

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D@T_C=25^{\circ}C$
650V	95mΩ@18V	43A

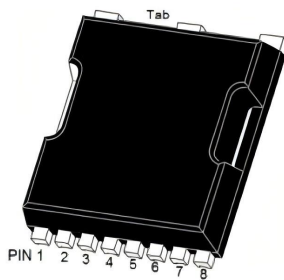
Feature

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

Application

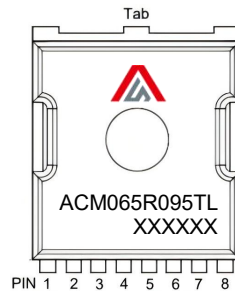
- Switch mode power supplies
- Renewable energy
- On Board Charger
- High voltage DC/DC converters

Package

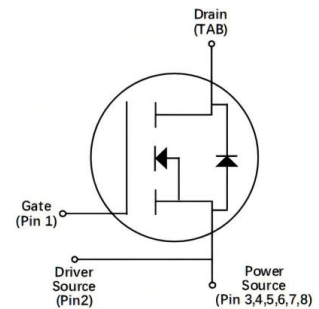


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Marking



Circuit diagram



Absolute maximum ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	V_{DS}	$V_{GS} = 0V, I_D = 100\mu A$	650	V
Gate-Source Voltage	V_{GSmax}	$t_p \leq 500ns, \text{duty cycle} \leq 1\%$	-8/+20	V
Gate-Source Voltage	V_{GSOP}	Static	-4/+18	V
Continuous Drain Current	I_D	$V_{GS} = 18V$	43	A
	I_D	$V_{GS} = 18V, T_C = 100^{\circ}C$	30	
Pulsed Drain Current	$I_{D,pulse}$	Pulse with t_p limited by T_{jmax}	56	A
Single Pulse Avalanche Energy	E_{AS}	$V_{DS} = 650V, V_{DD} = 50V, V_{GS} = 10V, L = 10mH$	405	mJ
Power Dissipation	P_D	$T_J = 175^{\circ}C$	185	W
Thermal Resistance (Typ)	$R_{\theta JC}$	Junction to Case	0.81	$^{\circ}C/W$
Operating 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 _{DS} = 0V, V _{GS} = 18V			250	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 4mA		3		V
		V _{DS} = V _{GS} , I _D = 4mA, T _J = 175°C		2		
Drain-source on-resistance	R _{Ds(on)}	V _{GS} = 18V, I _D = 10A		95	125	mΩ
		V _{GS} = 18V, I _D = 10A, T _J = 175°C		135		
Transconductance	g _{fs}	V _{GS} = 18V, I _D = 10A		7		S
		V _{GS} = 18V, I _D = 10A, T _J = 175°C		6		
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} = 600V, V _{GS} = 0V V _{AC} = 25mV, f = 1MHz		803		pF
Output Capacitance	C _{oss}			77		
Reverse Transfer Capacitance	C _{rss}			5		
Internal Gate Resistance	R _{G(int)}	V _{AC} = 25mV, f = 1 MHz		3.8		Ω
Total Gate Charge	Q _g	V _{DS} = 400V, V _{GS} = -4/18V I _D = 10A		34		nC
Gate-Source Charge	Q _{gs}			7.8		
Gate-Drain Charge	Q _{gd}			9		
Source-Drain Diode characteristics						
Diode Forward Current	I _S	V _{GS} = -5V, T _C = 25°C		43		A
Diode Forward voltage	V _{SD}	V _{GS} = -5V, I _{SD} = 5A		1.4	4	V
		V _{GS} = -5V, I _{SD} = 5A, T _J = 175°C		1.9	4.5	V

Typical Characteristics

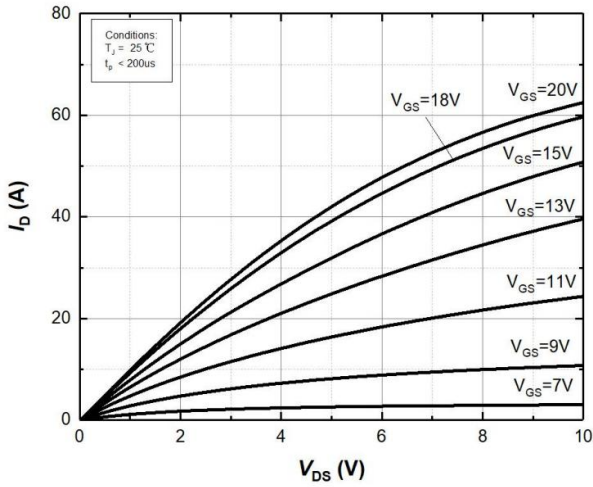


Figure 1. Output characteristics at $T_j=25^\circ\text{C}$

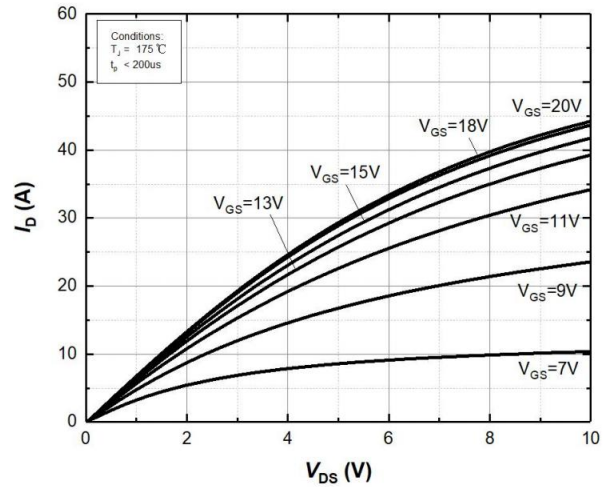


Figure 2. Output characteristics at $T_j=175^\circ\text{C}$

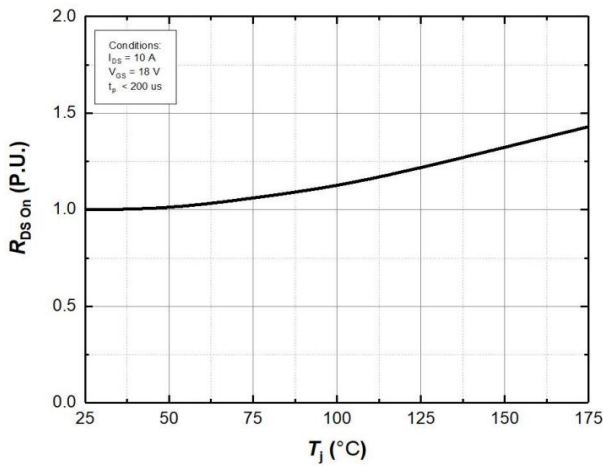


Figure 3. Normalized On-Resistance vs. Temperature

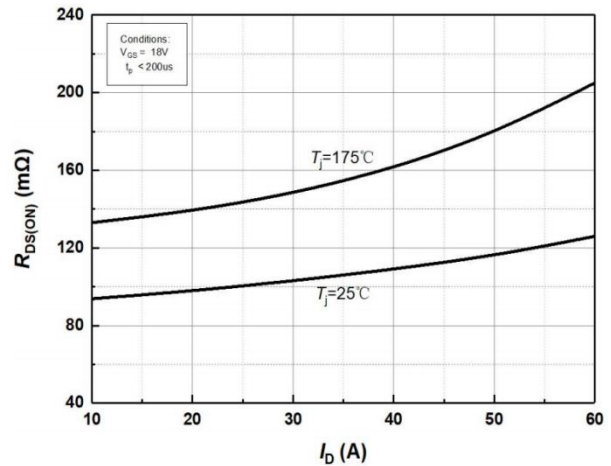


Figure 4. On-Resistance vs. Drain current for Various Temperature

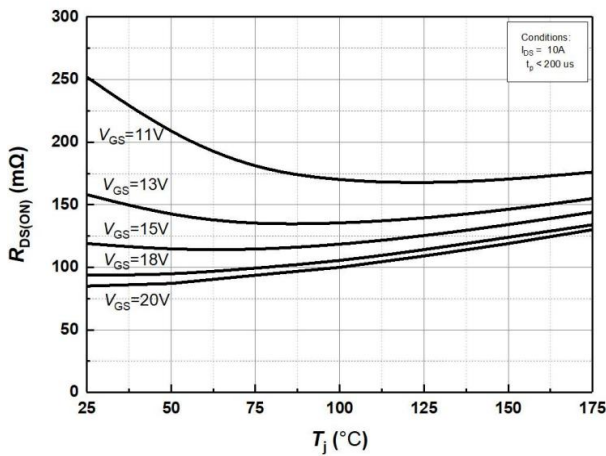


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

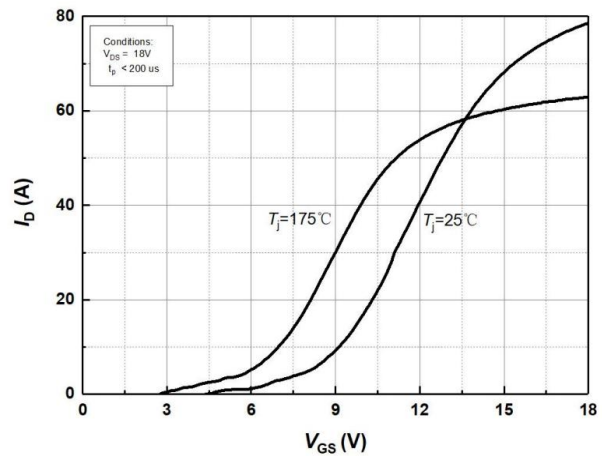


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

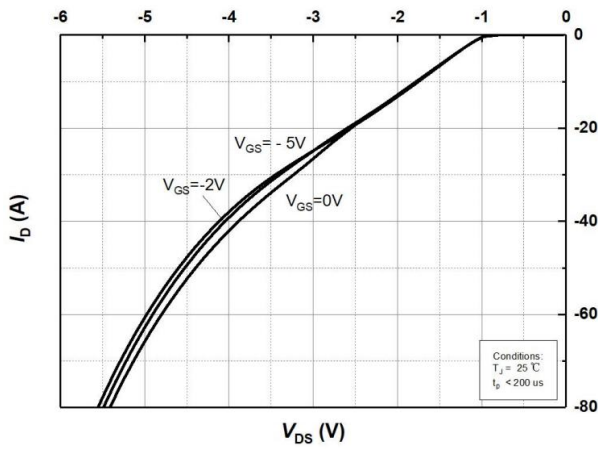


Figure 7. Body Diode Characteristics at $T_j = 25^\circ\text{C}$

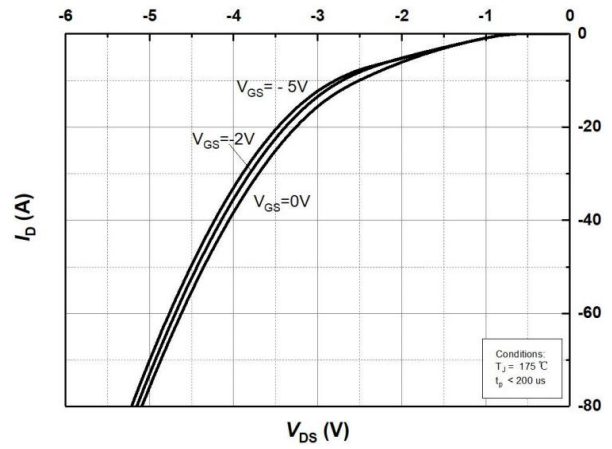


Figure 8. Body Diode Characteristics at $T_j = 175^\circ\text{C}$

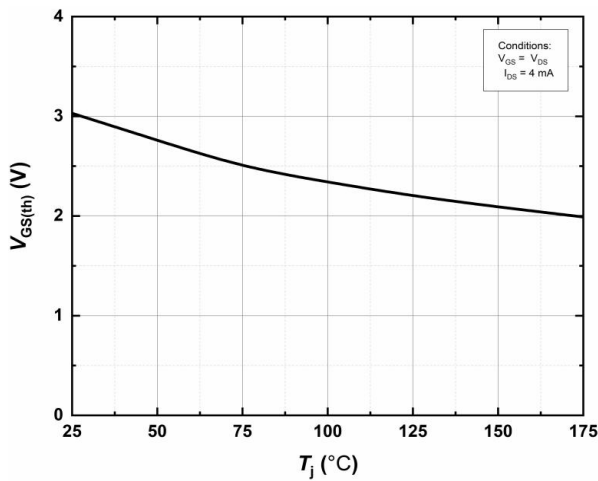


Figure 9. Threshold Voltage vs. Temperature

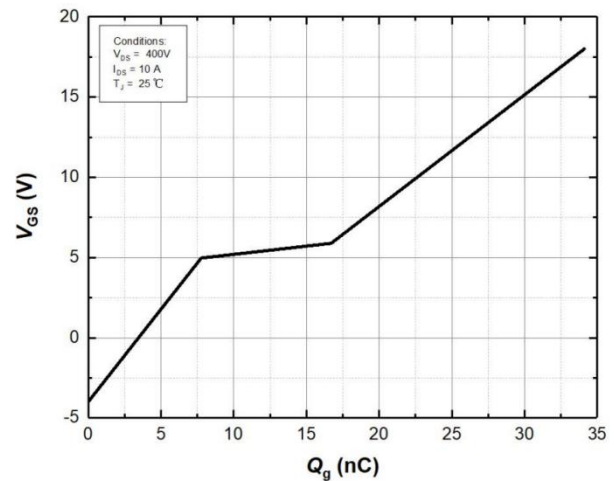


Figure 10. Gate Charge Characteristics

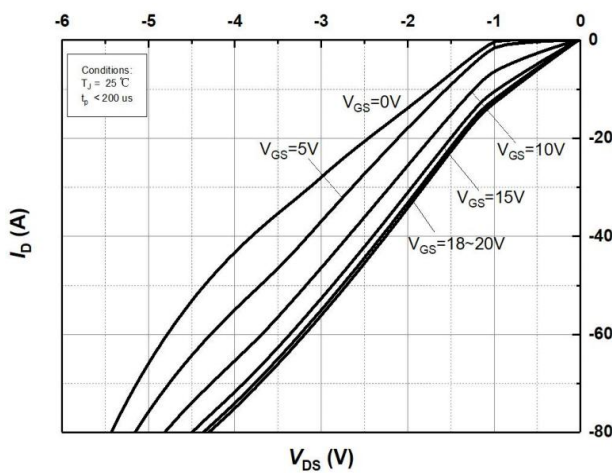


Figure 11. 3rd Quadrant Characteristic at $T_j = 25^\circ\text{C}$

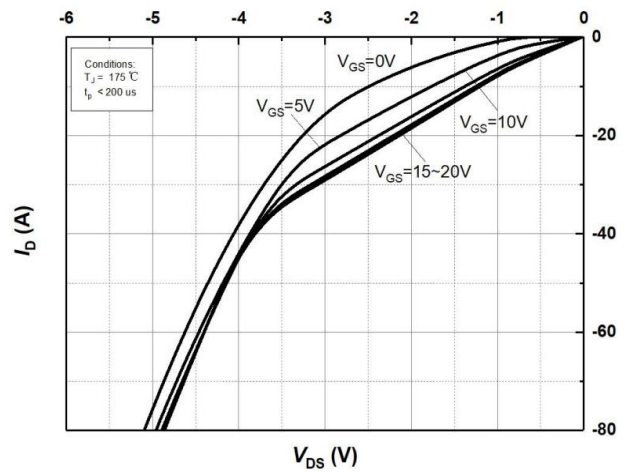


Figure 12. 3rd Quadrant Characteristic at $T_j = 175^\circ\text{C}$

Typical Characteristics

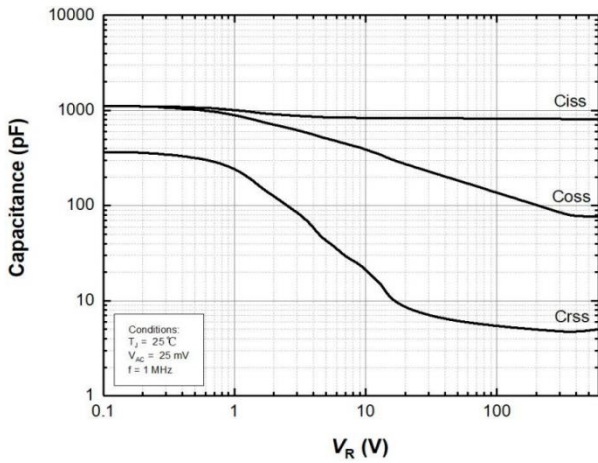


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

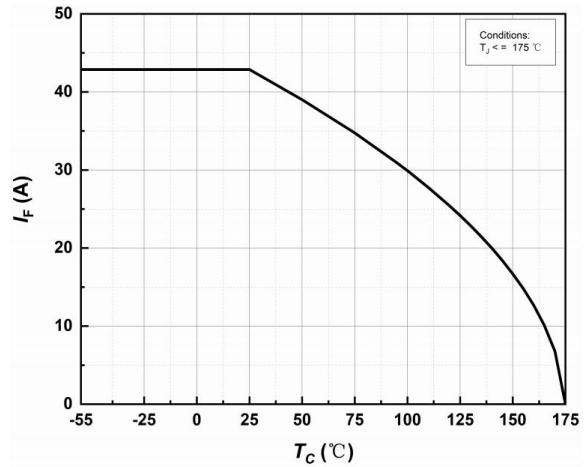


Figure 14. Continuous Drain Current Derating vs Case Temperature

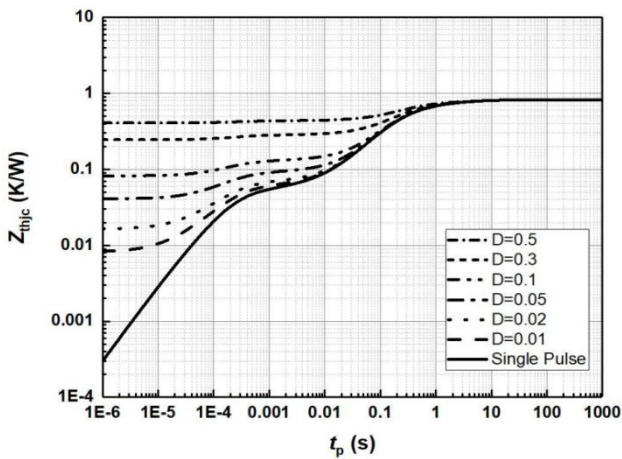


Figure 15. Transient Thermal Impedance (Junction – Case)

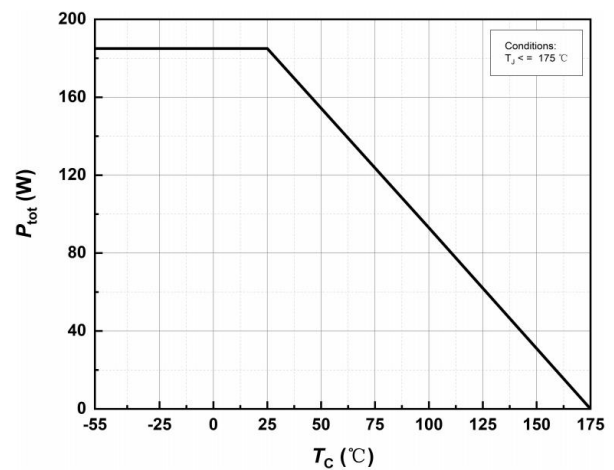


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

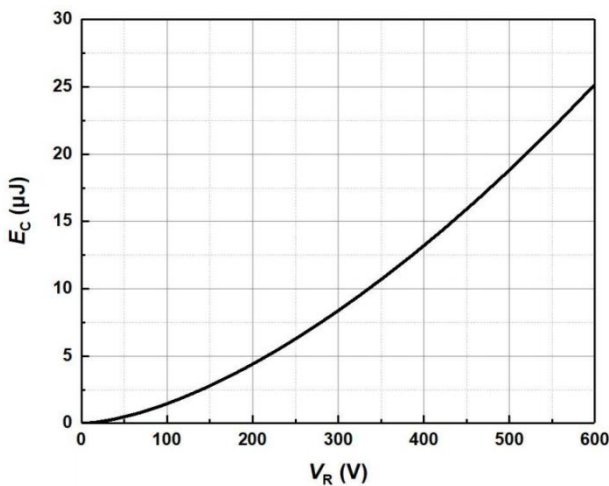


Figure 17. Output Capacitor Stored Energy

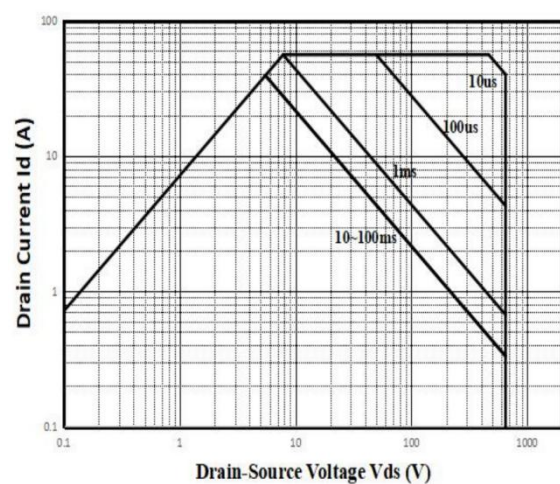
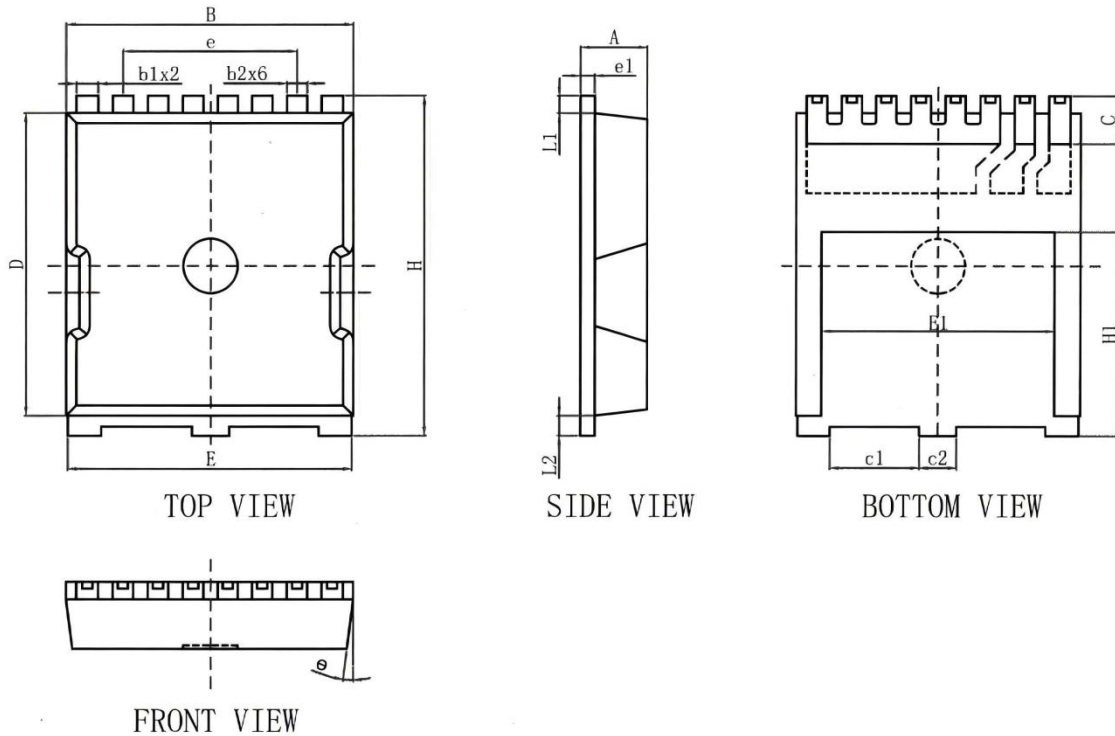


Figure 18. Safe Operating Area

TOLL Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
B	9.850	9.950	0.388	0.392
C	1.500	1.700	0.059	0.067
D	10.400	10.600	0.409	0.417
E	9.750	9.850	0.384	0.388
E1	7.950	8.250	0.313	0.325
H	11.600	11.800	0.457	0.465
H1	6.800	7.100	0.268	0.280
L1	0.550	0.750	0.022	0.030
L2	0.650	0.750	0.026	0.030
e	6.000 BSC.		0.236 BSC.	
e1	0.450	0.550	0.018	0.022
b1	0.700	0.800	0.028	0.031
b2	0.600	0.800	0.024	0.031
c1	3.000	3.200	0.118	0.126
c2	1.100	1.300	0.043	0.051
θ	11°		11°	