FDMA520PZ-VB Datasheet
P-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY

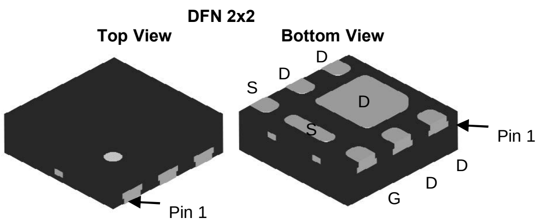
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
- 20	0.030 at V_{GS} = - 4.5 V	-10[a]	18 nC
	0.040 at V_{GS} = - 2.5 V	-9[a]	

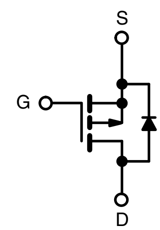
FEATURES

- TrenchFET® Power MOSFET
- Thermally Enhanced DFN2X2 Package
  - Small Footprint Area
  - Low On-Resistance

APPLICATIONS

- Load Switch, PA Switch, and Battery Switch for Portable Devices





P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 20	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 10[a]	A
	T_C = 70 °C		- 8[a]	
	T_A = 25 °C		- 10[b, c]	
	T_A = 70 °C		- 8[b, c]	
Pulsed Drain Current (t = 300 µs)		I_{DM}	- 30	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 10[a]	
	T_A = 25 °C		- 2.5[b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	17	W
	T_C = 70 °C		11	
	T_A = 25 °C		3.3[b, c]	
	T_A = 70 °C		2.1[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)[d, e]			250	

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b, f]	t ≤ 5 s	R_{thJA}	28	38	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	5.6	7.5	

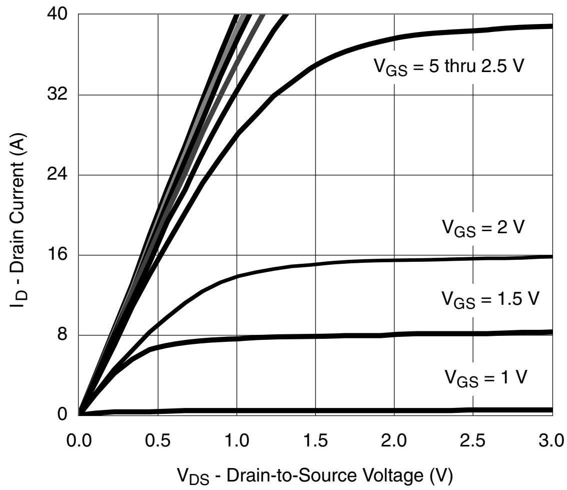
Notes:
a. Package limited.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 5 s.
d. See solder profile The DFN2X2 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
e. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
f. Maximum under steady state conditions is 80 °C/W.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 11		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			2.7		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.4		- 1	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 12 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 12 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≤ - 5 V, V_{GS} = - 4.5 V	- 20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 6.7 A		0.030		Ω
		V_{GS} = - 2.5 V, I_D = - 6.2 A		0.040		
		V_{GS} = - 1.8 V, I_D = - 2.3 A		0.042		
		V_{GS} = - 1.5 V, I_D = - 1 A		0.050		
Forward Transconductance[a]	g_{fs}	V_{DS} = - 10 V, I_D = - 6.7 A		30		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 10 V, V_{GS} = 0 V, f = 1 MHz		1600		pF
Output Capacitance	C_{oss}			430		
Reverse Transfer Capacitance	C_{rss}			370		
Total Gate Charge	Q_g	V_{DS} = - 6 V, V_{GS} = - 8 V, I_D = - 10 A		38	54	nC
		V_{DS} = - 6 V, V_{GS} = - 4.5 V, I_D = - 10 A		23	33	
Gate-Source Charge	Q_{gs}			3		
Gate-Drain Charge	Q_{gd}			6.5		
Gate Resistance	R_g	f = 1 MHz		7		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 6 V, R_L = 0.75 Ω I_D ≅ - 8 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		20	30	ns
Rise Time	t_r			40	60	
Turn-Off Delay Time	$t_{d(off)}$			65	100	
Fall Time	t_f			40	60	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 6 V, R_L = 0.75 Ω I_D ≅ - 8 A, V_{GEN} = - 8 V, R_g = 1 Ω		10	15	
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			70	105	
Fall Time	t_f			40	60	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 10	A
Pulse Diode Forward Current	I_{SM}				30	
Body Diode Voltage	V_{SD}	I_S = - 8 A, V_{GS} = 0 V		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 8 A, di/dt = 100 A/µs, T_J = 25 °C		40	60	ns
Body Diode Reverse Recovery Charge	Q_{rr}			20	30	nC
Reverse Recovery Fall Time	t_a			14		ns
Reverse Recovery Rise Time	t_b			26		

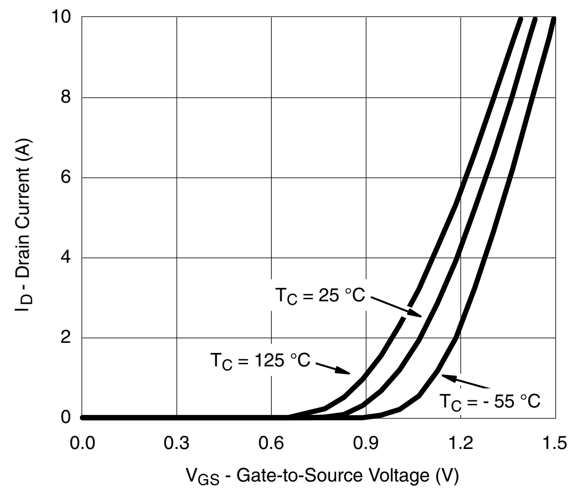
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

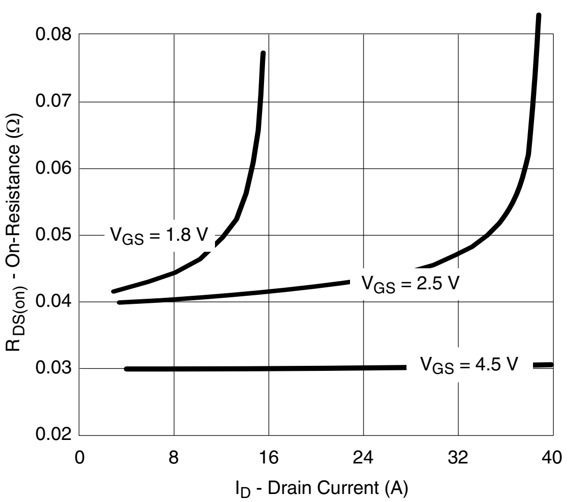
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



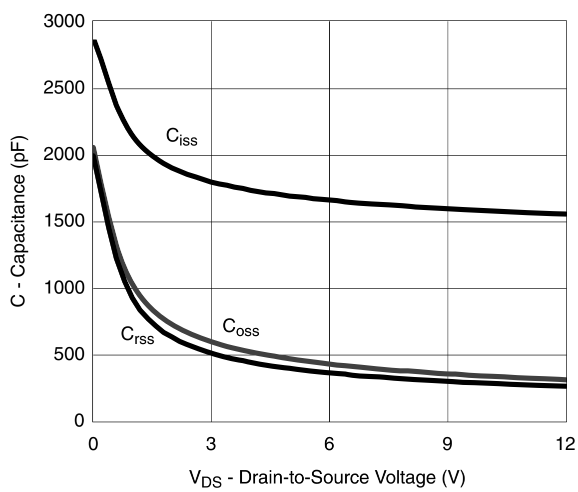
Output Characteristics



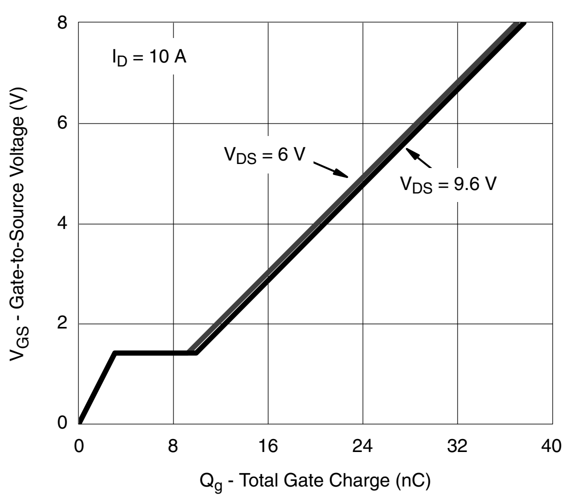
Transfer Characteristics



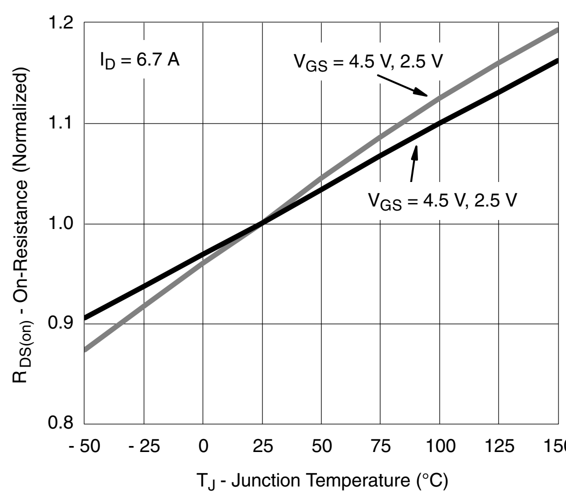
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

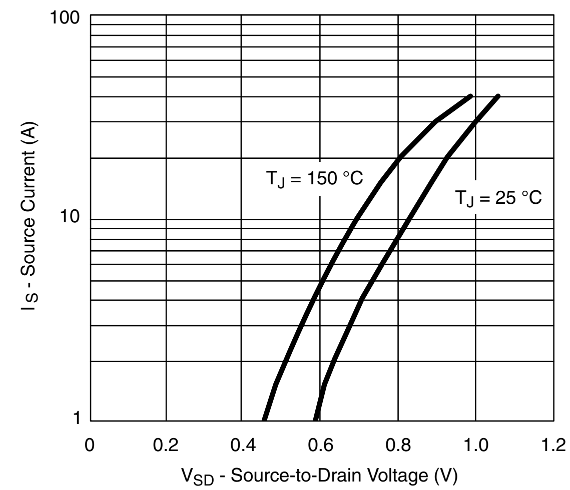


Gate Charge

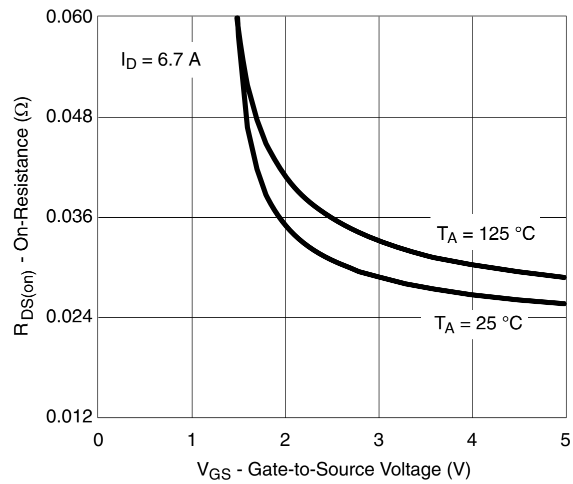


On-Resistance vs. Junction Temperature

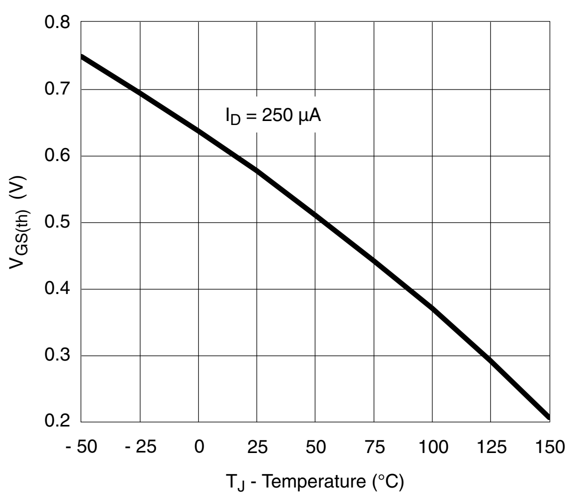
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



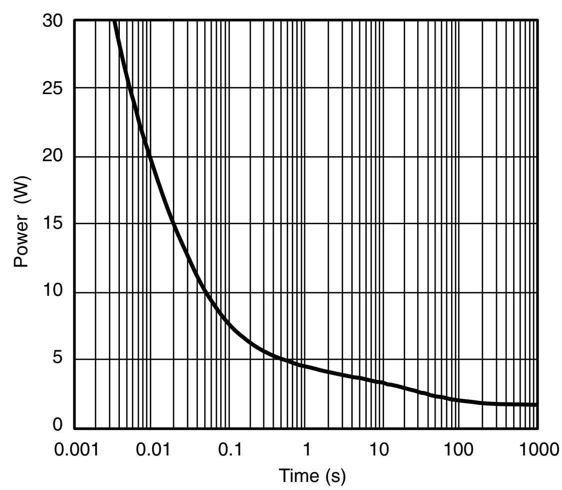
Soure-Drain Diode Forward Voltage



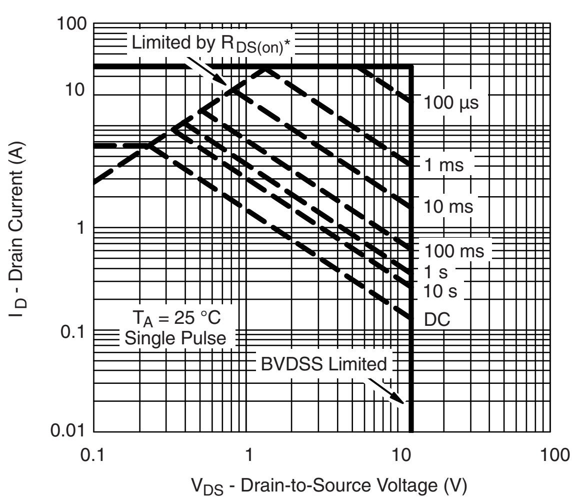
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



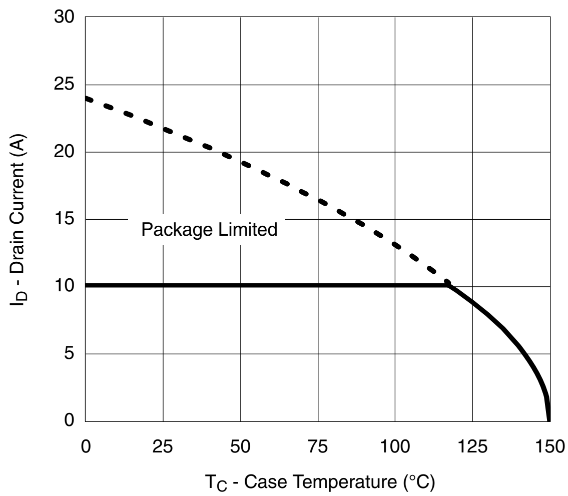
Single Pulse Power, Junction-to-Ambient



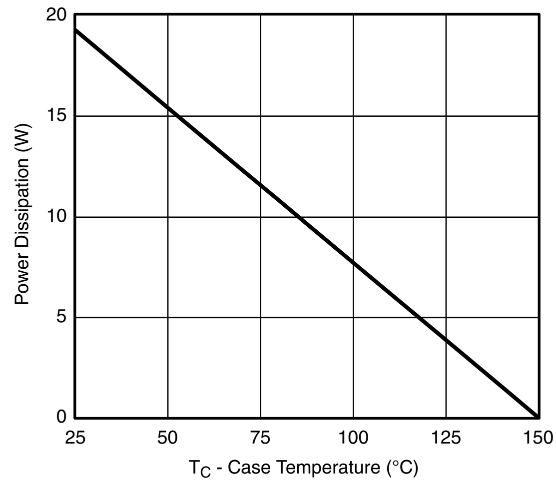
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



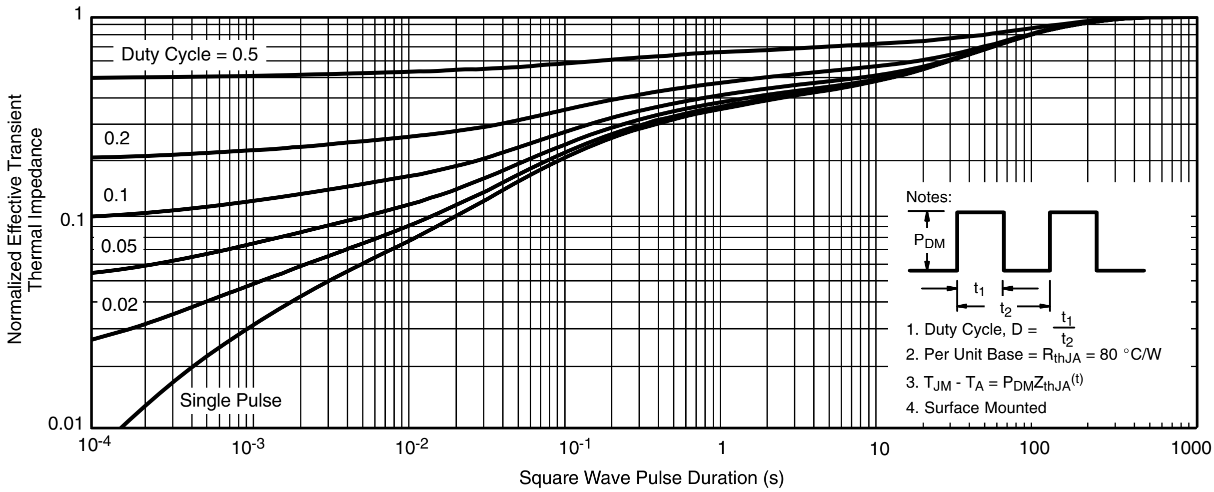
Current Derating*



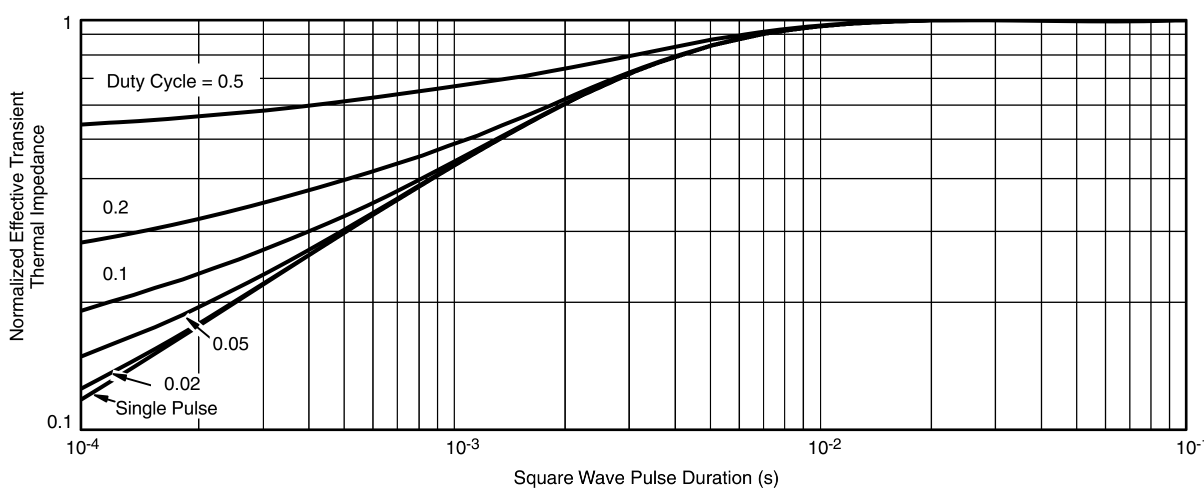
Power Derating

* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

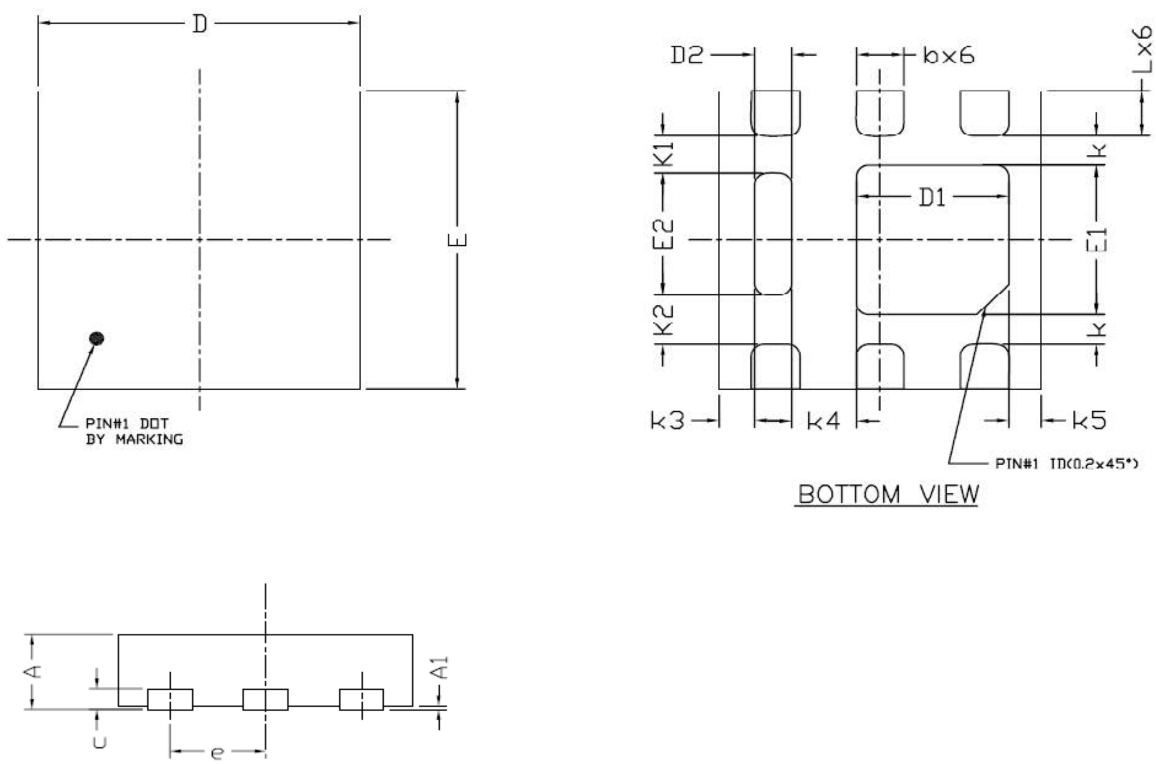


Normalized Thermal Transient Impedance, Junction-to-Ambient

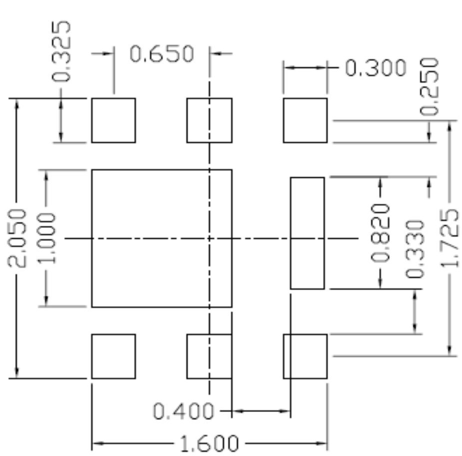


Normalized Thermal Transient Impedance, Junction-to-Case

DFN2x2 _6L_EP1_S PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



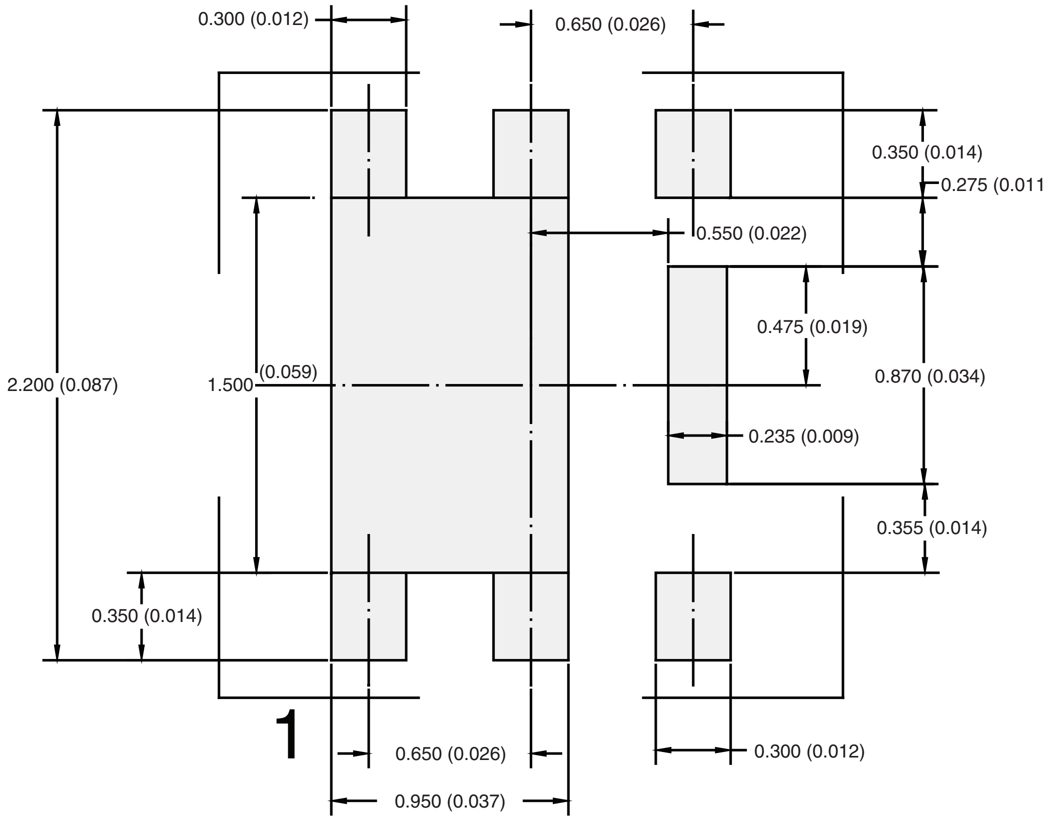
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.022	0.024
A1	0.00	——	0.05	0.000	——	0.002
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.152 REF			0.006 REF		
D	1.90	2.00	2.10	0.075	0.079	0.083
D1	0.85	0.95	1.05	0.033	0.037	0.041
D2	0.13	0.23	0.33	0.005	0.009	0.013
E	1.90	2.00	2.10	0.075	0.079	0.083
E1	0.90	1.00	1.10	0.035	0.039	0.043
E2	0.72	0.82	0.92	0.028	0.032	0.036
e	0.65 BSC			0.026 BSC		
K	0.20 BSC			0.008 BSC		
K1	0.25 BSC			0.010 BSC		
K2	0.33 BSC			0.013 BSC		
K3	0.22 BSC			0.009 BSC		
K4	0.40 BSC			0.016 BSC		
K5	0.20 BSC			0.008 BSC		
L	0.25	0.30	0.35	0.010	0.012	0.014

UNIT: mm

NOTE

1. CONTROLLING DIMENSION IS MILLIMETER.
   CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

RECOMMENDED PAD LAYOUT FOR DFN2X2



Dimensions in mm/(Inches)

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