

MC2443-VB Datasheet

P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω) Typ.	I_D (A) ^d	Q_g (TYP.)
-60	0.058 at $V_{GS} = -10$ V	-6.5	10.1 nC
	0.070 at $V_{GS} = -4.5$ V	-5.1	

FEATURES

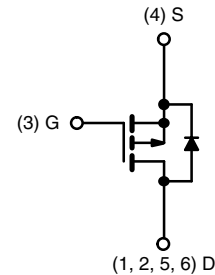
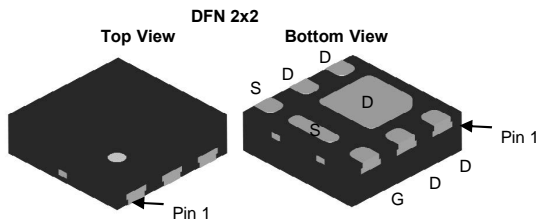
- Trench power MOSFET
- 100 % R_g and UIS tested

APPLICATIONS

- Load switches
- DC/DC converter



RoHS
COMPLIANT
HALOGEN
FREE



P-Channel MOSFET

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

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	I_D	-6.5	A
	$T_C = 70$ °C		-4.5	
	$T_A = 25$ °C		-3.8 ^{a,b}	
	$T_A = 70$ °C		-3.1 ^{a,b}	
Pulsed Drain Current ($t = 100$ μ s)		I_{DM}	-20	
Continuous Source-Drain Diode Current	$T_C = 25$ °C	I_S	-3.5	
	$T_A = 25$ °C		-1.7 ^{a,b}	
Avalanche Current	L = 0.1 mH	I_{AS}	-15	mJ
Single-Pulse Avalanche Energy		E_{AS}	11.25	
Maximum Power Dissipation	$T_C = 25$ °C	P_D	4.2	W
	$T_C = 70$ °C		2.7	
	$T_A = 25$ °C		2 ^{a,b}	
	$T_A = 70$ °C		1.3 ^{a,b}	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum Junction-to-Ambient ^{a,c}	$t \leq 10$ s	R_{thJA}	40	62.5	°C/W
Maximum Junction-to-Foot	Steady State	R_{thJF}	25	30	

Notes

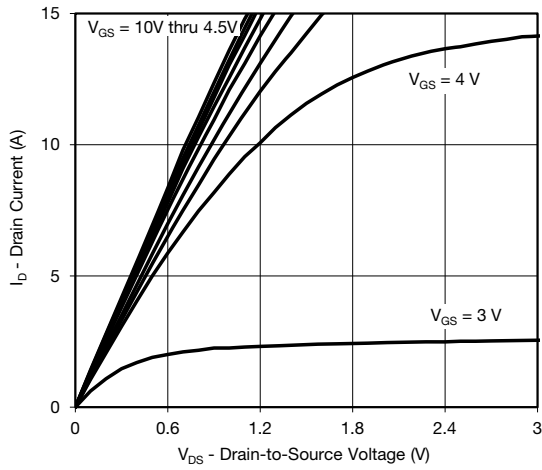
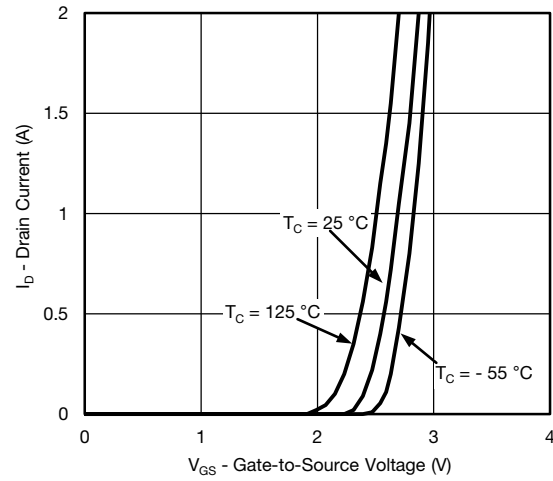
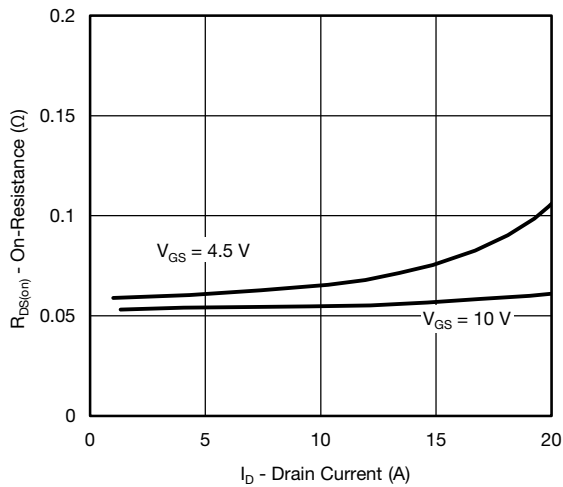
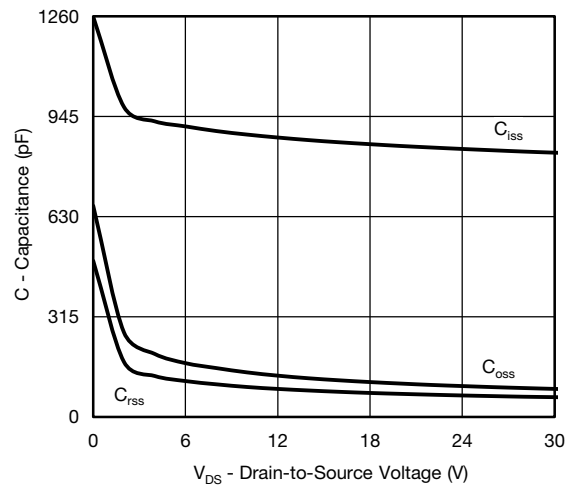
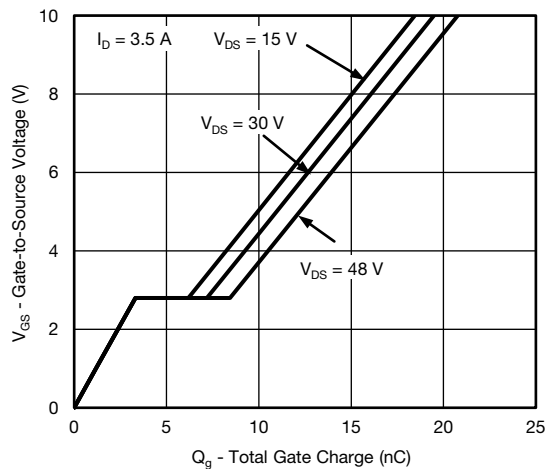
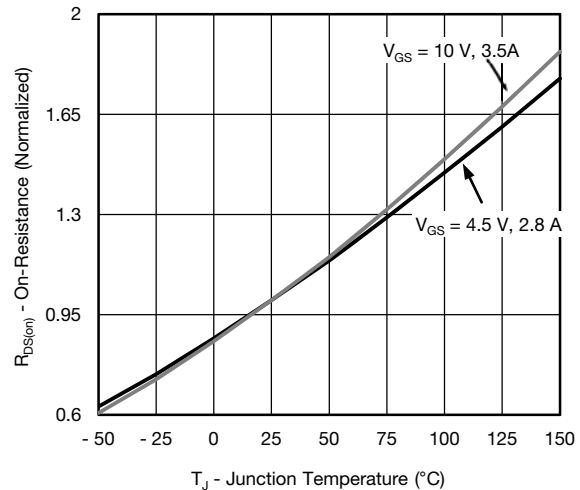
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- Maximum under steady state conditions is 110 °C/W.
- Based on $T_C = 25$ °C.

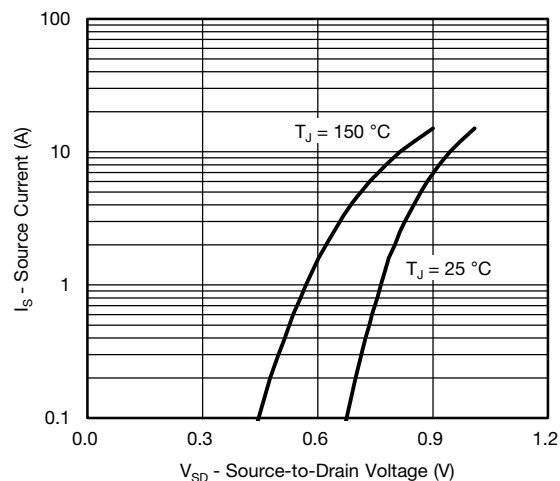
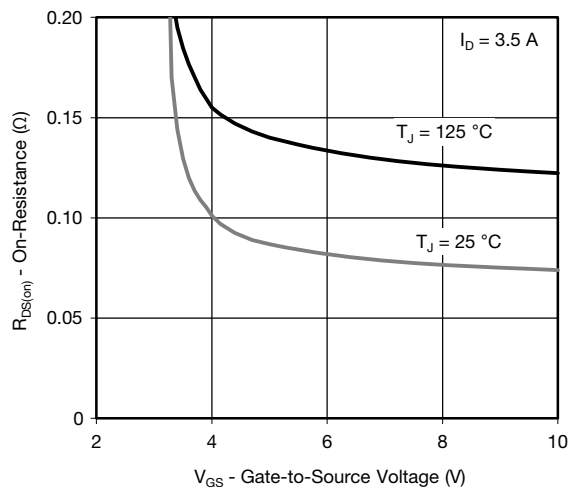
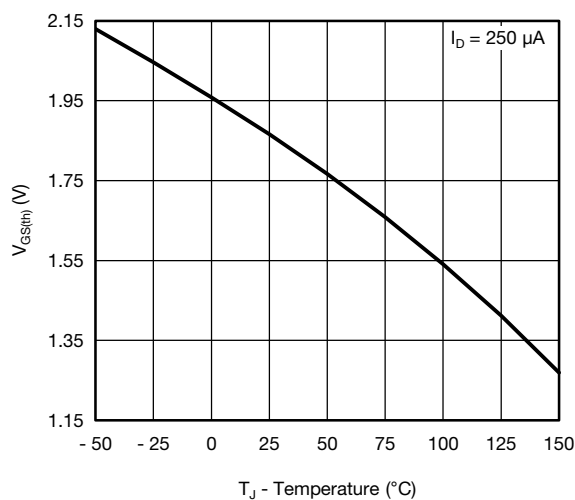
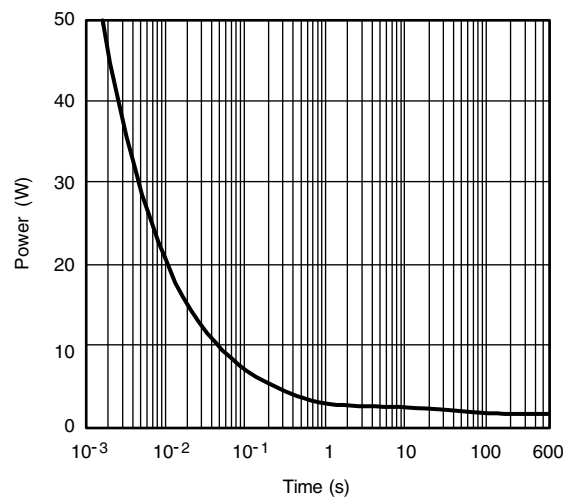
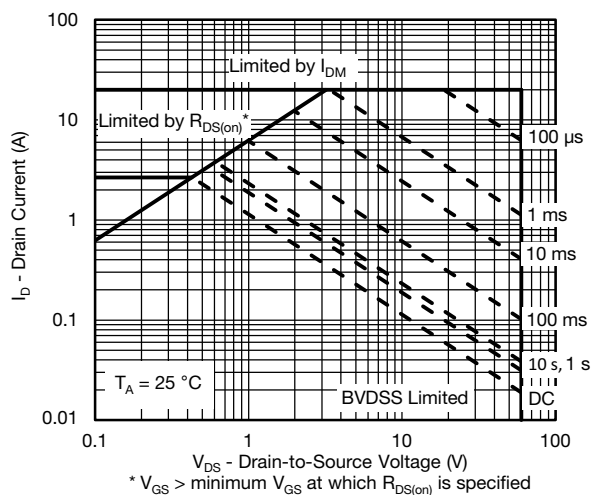
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = -250 μA	-60	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = -250 μA	-	-6.7	-	mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J		-	4.3	-	
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-1	-	-3	V
Gate-Source 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} ≥ -10 V, V _{GS} = -10 V	-30	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = -10 V, I _D = -3.5 A	-	0.058	-	Ω
		V _{GS} = -4.5 V, I _D = -2.8 A	-	0.070	-	
Forward Transconductance ^a	g _{fs}	V _{DS} = -30 V, I _D = -3.5 A	-	11	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = -30 V, V _{GS} = 0 V, f = 1 MHz	-	832	-	pF
Output Capacitance	C _{oss}		-	88	-	
Reverse Transfer Capacitance	C _{rss}		-	63	-	
Total Gate Charge	Q _g	V _{DS} = -30 V, V _{GS} = -10 V, I _D = -3.5 A	-	20	30	nC
		V _{DS} = -30 V, V _{GS} = -4.5 V, I _D = -3.5 A	-	10.1	15.2	
Gate-Source Charge	Q _{gs}		-	3.3	-	
Gate-Drain Charge	Q _{gd}		-	3.9	-	
Gate Resistance	R _g	f = 1 MHz	1.8	9	18	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = -30 V, R _L = 10.7 Ω I _D ≡ -2.8 A, V _{GEN} = -10 V, R _g = 1 Ω	-	8	16	ns
Rise Time	t _r		-	6	12	
Turn-Off DelayTime	t _{d(off)}		-	35	53	
Fall Time	t _f		-	16	24	
Turn-On Delay Time	t _{d(on)}	V _{DD} = -30 V, R _L = 10.7 Ω I _D ≡ -2.8 A, V _{GEN} = -4.5 V, R _g = 1 Ω	-	40	60	
Rise Time	t _r		-	28	42	
Turn-Off DelayTime	t _{d(off)}		-	31	47	
Fall Time	t _f		-	15	23	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C	-	-	-3.5	A
Pulse Diode Forward Current (t = 100 μs)	I _{SM}		-	-	-20	
Body Diode Voltage	V _{SD}	I _S = -2.8 A, V _{GS} = 0 V	-	-0.85	-1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = -2.8 A, dI/dt = 100 A/μs, T _J = 25 °C	-	32	48	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	45	68	nC
Reverse Recovery Fall Time	t _a		-	24	-	ns
Reverse Recovery Rise Time	t _b		-	8	-	

Notes

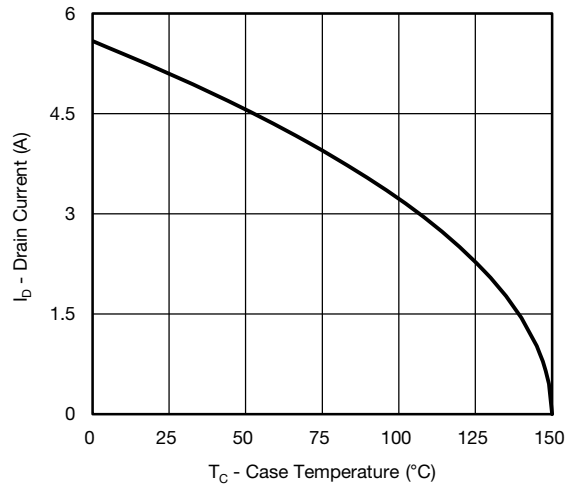
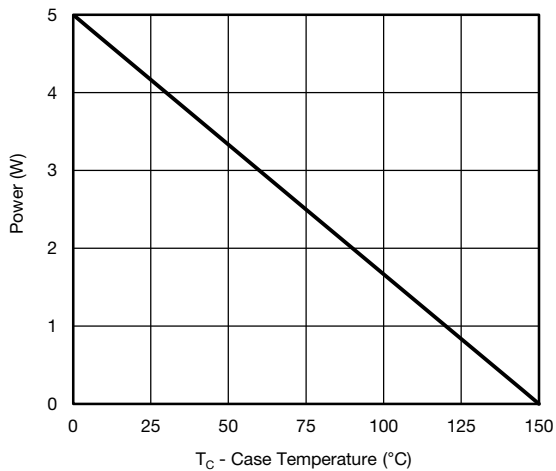
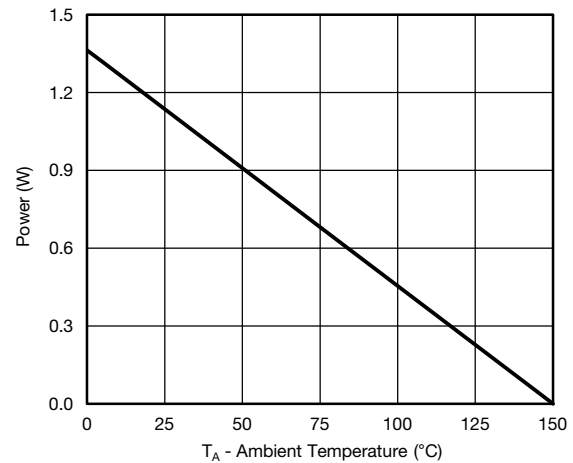
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

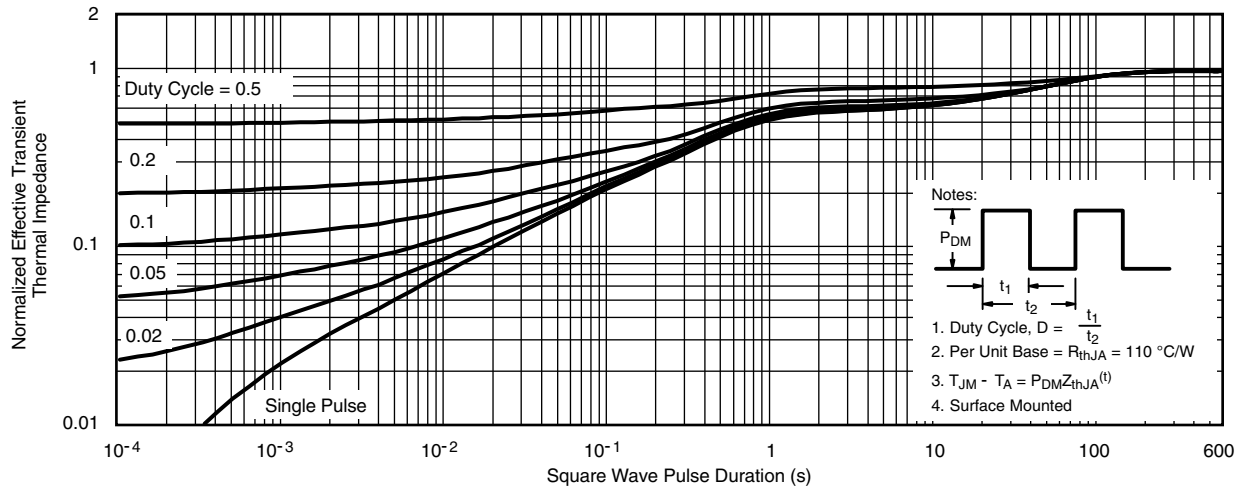
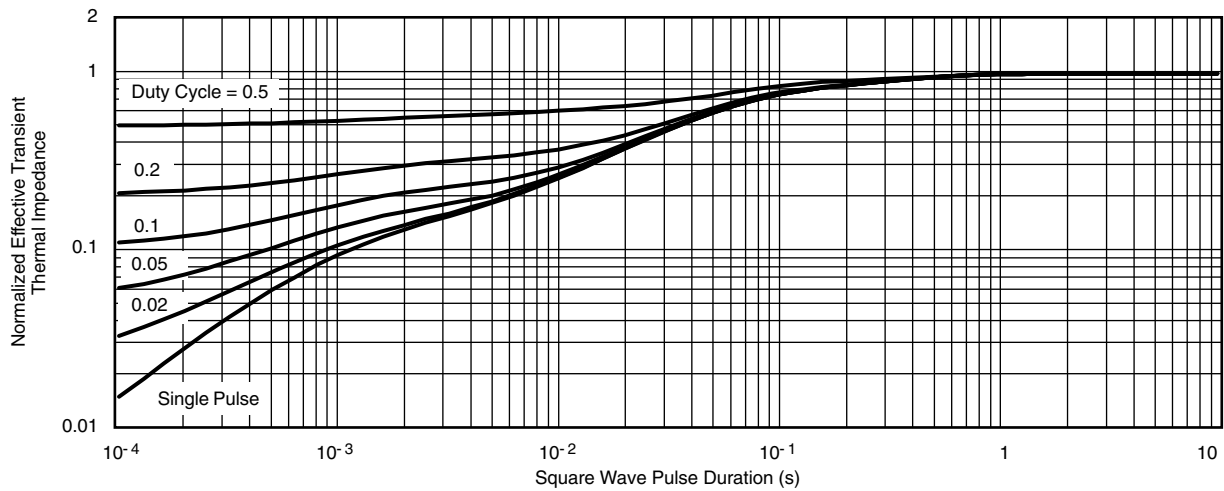
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

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

Safe Operating Area

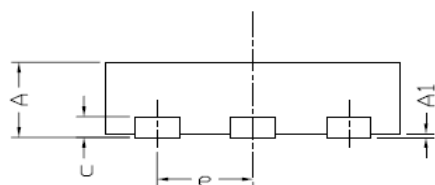
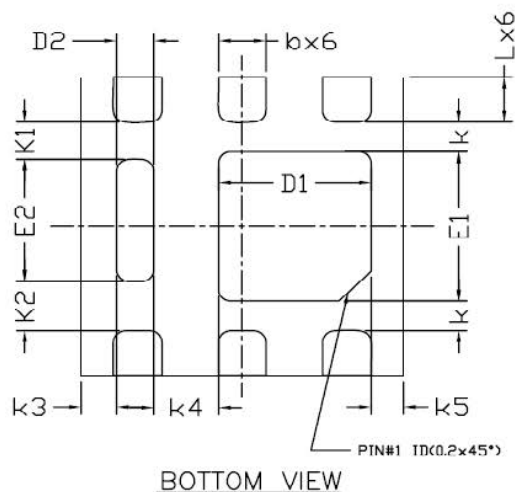
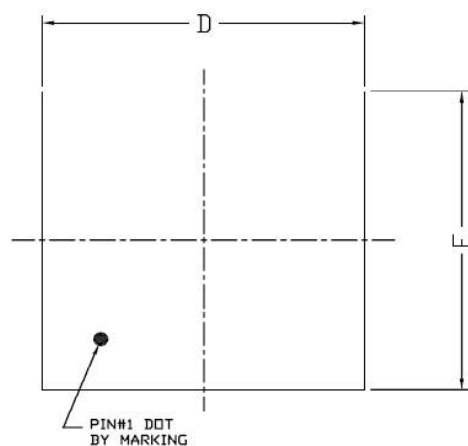
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Current Derating*

Power, Junction-to-Foot

Power Derating, Junction-to-Ambient

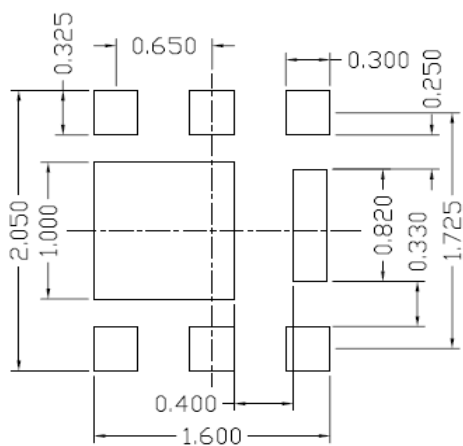
* The power dissipation P_D is based on $T_{J(max)} = 150\text{ °C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Thermal Transient Impedance, Junction-to-Foot

DFN2x2 _6L_EP1_S PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



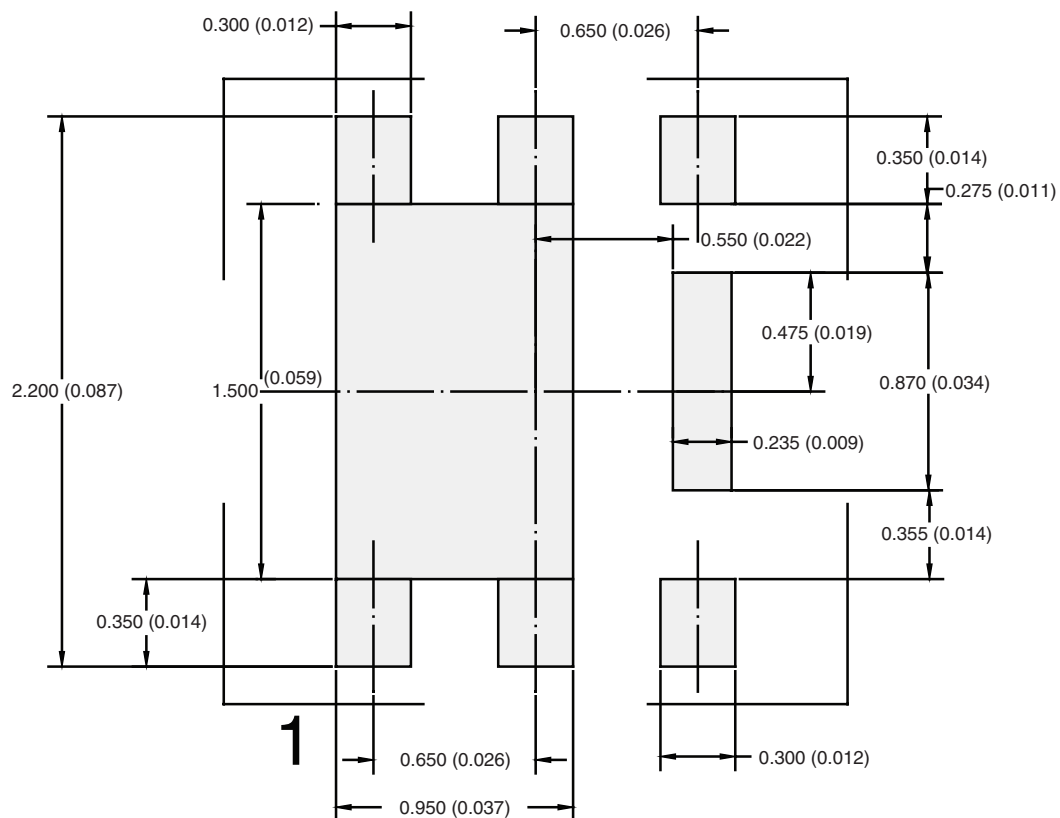
UNIT: mm

NOTE

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

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

RECOMMENDED PAD LAYOUT FOR DFN2X2



Dimensions in mm/(Inches)

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