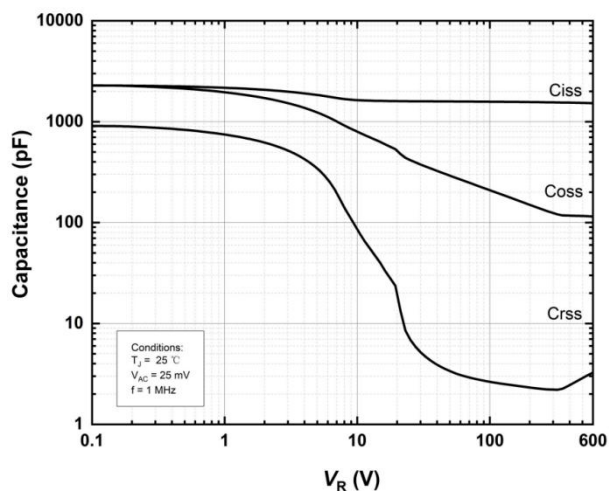


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

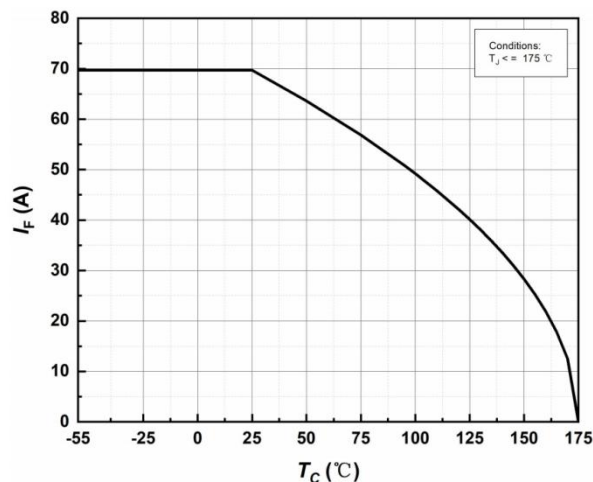


Figure 14. Continuous Drain Current Derating vs Case Temperature

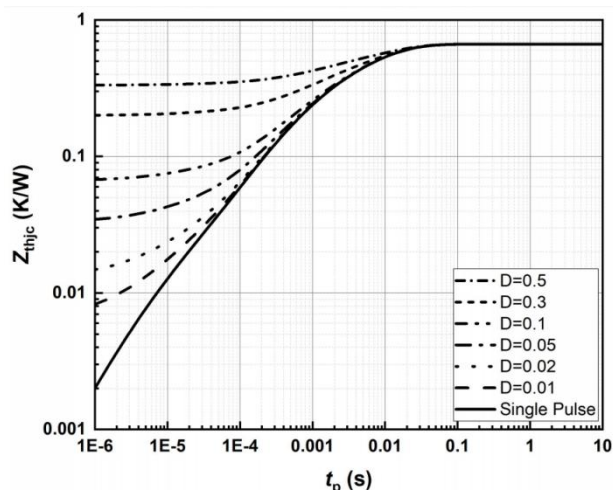


Figure 15. Transient Thermal Impedance (Junction – Case)

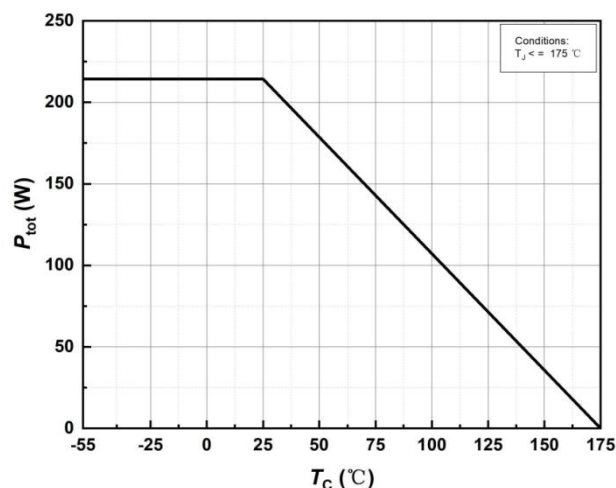


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

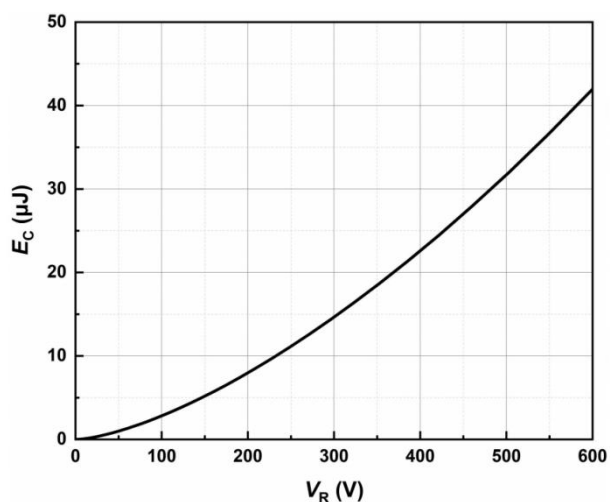


Figure 17. Output Capacitor Stored Energy

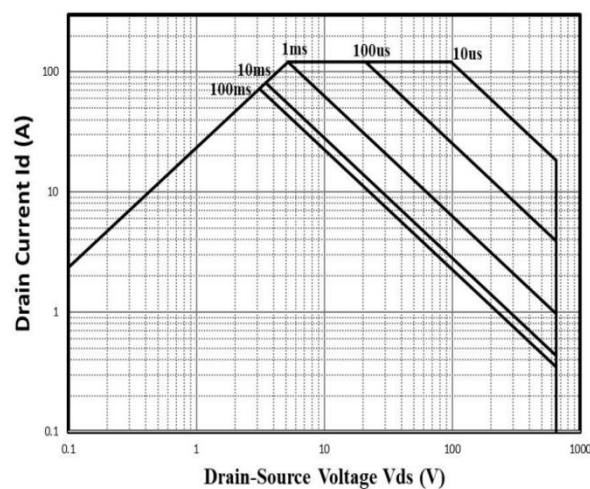
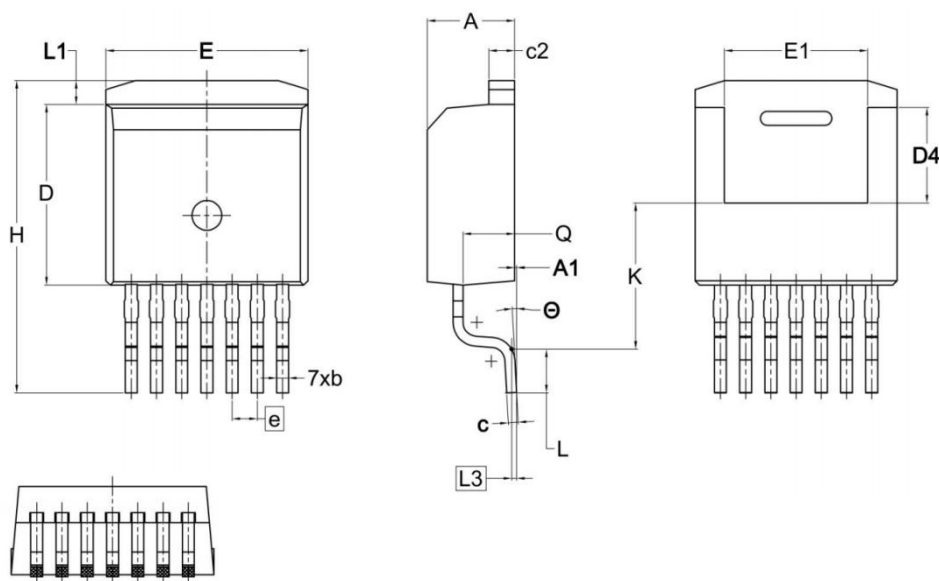


Figure 18. Safe Operating Area

TO-263-7 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°