N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.028 at V_{GS} = 10 V	8.5
	0.031 at V_{GS} = 4.5 V	7.9

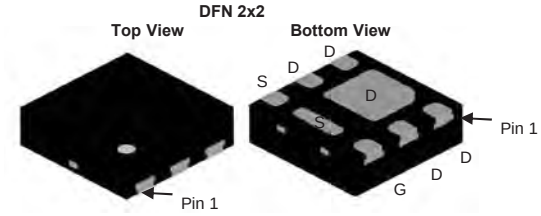
FEATURES

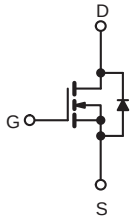
- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC

Pb-free
RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- Primary Side Switch
- Synchronous Rectification





N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		**Symbol**	**10 s**	**Steady State**	**Unit**
Drain-Source Voltage		V_{DS}	60		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C)	T_A = 25 °C	I_D	8.5	6.0	A
	T_A = 70 °C		7.6	4.8	
Pulsed Drain Current		I_{DM}	40		
Continuous Source Current (Diode Conduction)[a]		I_S	3.2	1.3	
Single Avalanche Current	L = 0.1 mH	I_{AS}	22		
Single Avalanche Energy		E_{AS}	24		mJ
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	3.8	1.5	W
	T_A = 70 °C		2.4	1.0	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C
Soldering Recommendations (Peak Temperature)[b, c]			260		

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[a]	t ≤ 10 s	R_{thJA}	26	33	°C/W
	Steady State		65	81	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.9	2.4	

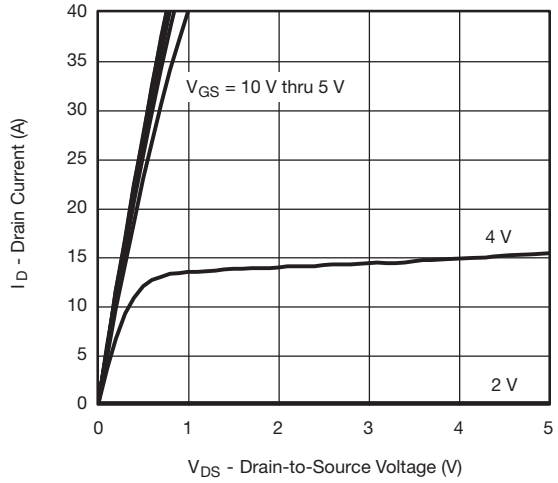
Notes:
a. Surface mounted on 1" x 1" FR4 board.
b. The DFN2X2 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
c. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 µA	1.5	2.5	3.0	V
Gate Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 55 °C			5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	30			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 8.5 A		0.028	0.031	Ω
		V_{GS} = 4.5 V, I_D = 6.9 A		0.031	0.034	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 8.5 A		35		S
Diode Forward Voltage[a]	V_{SD}	I_S = 3.2 A, V_{GS} = 0 V		0.78	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 10 V, I_D = 8.5 A		30	45	nC
Gate-Source Charge	Q_{gs}			6.9		
Gate-Drain Charge	Q_{gd}			5.8		
Gate Resistance	R_g		0.65	1.3	1.95	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 30 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_g = 6 Ω		14	25	ns
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			50	80	
Fall Time	t_f			12	20	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 3.2 A, dI/dt = 100 A/µs		60	100	

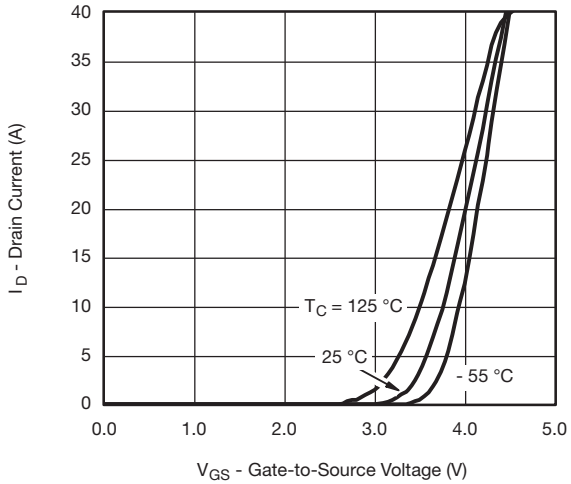
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

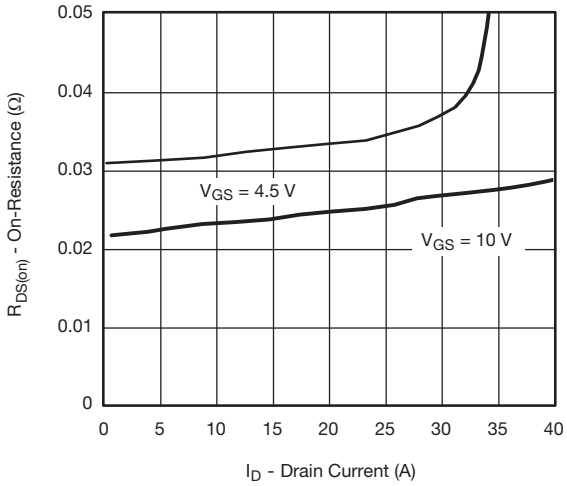
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



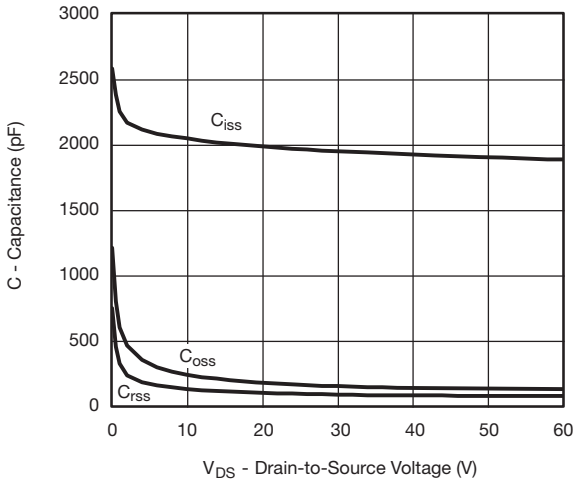
Output Characteristics



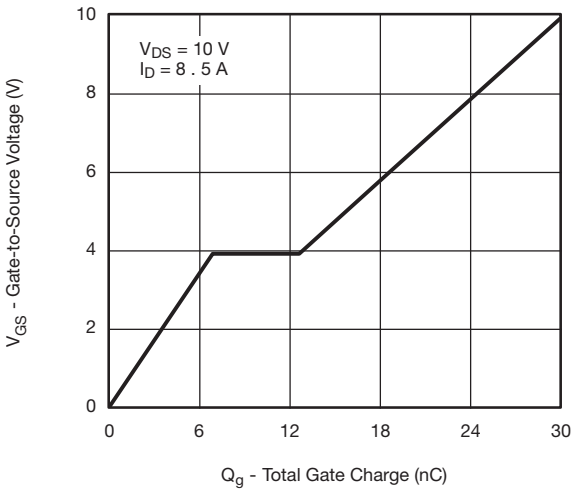
Transfer Characteristics



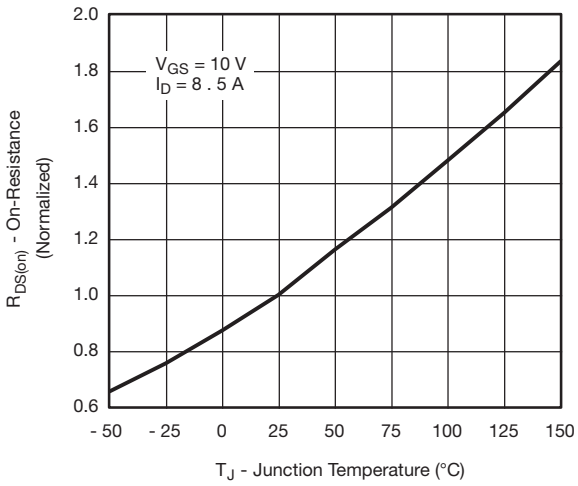
On-Resistance vs. Drain Current



Capacitance

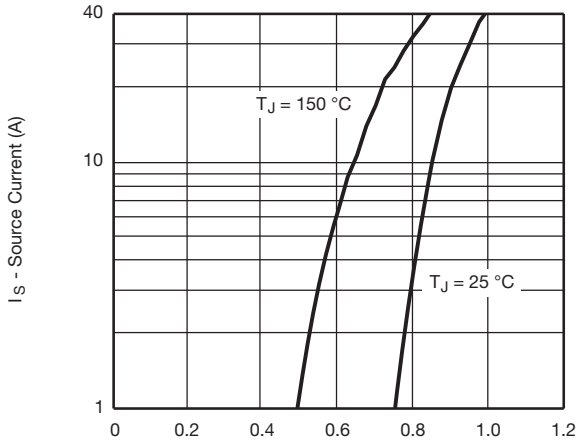


Gate Charge

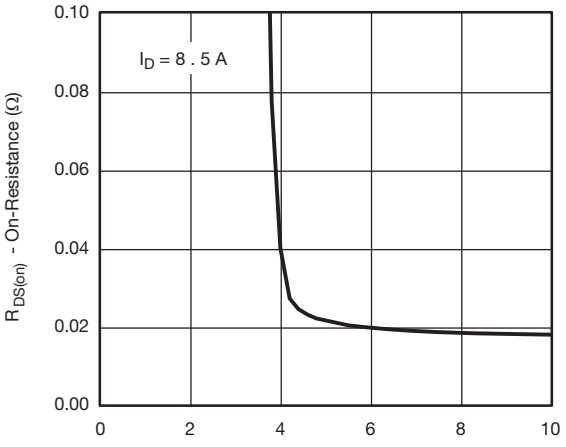


On-Resistance vs. Junction Temperature

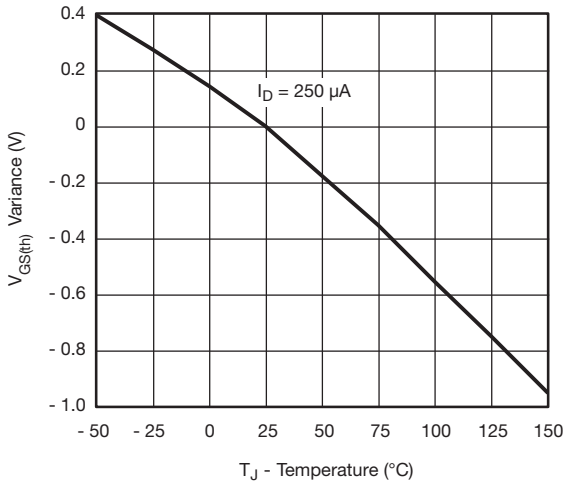
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



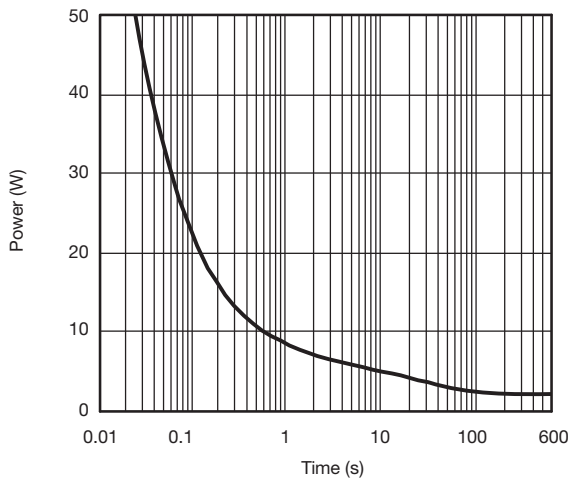
Source-Drain Diode Forward Voltage



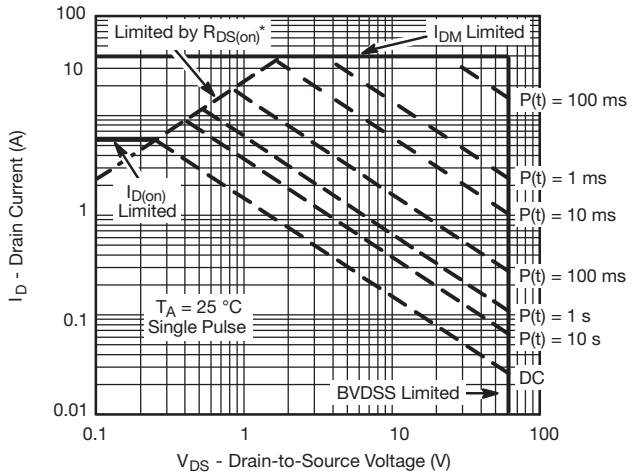
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



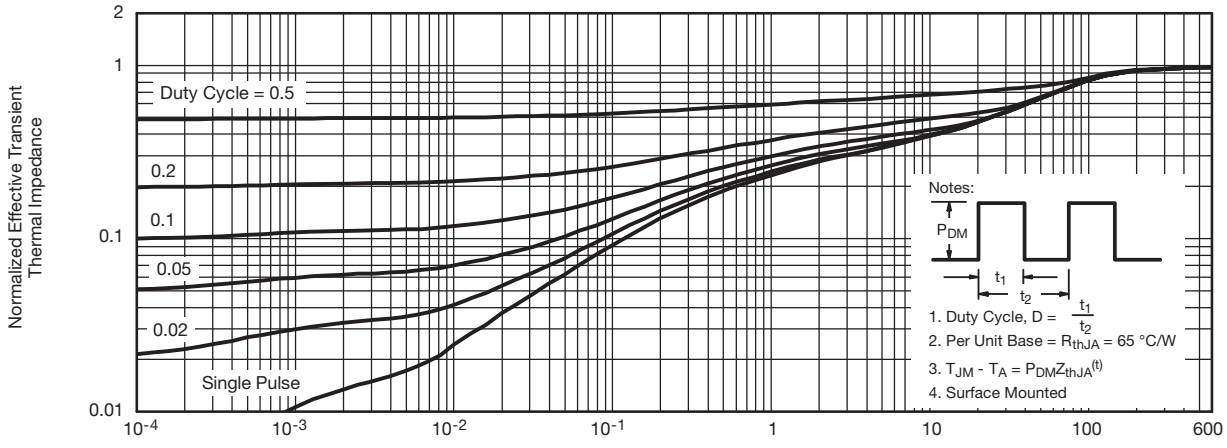
Single Pulse Power, Junction-to-Ambient



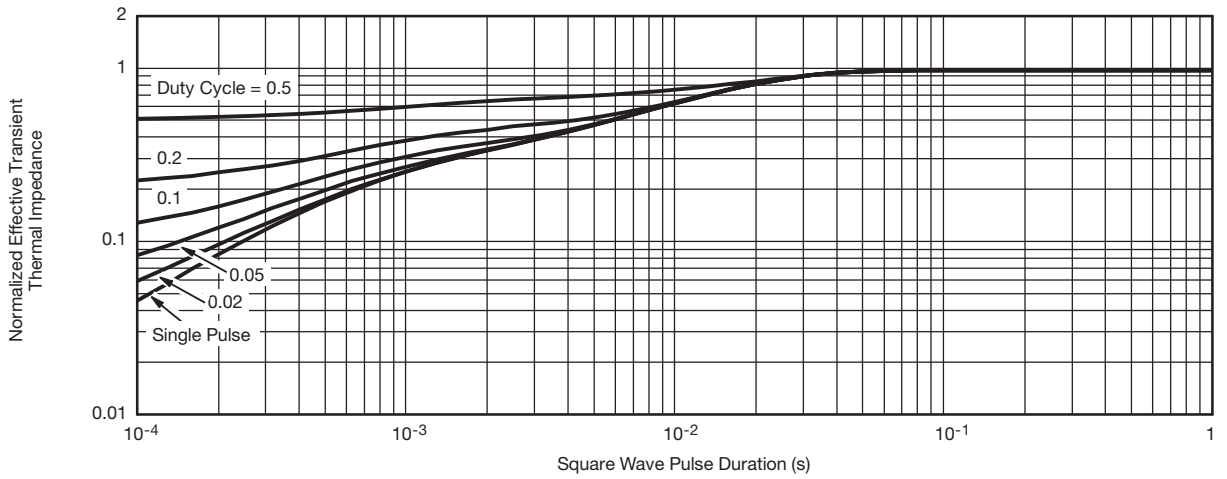
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

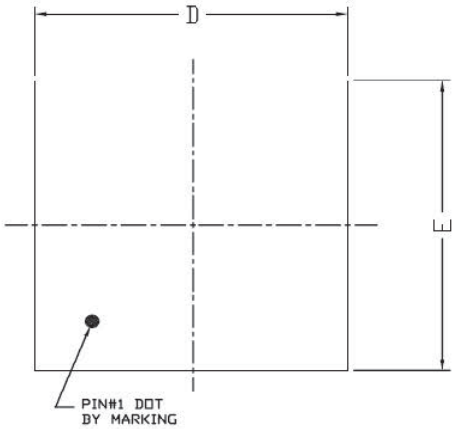


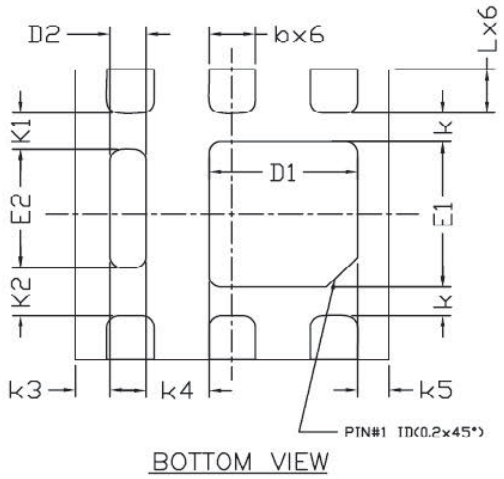
Normalized Thermal Transient Impedance, Junction-to-Ambient



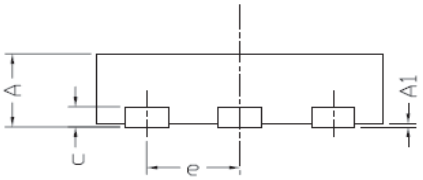
Normalized Thermal Transient Impedance, Junction-to-Case

DFN2x2 _6L_EP1_S PACKAGE OUTLINE

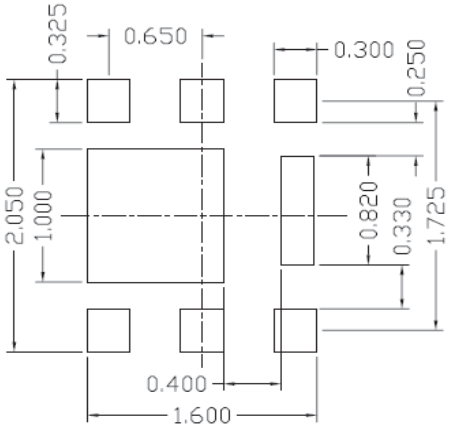




BOTTOM VIEW



RECOMMENDED LAND PATTERN



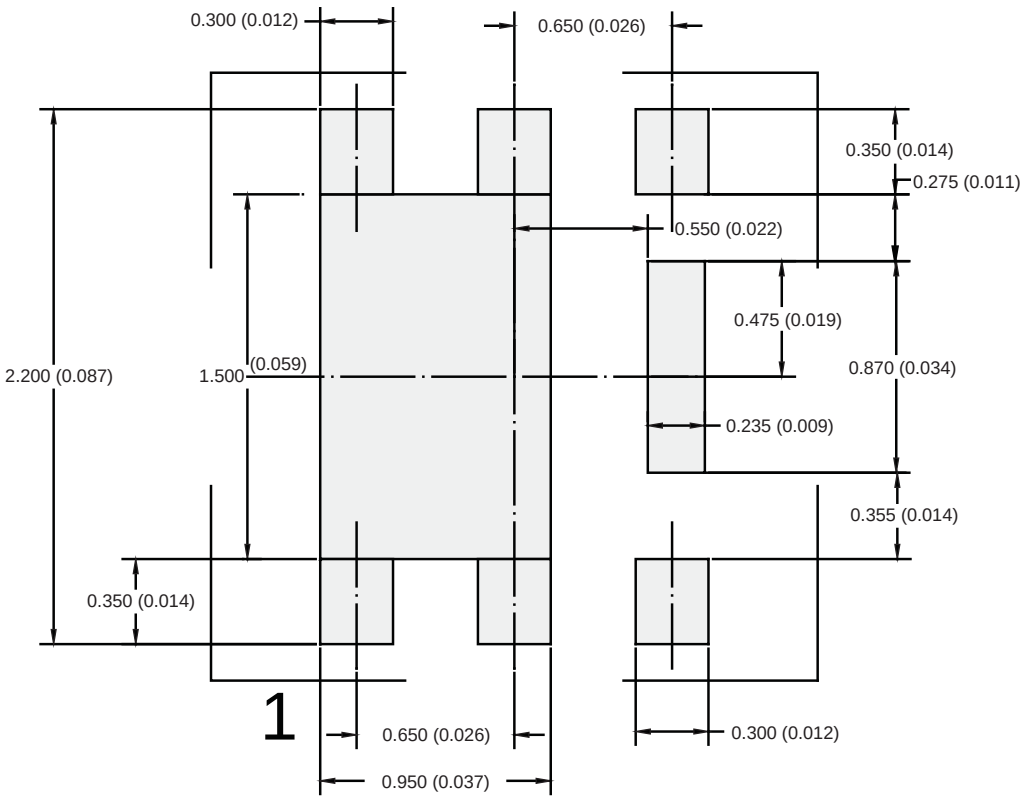
UNIT: mm

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

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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