

SI5406DC-TI-E3-VB Datasheet

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
30	0.029 at $V_{GS} = 10$ V	6.7
	0.035 at $V_{GS} = 4.5$ V	6.1

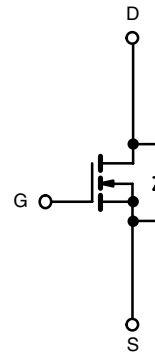
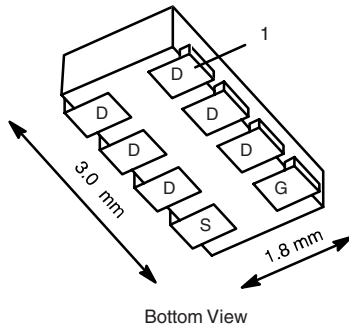
FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- Trench Power MOSFET



RoHS
COMPLIANT
HALOGEN
FREE
Available

DFN 3x2



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted¹

ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted'					
Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	6.7	4.9	A
	$T_A = 85\text{ }^{\circ}\text{C}$		4.8	3.5	
Pulsed Drain Current		I_{DM}	20		
Continuous Source Current (Diode Conduction) ^a		I_S	2.1	1.1	
Maximum Power Dissipation ^a	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	2.5	1.3	W
	$T_A = 85\text{ }^{\circ}\text{C}$		1.3	0.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		$^{\circ}\text{C}$
Soldering Recommendations (Peak Temperature) ^{b, c}			260		

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	45	50	$^\circ\text{C/W}$
		80	95	
Maximum Junction-to-Foot (Drain)	R_{thJF}	18	22	

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

b. See Reliability Manual for profile. The DFN3X2 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

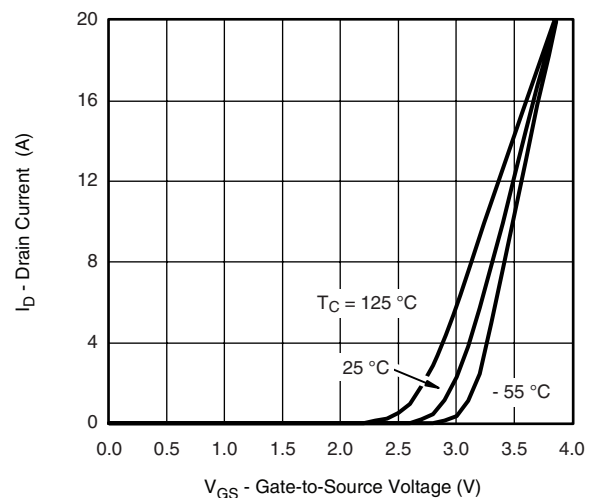
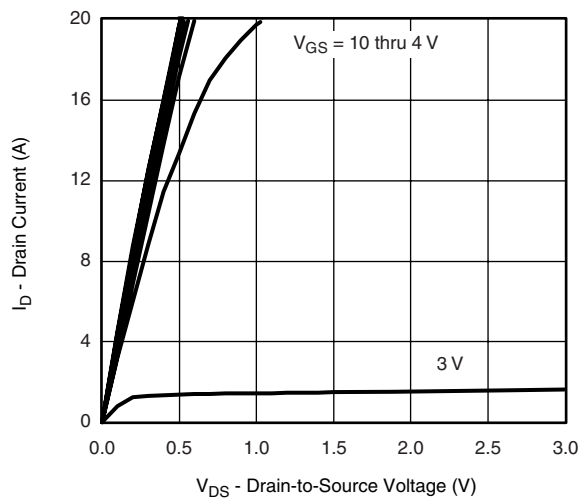
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1.0		3.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30 V, V_{GS} = 0 V$			1	μA
		$V_{DS} = 30 V, V_{GS} = 0 V, T_J = 85^\circ C$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5 V, V_{GS} = 10 V$	20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10 V, I_D = 4.9 A$		0.029		Ω
		$V_{GS} = 4.5 V, I_D = 4.4 A$		0.035		
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10 V, I_D = 4.9 A$		19		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 1.1 A, V_{GS} = 0 V$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 15 V, V_{GS} = 10 V, I_D = 4.9 A$		10	20	nC
Gate-Source Charge	Q_{gs}			1.9		
Gate-Drain Charge	Q_{gd}			1.6		
Gate Resistance	R_g	$f = 1 MHz$		14		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15 V, R_L = 15 \Omega$ $I_D \cong 1 A, V_{GEN} = 10 V, R_g = 6 \Omega$		10	15	ns
Rise Time	t_r			10	15	
Turn-Off Delay Time	$t_{d(off)}$			27	40	
Fall Time	t_f			10	15	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.1 A, di/dt = 100 A/\mu s$		20	60	

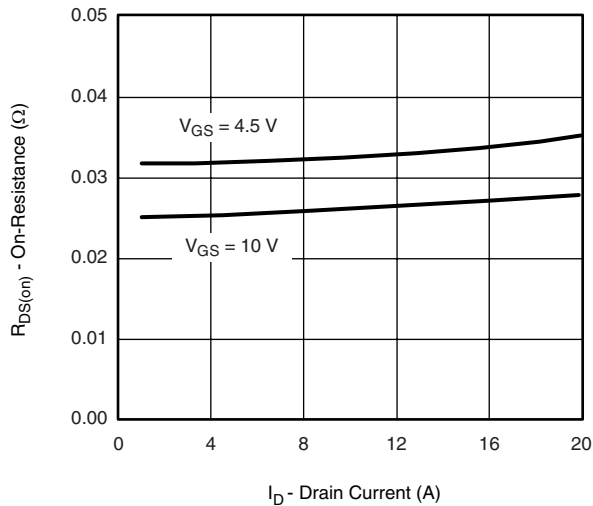
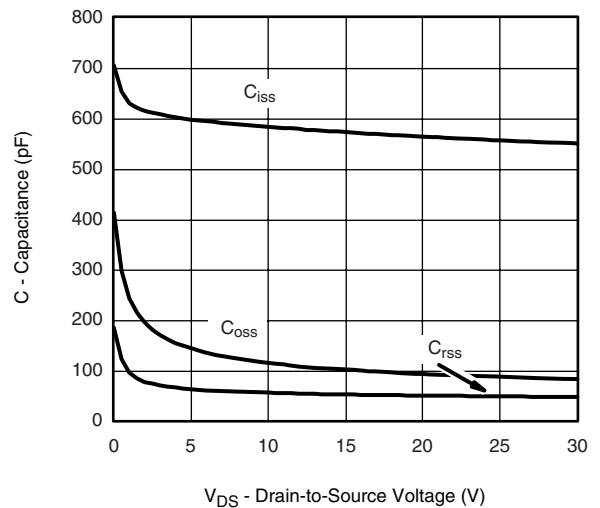
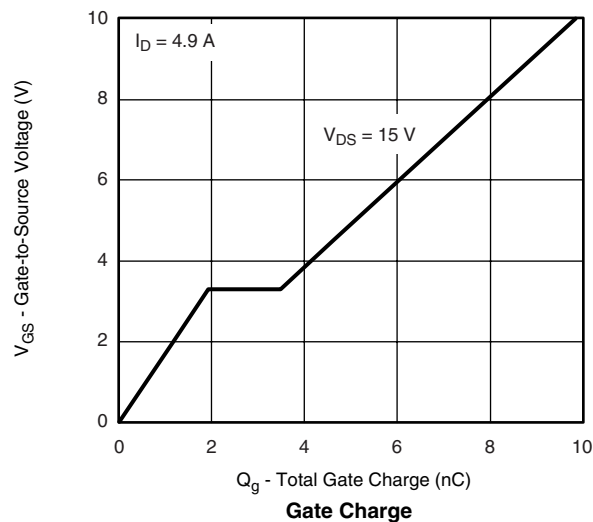
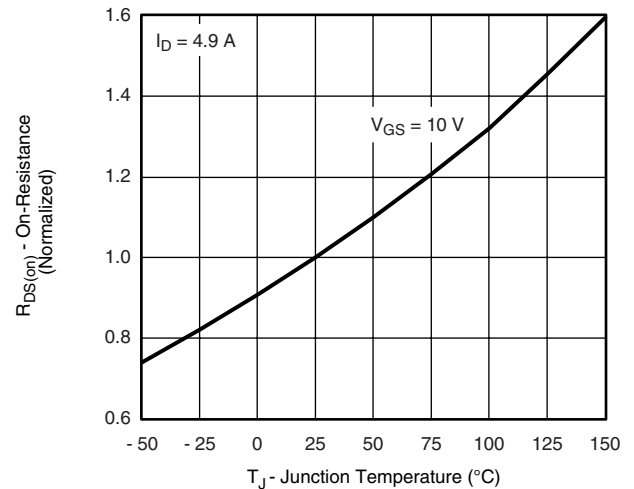
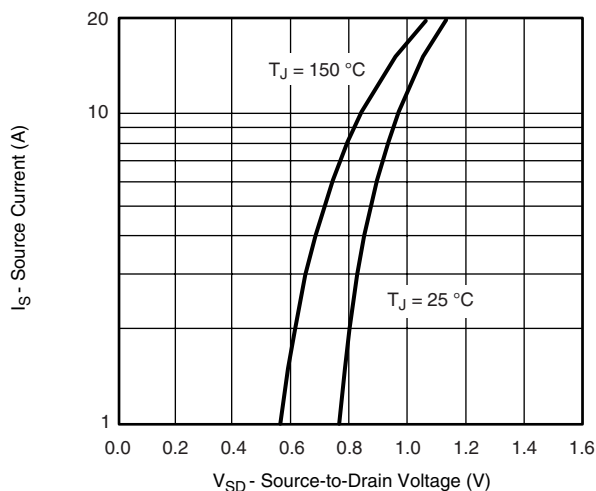
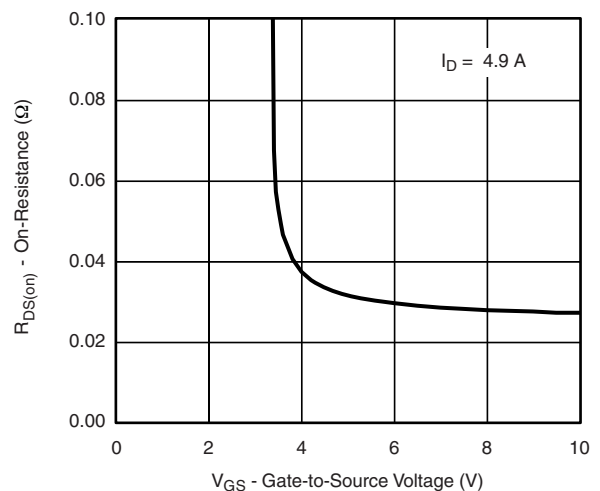
Notes:

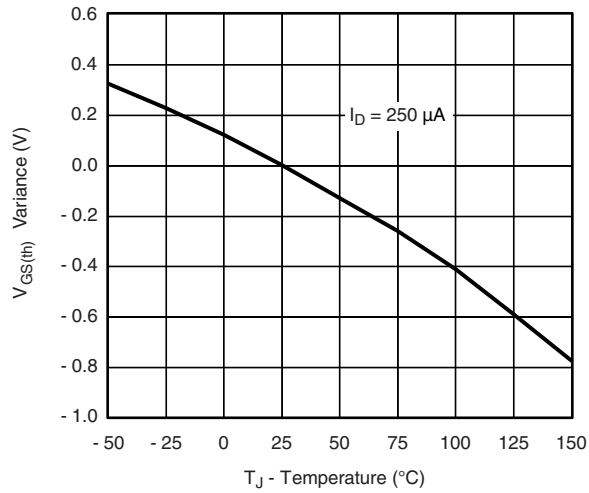
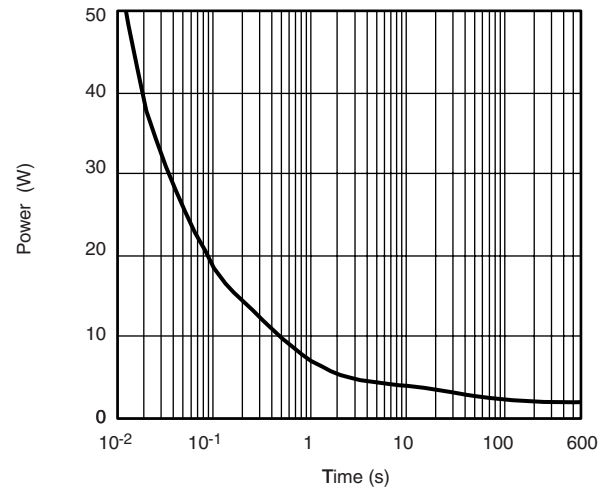
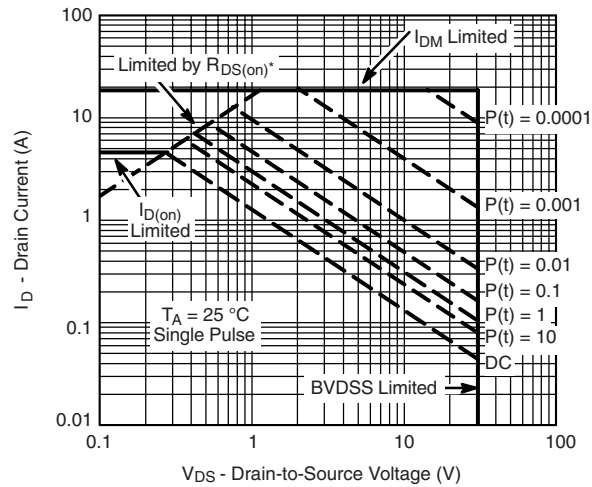
a. Pulse test; pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

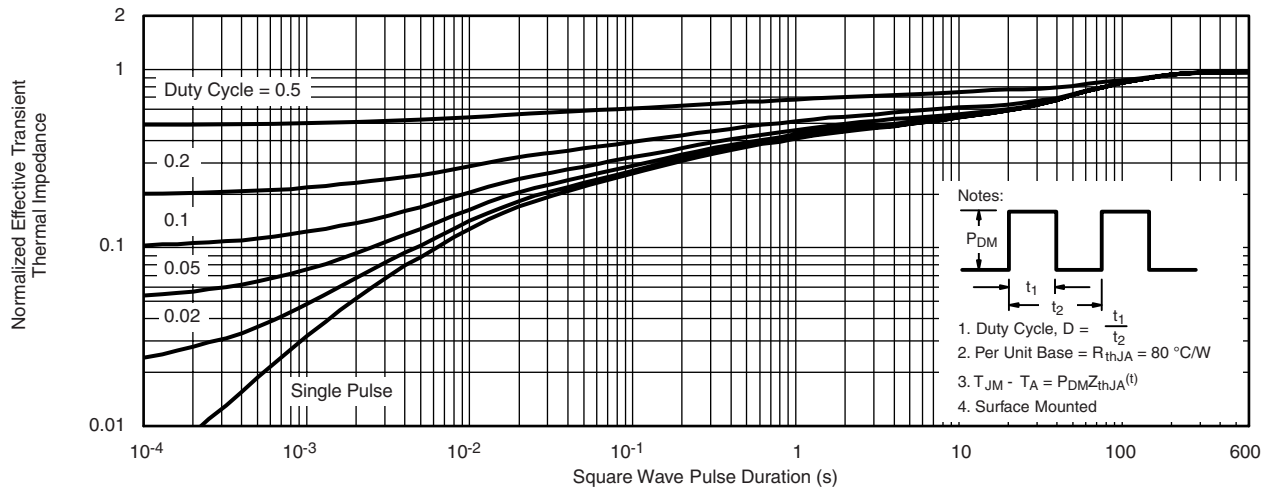
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS $T_J = 25^\circ C$, unless otherwise noted

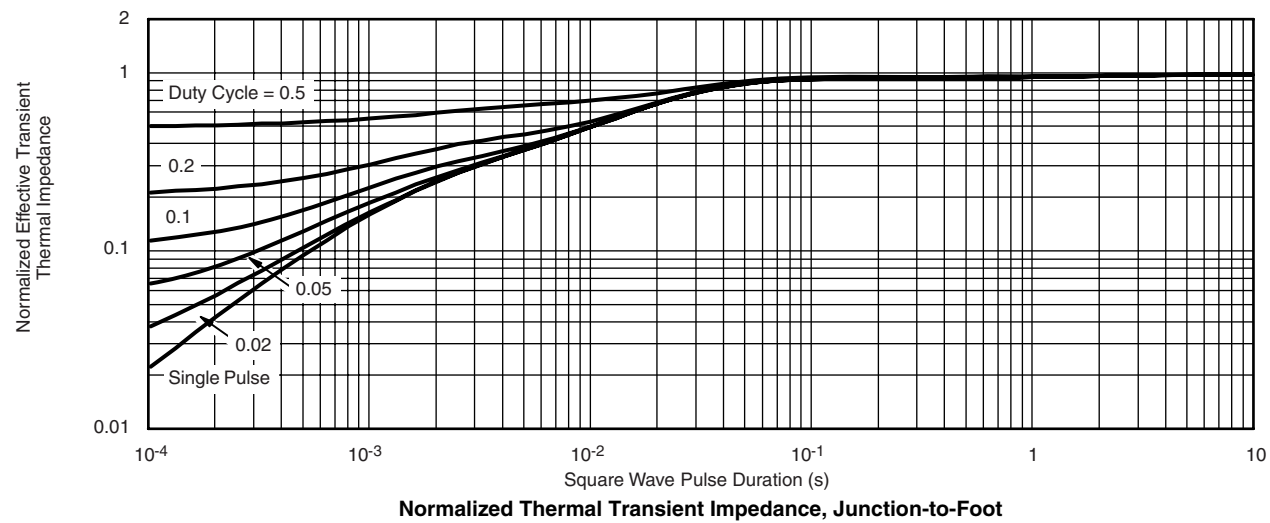
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Threshold Voltage

Single Pulse Power


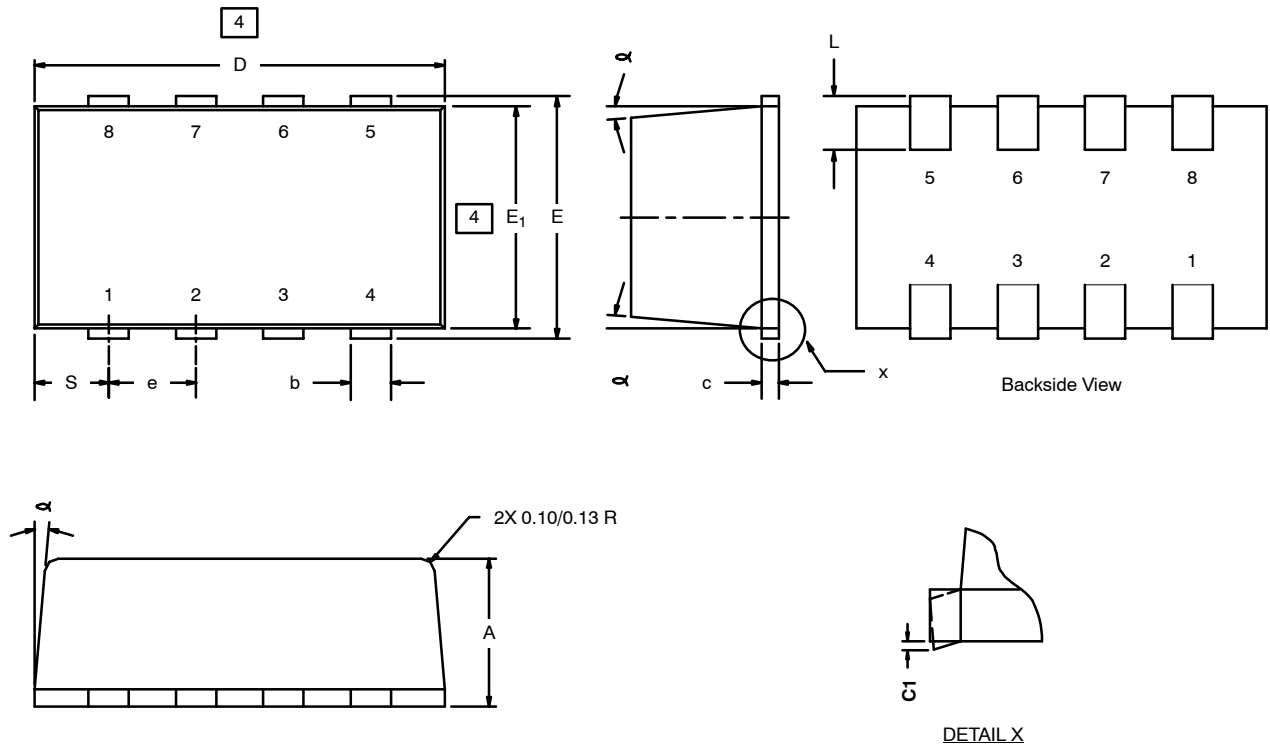
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

Normalized Thermal Transient Impedance, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



DFN 3x2

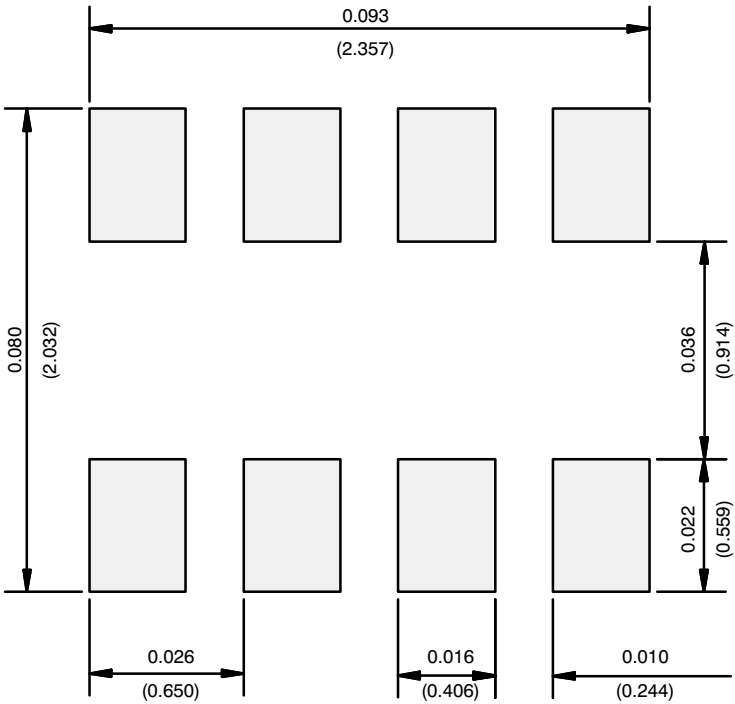


NOTES:

1. All dimensions are in millimeters.
2. Mold gate burrs shall not exceed 0.13 mm per side.
3. Leadframe to molded body offset is horizontal and vertical shall not exceed 0.08 mm.
4. Dimensions exclusive of mold gate burrs.
5. No mold flash allowed on the top and bottom lead surface.

	MILLIMETERS			INCHES		
Dim	Min	Nom	Max	Min	Nom	Max
A	1.00	–	1.10	0.039	–	0.043
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.1	0.15	0.20	0.004	0.006	0.008
c1	0	–	0.038	0	–	0.0015
D	2.95	3.05	3.10	0.116	0.120	0.122
E	1.825	1.90	1.975	0.072	0.075	0.078
E ₁	1.55	1.65	1.70	0.061	0.065	0.067
e	0.65 BSC			0.0256 BSC		
L	0.28	–	0.42	0.011	–	0.017
S	0.55 BSC			0.022 BSC		
α	5°Nom			5°Nom		
ECN: C-03528—Rev. F, 19-Jan-04 DWG: 5547						

RECOMMENDED MINIMUM PADS FOR DFN3x2



Recommended Minimum Pads
Dimensions in Inches/(mm)

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