WPM2005

Power MOSFET and Schottky Diode

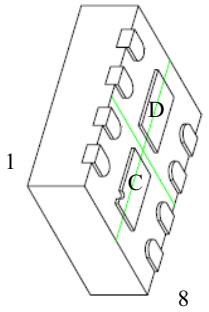
Features

- Featuring a MOSFET and Schottky Diode
- Independent Pinout to each Device to Ease Circuit Design
- Ultra Low V_F Schottky

Applications

- Li--Ion Battery Charging
- High Side DC-DC Conversion Circuits
- High Side Drive for Small Brushless DC Motors
- Power Management in Portable, Battery Powered Products

DFN3×2-8L

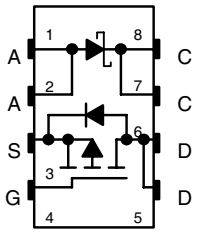


MOSFET MAXIMUM RATINGS (T_J = 25℃ unless otherwise noted)

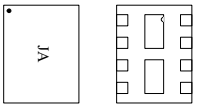
Parameter			Symbol	Value	Units
Drain−to−Source Voltage			V_{DS}	−20	V
Gate−to−Source Voltage			V_{GS}	±8.0	V
Continuous Drain Current (Note 1)	Steady State	T_J = 25°C	I_D	−2.9	A
		T_J = 85°C		−1.8	
	t ≤ 5 s	T_J = 25°C		−3.7	
Power Dissipation (Note 1)	Steady State	T_J = 25°C	P_D	1.4	W
	t ≤ 5 s			2.2	
Pulsed Drain Current	t_p = 10 μs		I_{DM}	−13	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°C
Source Current (Body Diode)			I_S	1.7	A
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			T_L	260	°C

1. Surface Mounted on FR4 Board using 1 in sq pad size, 1oz Cu.

pin connections:



Marking:



J = Specific Device Code
A = Date Code

SCHOTTKY DIODE MAXIMUM RATINGS(T_J = 25℃ unless otherwise noted)

Parameter	Symbol	Limits	Unit
Peak repetitive reverse voltage	V_{RRM}	20	V
DC Blocking voltage	V_R	20	V
Average rectified forward current	I_F	1	A

Order information

Part Number	Package	Shipping
WPM2005-8/TR	DFN3*2- 8L	3000 Tape & Reel

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Units
Junction–to–Ambient – Steady State (Note 2)	$R_{\theta JA}$	89	°C/W
Junction–to–Ambient – t ≤ 5 s (Note 2)	$R_{\theta JA}$	57	°C/W

2. Surface Mounted on FR4 Board using 1 in sq pad size, 1oz Cu.

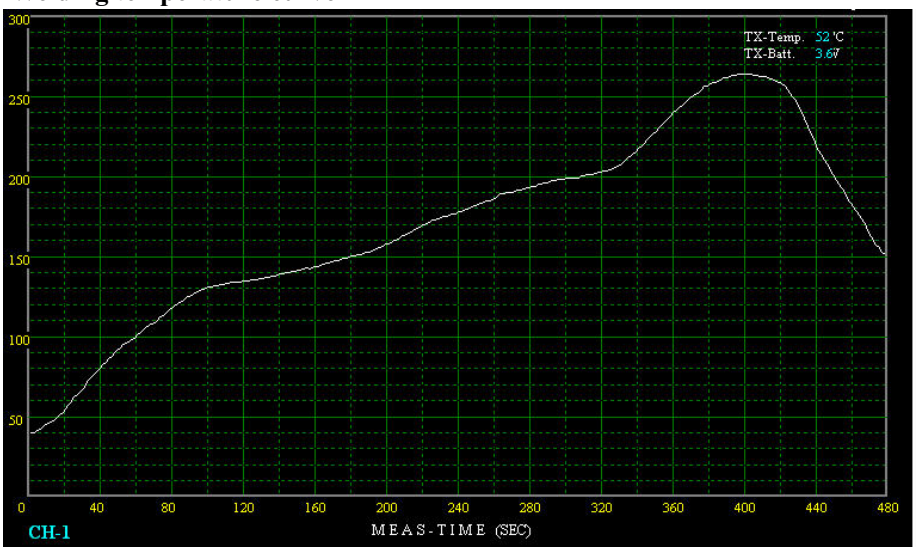
MOSFET ELECTRICAL CHARACTERISTICS(T_J =25℃ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V,I_D = -250μA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =-16V,V_{GS} = 0V			-1	μA
Gate –Source leakage current	I_{GSS}	V_{GS} = ± 8V,V_{DS} = 0V			±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D =-250μA	-0.45		-0.81	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -2.7A			120	mΩ
		V_{GS} = -2.5V,I_D = -2.2A			160	mΩ
Forward Transconductance	g_{FS}	V_{DS} = -10V, I_D = -2.7A		7.0		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = -10V, V_{GS} = 0V, f = 1.0 MHz			700	pF
Output Capacitance	C_{oss}				150	pF
Reverse Transfer Capacitance	C_{rss}				90	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = -4.5V, V_{DD} = -10V, I_D = -1.0A, R_G=6.0Ω,			10	ns
Turn-On Rise Time	t_r				20	ns
Turn-Off Delay Time	$t_{d(off)}$				60	ns
Turn-Off Fall Time	t_f				30	ns
Total Gate Charge	$Q_{G(TOT)}$	V_{DS} = -10V,I_D = -2.7A, V_{GS} =-4.5V		5.0	6.5	nC
Threshold gate charge	$Q_{G(TH)}$			0.4		nC
Gate-Source Charge	Q_{GS}			1.4		nC
Gate-Drain Charge	Q_{GD}			0.9		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Forward Diode Voltage	V_{SD}	V_{GS} = 0V,I_S = -1.5A			-1.5	V

SCHOTTKY DIODE ELECTRICAL CHARACTERISTICS (TJ = 25° C unless otherwise noted)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{F1}		0.425		V	I_F=0.1A
	V_{F2}		0.480			I_F=0.5A
	V_{F3}			0.575		I_F=1A
Reverse current	I_{R1}			20	μA	V_R=10V
	I_{R2}			100	μA	V_R=20V

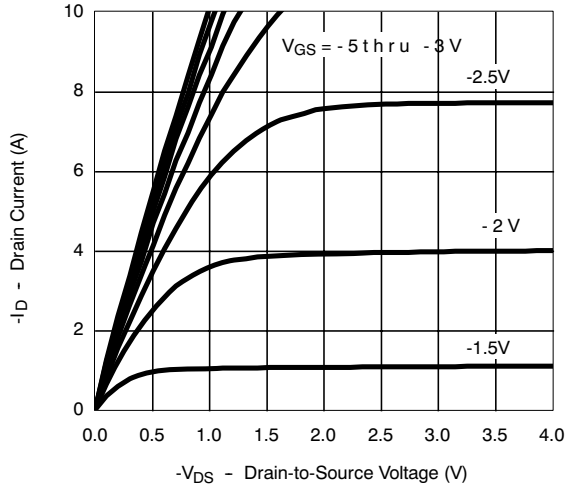
Welding temperature curve



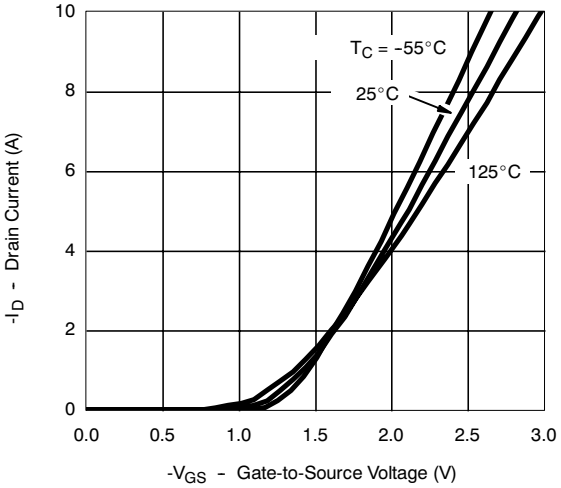
MSL=1

Typical Characteristics (T_J = 25°C unless otherwise noted)

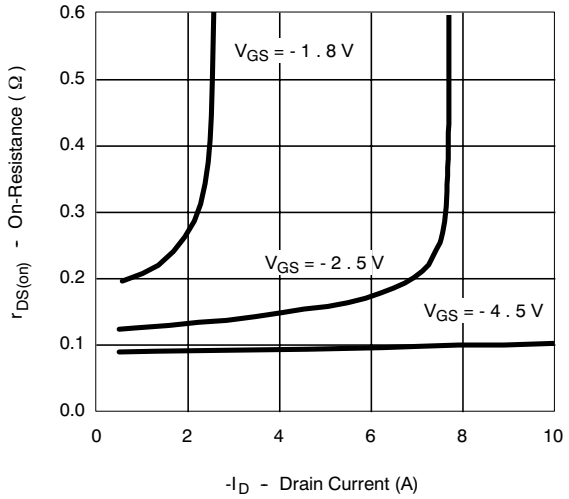
Output Characteristics



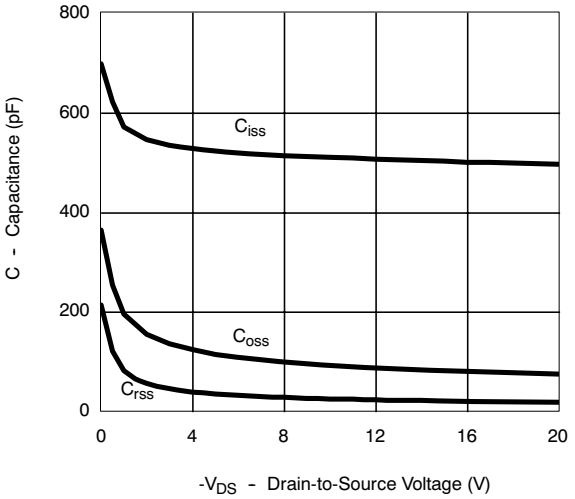
Transfer Characteristics



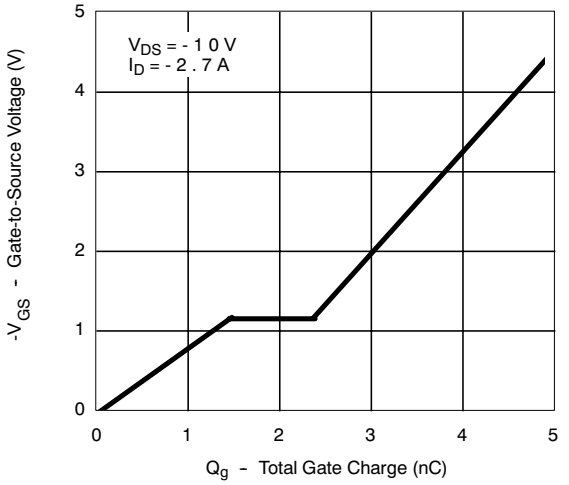
On-Resistance vs. Drain Current



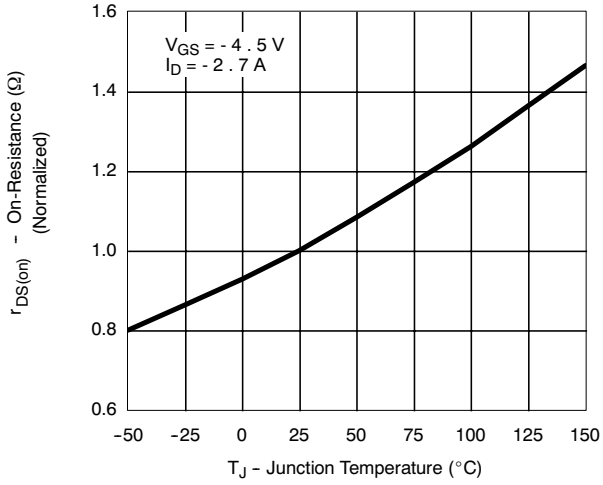
Capacitance



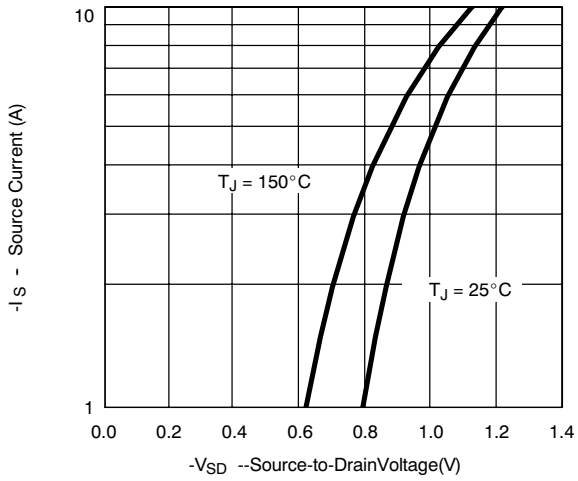
Gate Charge



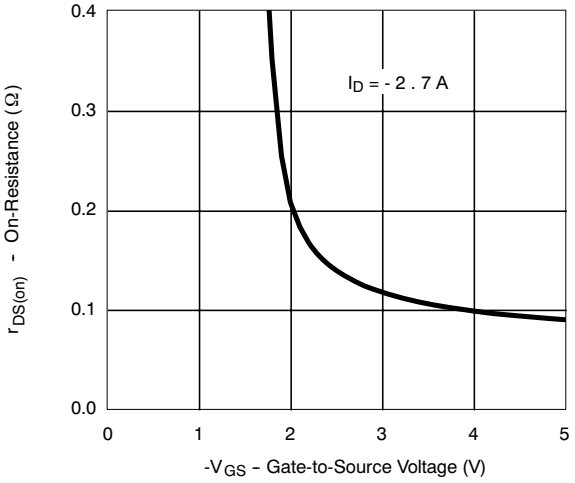
On-Resistance vs. Junction Temperature



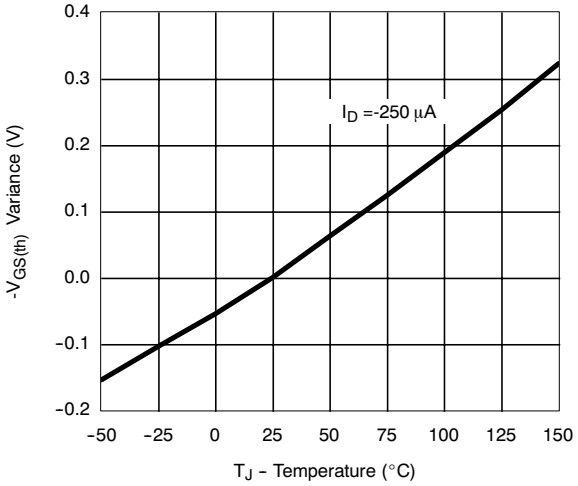
Source-Drain Diode Forward Voltage



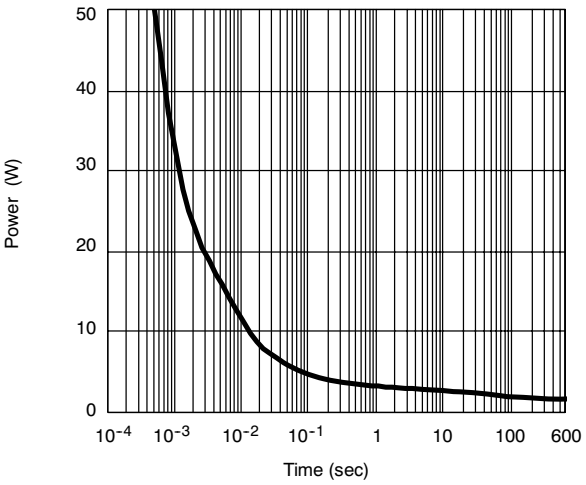
On-Resistance vs. Gate-to-Source Voltage



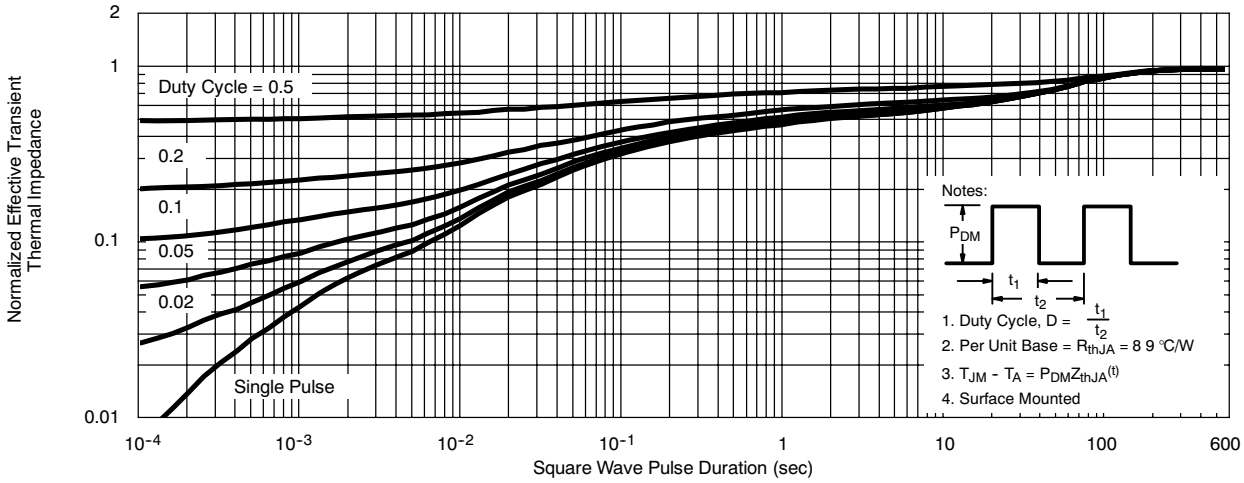
Threshold Voltage



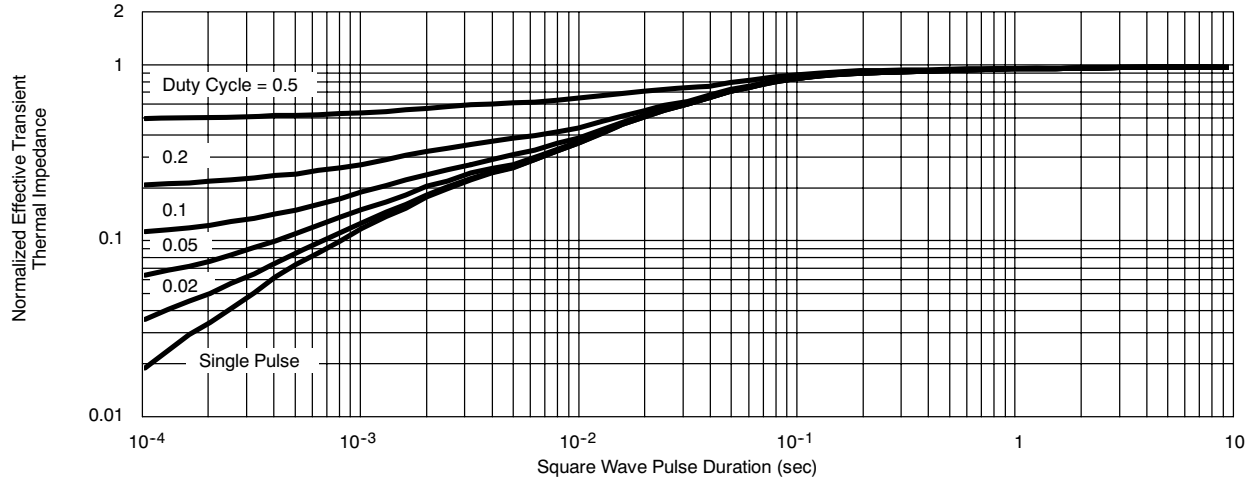
Single Pulse Power



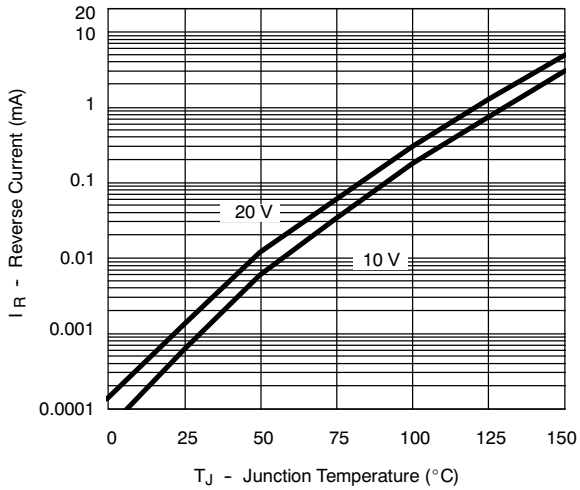
Normalized Thermal Transient Impedance, Junction-to-Ambient



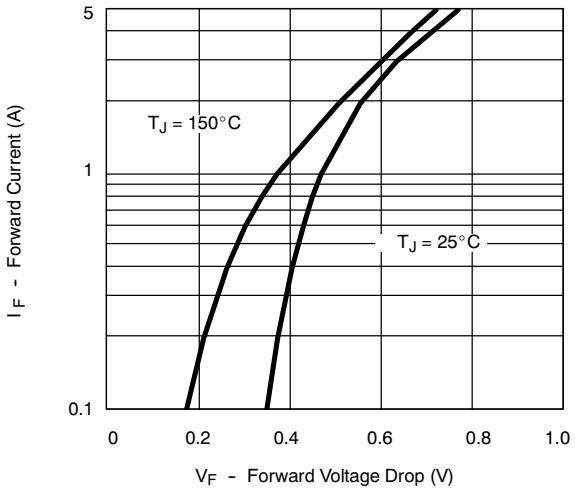
Normalized Thermal Transient Impedance, Junction-to-Foot



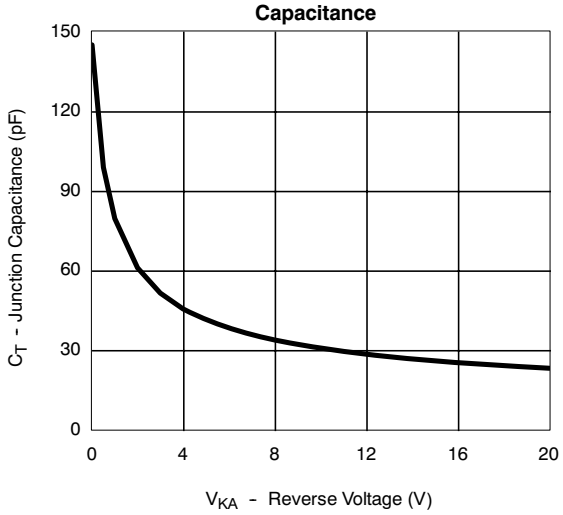
Reverse Current vs. Junction Temperature



Forward Voltage Drop

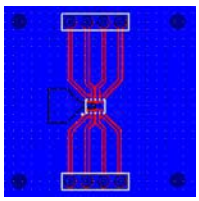


Capacitance



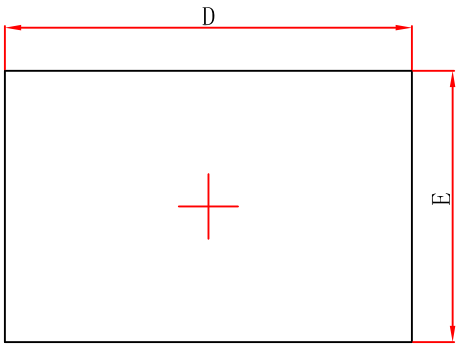
Power Dissipation Characteristics

1. The package of WPM2005 is DFN3x2-8L, surface mounted on FR4 Board using 1 in sq pad size，1 oz Cu，$R_{\theta JA}$ is 89 ℃/W.
2. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, and the relation between T_J and P_D is $T_J = T_a + R_{\theta JA} * P_D$, the maximum power dissipation is determined by $R_{\theta JA}$.
3. The $R_{\theta JA}$ is the thermal impedance from junction to ambient, using larger PCB pad size can get smaller $R_{\theta JA}$ and result in larger maximum power dissipation.

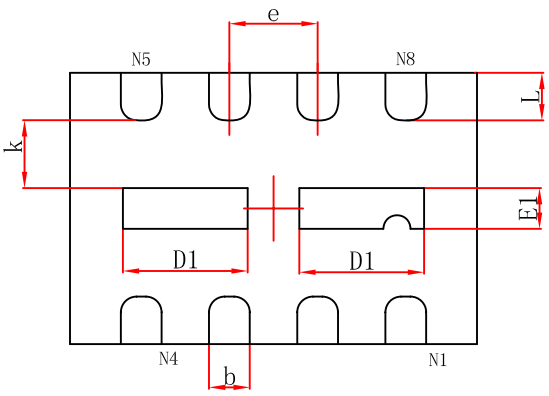


89 ℃/W when mounted on
a 1 in^2 pad of 1 oz copper.

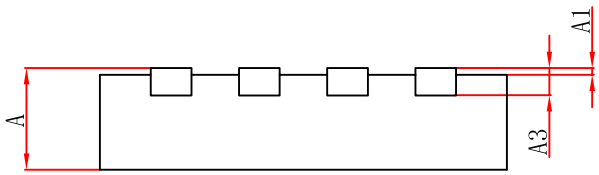
DFNWB3X2-8L(P0.65T0.75/0.85) PACKAGE OUTLINE DIMENSIONS



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.153	0.253	0.006	0.010
D	2.9	3.1	0.114	0.122
E	1.9	2.1	0.075	0.083
D1	0.82	1.020	0.032	0.040
E1	0.200	0.400	0.008	0.016
k	0.300MIN.		0.010MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.250	0.350	0.010	0.014

DFN 3X2-8L PCB Layout Guide