

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D@25^{\circ}C$
650V	390mΩ@18V	13A
	450mΩ@15V	

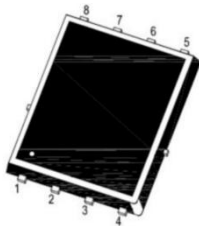
### Feature

- 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

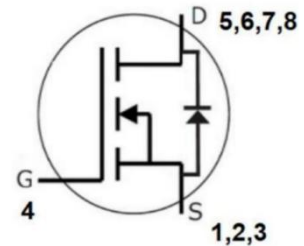


DFN5\*6

### Marking



### Circuit diagram



### Absolute maximum ratings ( $T_C=25^{\circ}C$ 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	$V_{GSmax}$	AC ( $f > 1 \text{ Hz}$ )	-10/+25	V
Gate-Source Voltage	$V_{GSOP}$	Static	-4/+18 -4/+15	V
Continuous Drain Current	$I_D$	$V_{GS} = 18V, T_C=25^{\circ}C$	13	A
	$I_D$	$V_{GS} = 18V, T_C=100^{\circ}C$	8	
Pulsed Drain Current	$I_{D,pulse}$	Pulse with $t_p$ limited by $T_{jmax}$ at 1ms	19	A
		Pulse with $t_p$ limited by $T_{jmax}$ at 100μs	34	
Power Dissipation	$P_D$	$T_C=25^{\circ}C$	71	W
Thermal Resistance (Typ)	$R_{\theta JC}$	Junction-to-Case	2.12	$^{\circ}C/W$
Junction Temperature	$T_J$		-55~ +175	$^{\circ}C$
Storage Temperature	$T_{STG}$		-55~ +175	$^{\circ}C$

### Electrical characteristics (T<sub>j</sub>=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 100μA	650			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 650V, V <sub>GS</sub> = 0V			50	μA
Gate-Source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = 18V, V <sub>DS</sub> = 0V			250	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1.33mA		3.0		V
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1.33mA, T <sub>j</sub> = 175°C		2.1		
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 15V, I <sub>D</sub> = 4.5A		350	450	mΩ
		V <sub>GS</sub> = 18V, I <sub>D</sub> = 4.5A		290	390	
		V <sub>GS</sub> = 15V, I <sub>D</sub> = 4.5A, T <sub>j</sub> = 175°C		430		
		V <sub>GS</sub> = 18V, I <sub>D</sub> = 4.5A, T <sub>j</sub> = 175°C		400		
Transconductance	g <sub>fs</sub>	V <sub>GS</sub> = 18V, I <sub>D</sub> = 4.5A		4		S
		V <sub>GS</sub> = 18V, I <sub>D</sub> = 4.5A, T <sub>j</sub> = 175°C		3		
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V, f = 1 MHz V <sub>AC</sub> = 25mV		184		pF
Output Capacitance	C <sub>oss</sub>			22		
Reverse Transfer Capacitance	C <sub>rss</sub>			3.2		
Internal Gate Resistance	R <sub>G(int)</sub>	f = 1 MHz, V <sub>AC</sub> = 25mV		13		Ω
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 400V, I <sub>D</sub> = 4.5A V <sub>GS</sub> = -4/18V		11.6		nC
Gate-Source Charge	Q <sub>gs</sub>			2.5		
Gate-Drain Charge	Q <sub>gd</sub>			6		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>	V <sub>GS</sub> = -4V, T <sub>C</sub> = 25°C		11		A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = -4V, I <sub>SD</sub> = 2.5A		4.1		V
		V <sub>GS</sub> = -4V, I <sub>SD</sub> = 2.5A, T <sub>J</sub> = 175°C		3.8		V
Diode pulse Current	I <sub>S, pulse</sub>	V <sub>GS</sub> = -4V, pulse width t <sub>p</sub> limited by T <sub>jmax</sub>		19		A

## Typical Characteristics

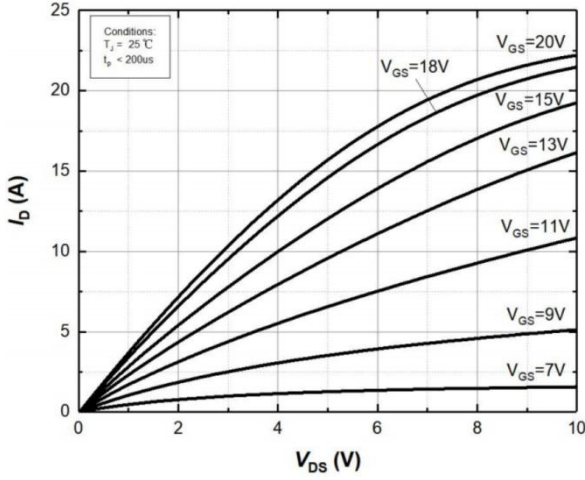


Figure 1. Output characteristics at  $T_j=25^\circ\text{C}$

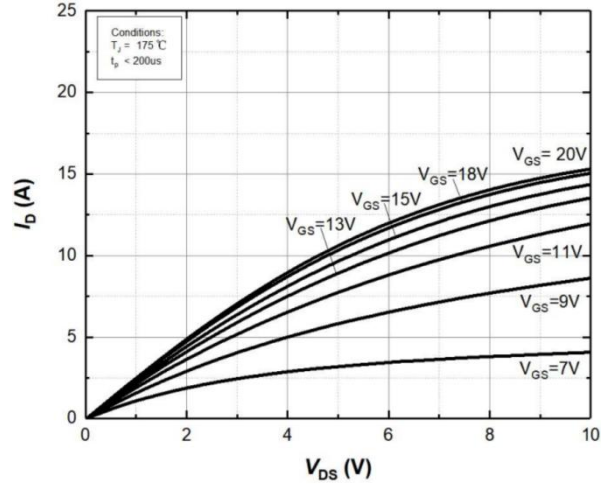


Figure 2. Output characteristics at  $T_j=175^\circ\text{C}$

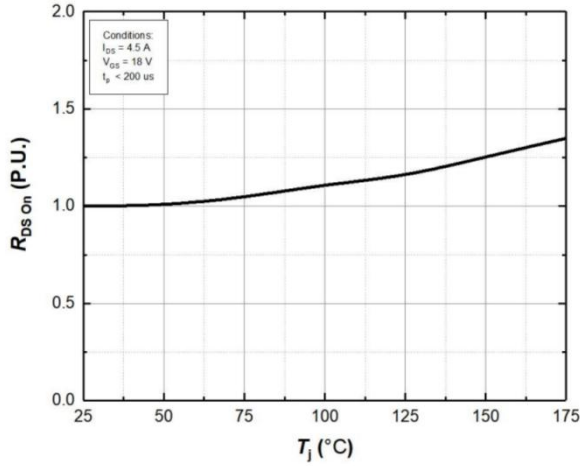


Figure 3. Normalized On-Resistance vs. Temperature

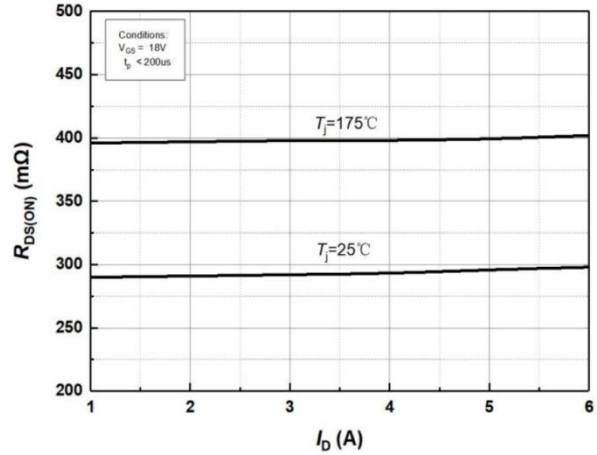


Figure 4. On-Resistance vs. Drain current for Various Temperature

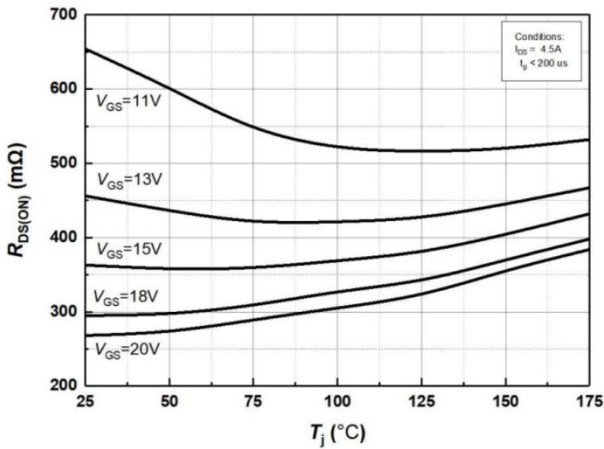


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

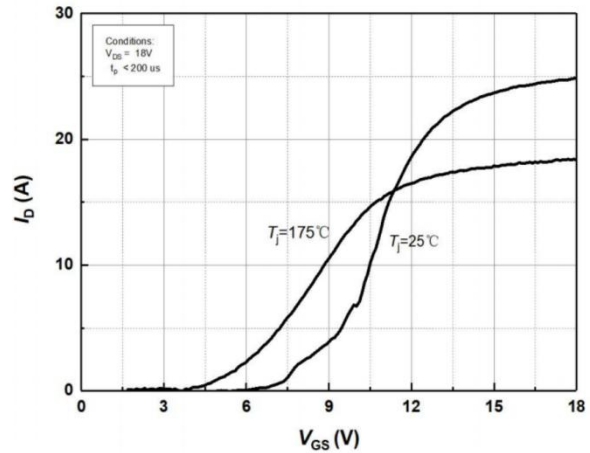


Figure 6. Transfer Characteristics for Various Junction Temperatures

## Typical Characteristics

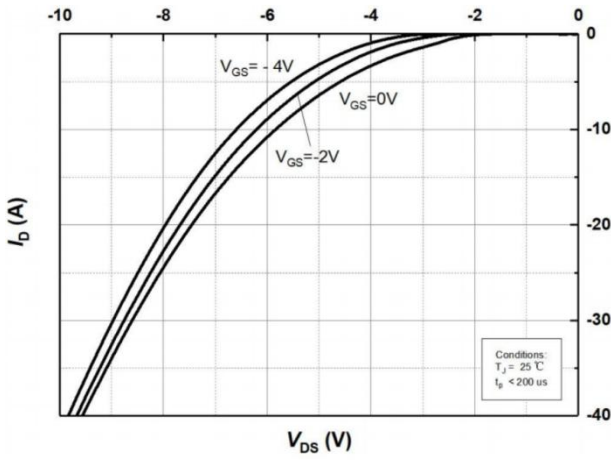


Figure 7. Body Diode Characteristics at Tj=25°C

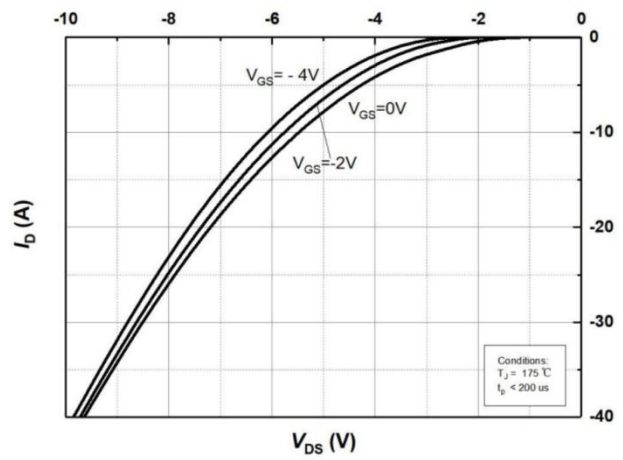


Figure 8. Body Diode Characteristics at Tj=175°C

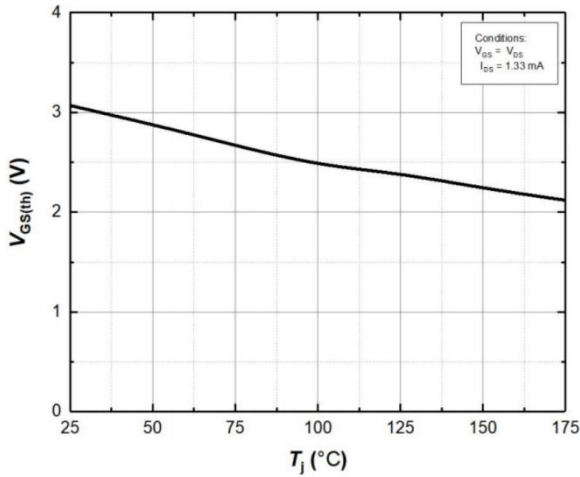


Figure 9. Threshold Voltage vs. Temperature

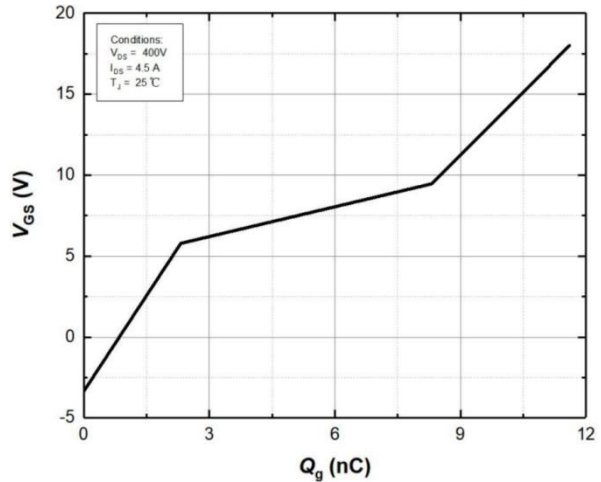


Figure 10 Gate Charge Characteristics

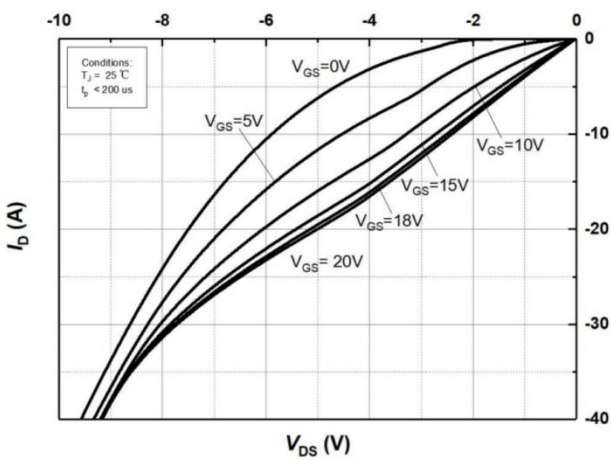


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

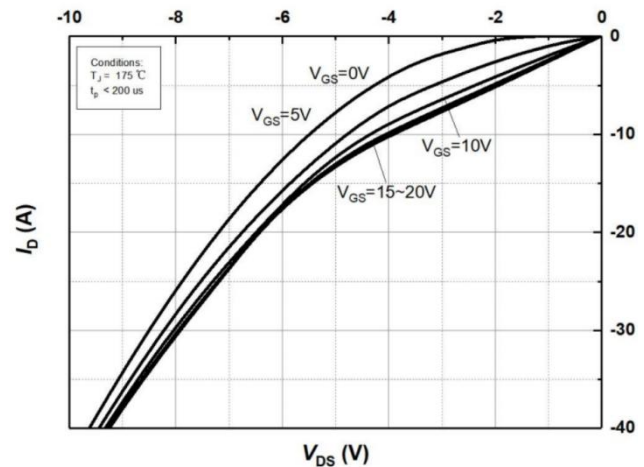


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

## Typical Characteristics

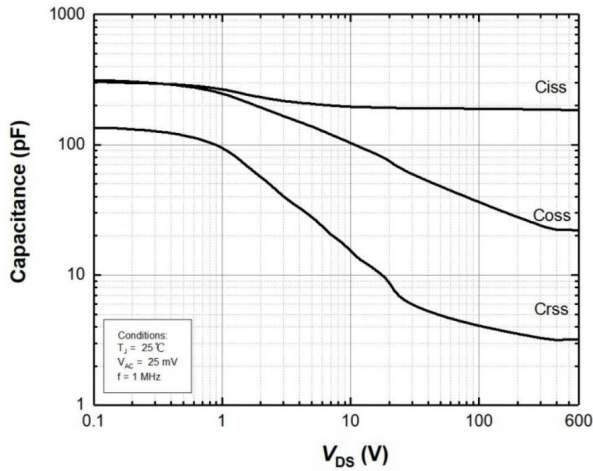


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

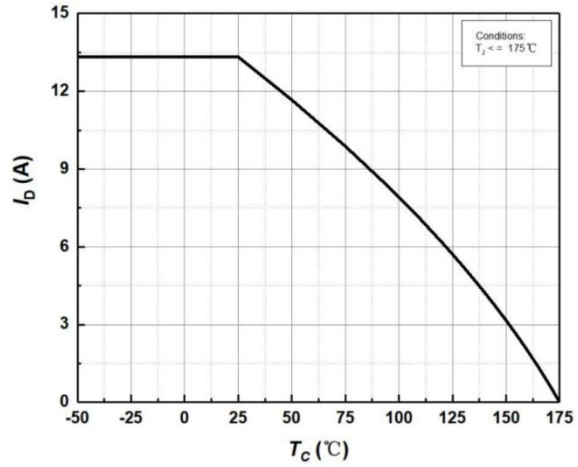


Figure 14. Continuous Drain Current Derating vs Case Temperature

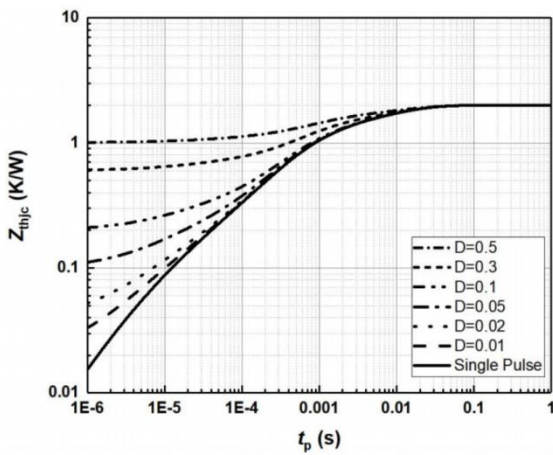


Figure 15. Transient Thermal Impedance (Junction – Case)

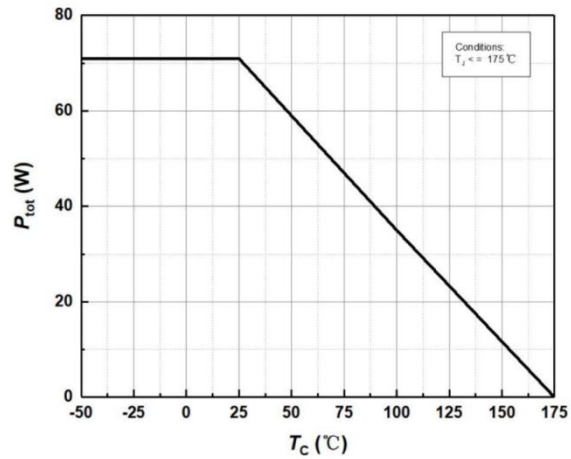


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

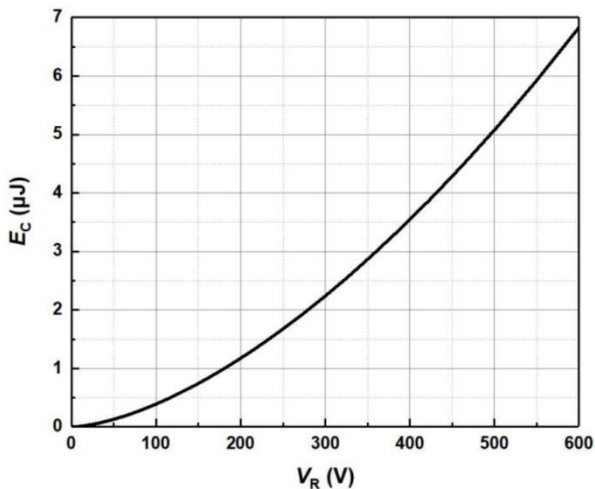


Figure 17. Output Capacitor Stored Energy

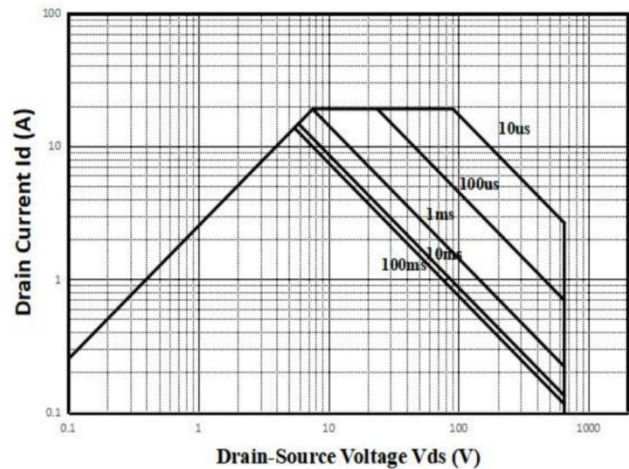
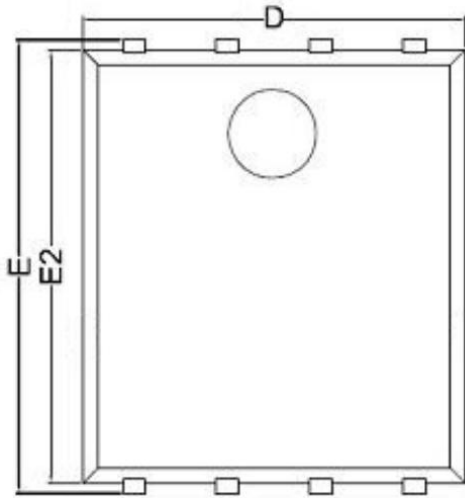
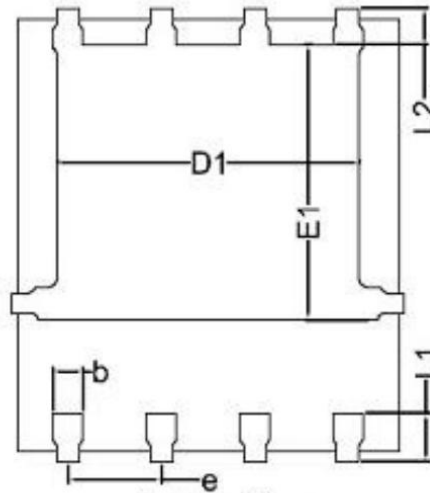


Figure 18. Safe Operating Area

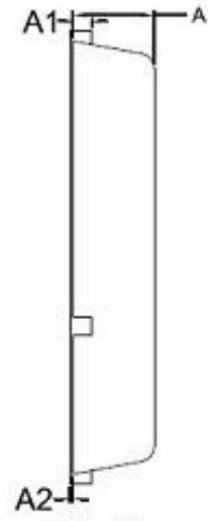
### DFN5\*6 Package Information



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.200	0.300	0.008	0.012
A2	0.000	0.050	0.000	0.002
D	4.800	5.000	0.189	0.197
E	5.900	6.100	0.232	0.240
D1	3.610	3.960	0.142	0.156
E1	3.380	3.780	0.133	0.149
E2	5.700	5.800	0.224	0.228
b	0.330	0.510	0.013	0.020
e	1.270 BSC.		0.050 BSC	
L1	0.510	0.710	0.020	0.028
L2	0.410	0.610	0.016	0.024