



## N-Channel 8 V (D-S) MOSFET

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)
8	0.054 at V <sub>GS</sub> = 4.5 V	3.5	4.3 nC
	0.060 at V <sub>GS</sub> = 2.5 V	3.3	
	0.068 at V <sub>GS</sub> = 1.8 V	3.1	
	0.086 at V <sub>GS</sub> = 1.5 V	2.3	
	0.135 at V <sub>GS</sub> = 1.2 V	1.0	

### FEATURES

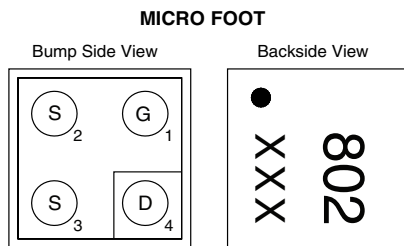
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET<sup>®</sup> Power MOSFET
- Small 0.8 mm x 0.8 mm Outline Area
- Low 0.4 mm max. profile
- Low On-Resistance
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATIONS

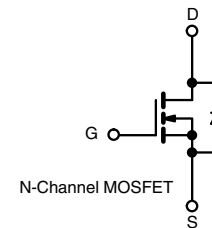
- Load Switch with Low Voltage Drop
- Load Switch for 1.2 V, 1.5 V, 1.8 V Power Lines
- Smart Phones, Tablet PCs, Portable Media Players



Device Marking: 802

xxx = Date/Lot Traceability Code

Ordering Information: Si8802DB-T2-E1 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	8	V	
Gate-Source Voltage	V <sub>GS</sub>	± 5		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>A</sub> = 25 °C	3.5 <sup>a</sup>	A
		T <sub>A</sub> = 70 °C	2.8 <sup>a</sup>	
		T <sub>A</sub> = 25 °C	3.0 <sup>b</sup>	
		T <sub>A</sub> = 70 °C	2.4 <sup>b</sup>	
Pulsed Drain Current (t = 300 μs)	I <sub>DM</sub>	15		
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>A</sub> = 25 °C	0.7 <sup>a</sup>	
		T <sub>A</sub> = 25 °C	0.4 <sup>b</sup>	
Maximum Power Dissipation	P <sub>D</sub>	T <sub>A</sub> = 25 °C	0.9 <sup>a</sup>	W
		T <sub>A</sub> = 70 °C	0.6 <sup>a</sup>	
		T <sub>A</sub> = 25 °C	0.5 <sup>b</sup>	
		T <sub>A</sub> = 70 °C	0.3 <sup>b</sup>	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	
Soldering Recommendations (Peak Temperature) <sup>c</sup>		260		

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a, d</sup>	R <sub>thJA</sub>	105	135	°C/W
Maximum Junction-to-Ambient <sup>b, e</sup>		200	260	

Notes:

- Surface mounted on 1" x 1" FR4 board with full copper, t = 5 s.
- Surface mounted on 1" x 1" FR4 board with minimum copper, t = 5 s.
- Refer to IPC/JEDEC (J-STD-020C), no manual or hand soldering.
- Maximum under steady state conditions is 185 °C/W.
- Maximum under steady state conditions is 330 °C/W.

SPECIFICATIONS ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = 250\text{ }\mu\text{A}$	8			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		7		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 2.1		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$	0.35		0.7	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 5\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 8\text{ V}$ , $V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 8\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}$ , $V_{GS} = 4.5\text{ V}$	10			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}$ , $I_D = 1\text{ A}$		0.044	0.054	$\Omega$
		$V_{GS} = 2.5\text{ V}$ , $I_D = 1\text{ A}$		0.049	0.060	
		$V_{GS} = 1.8\text{ V}$ , $I_D = 0.5\text{ A}$		0.055	0.068	
		$V_{GS} = 1.5\text{ V}$ , $I_D = 0.2\text{ A}$		0.060	0.086	
		$V_{GS} = 1.2\text{ V}$ , $I_D = 0.1\text{ A}$		0.080	0.135	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 4\text{ V}$ , $I_D = 1\text{ A}$		13		S
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 4\text{ V}$ , $V_{GS} = 4.5\text{ V}$ , $I_D = 1\text{ A}$		4.3	6.5	nC
Gate-Source Charge	$Q_{gs}$			0.44		
Gate-Drain Charge	$Q_{gd}$			0.72		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		3.5		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 4\text{ V}$ , $R_L = 4\text{ }\Omega$ $I_D \cong 1\text{ A}$ , $V_{GEN} = 4.5\text{ V}$ , $R_g = 1\text{ }\Omega$		5	10	ns
Rise Time	$t_r$			15	30	
Turn-Off Delay Time	$t_{d(off)}$			22	40	
Fall Time	$t_f$			7	15	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_A = 25\text{ }^\circ\text{C}$			0.7	A
Pulse Diode Forward Current	$I_{SM}$				15	
Body Diode Voltage	$V_{SD}$	$I_S = 1\text{ A}$ , $V_{GS} = 0\text{ V}$		0.7	1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 1\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25\text{ }^\circ\text{C}$		20	40	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			5	10	nC
Reverse Recovery Fall Time	$t_a$			14		ns
Reverse Recovery Rise Time	$t_b$			60		

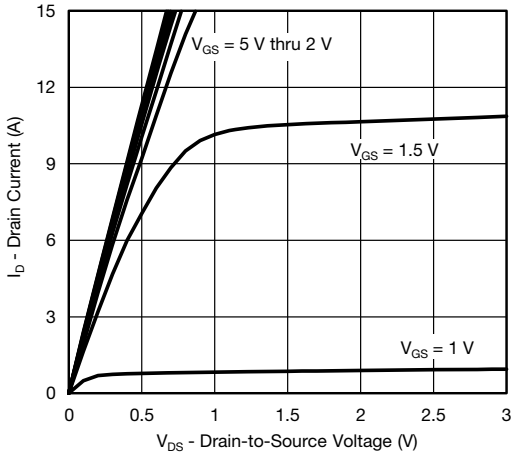
Notes:

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

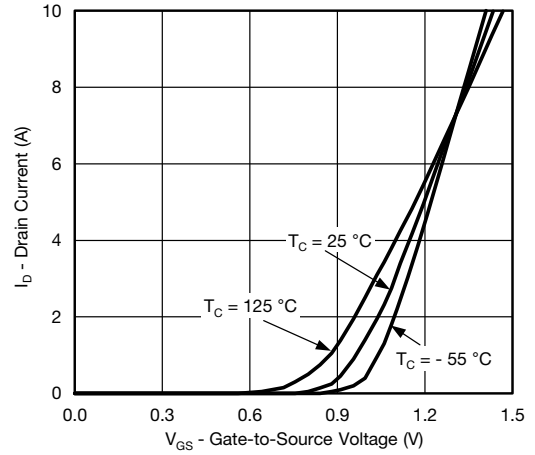
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



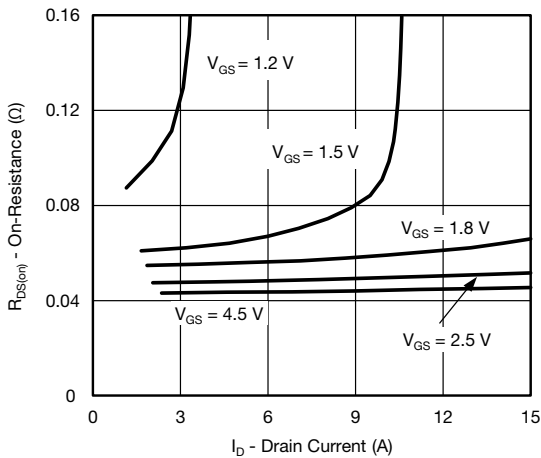
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



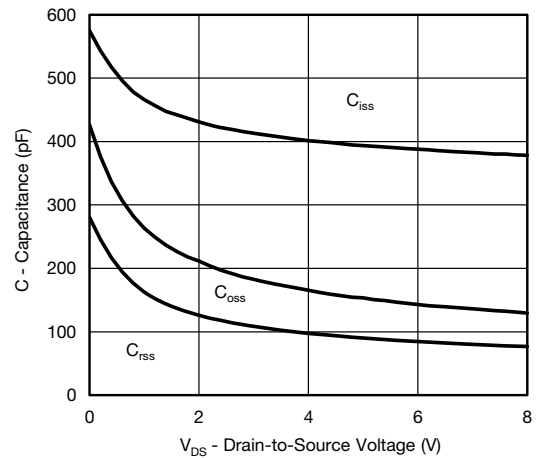
**Output Characteristics**



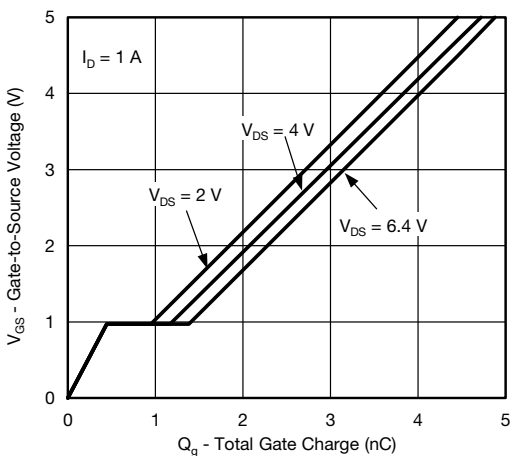
**Transfer Characteristics**



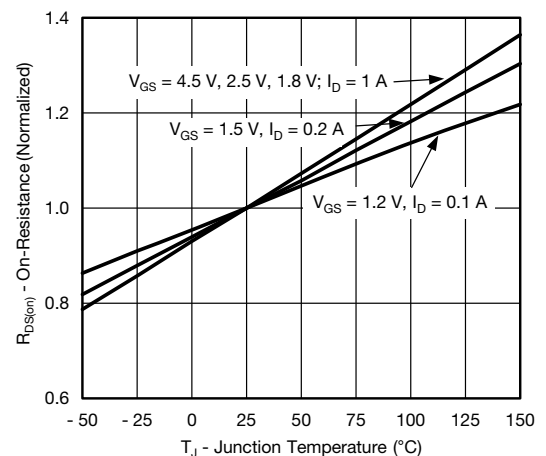
**On-Resistance vs. Drain Current**



**Capacitance**



**Gate Charge**



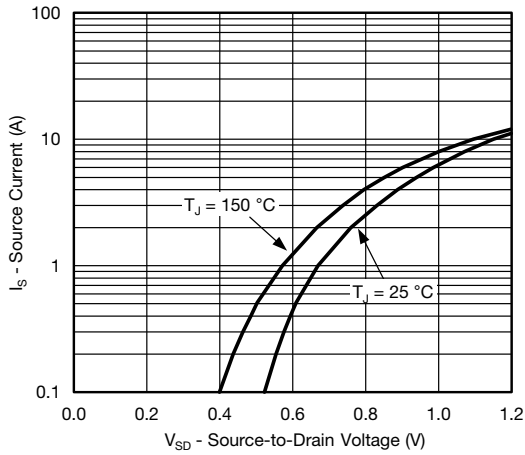
**On-Resistance vs. Junction Temperature**

# Si8802DB

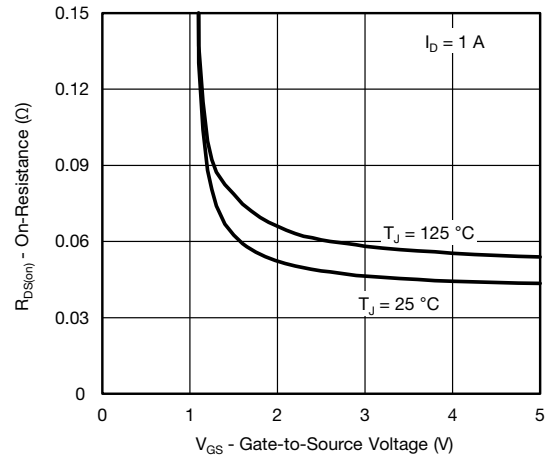
Vishay Siliconix



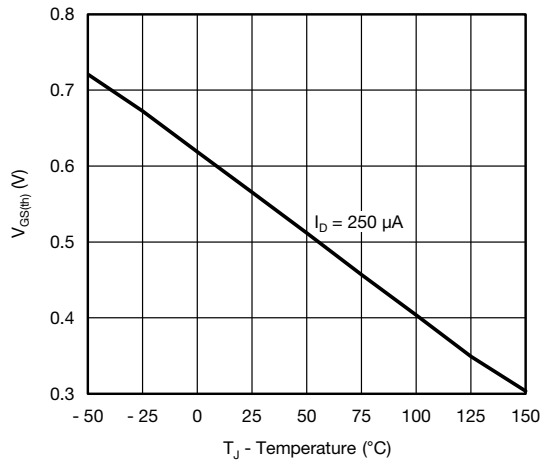
## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



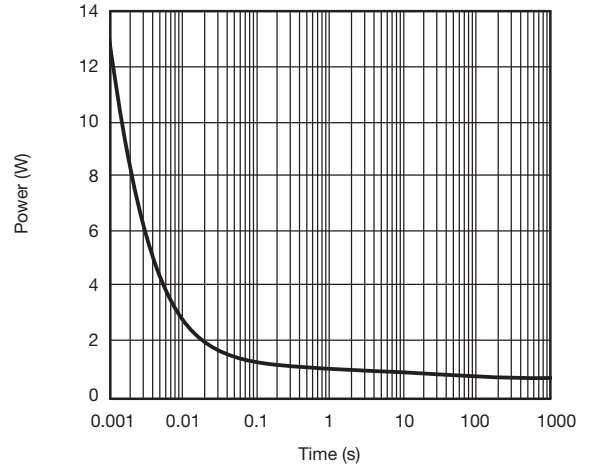
Source-Drain Diode Forward Voltage



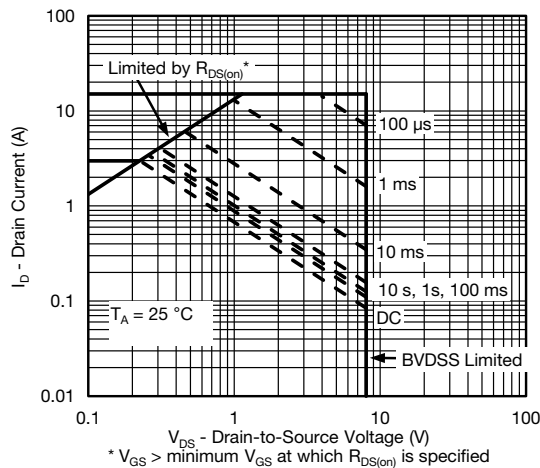
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



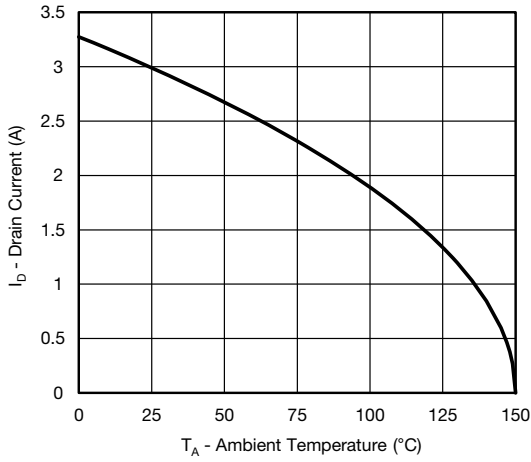
Single Pulse Power (Junction-to-Ambient)



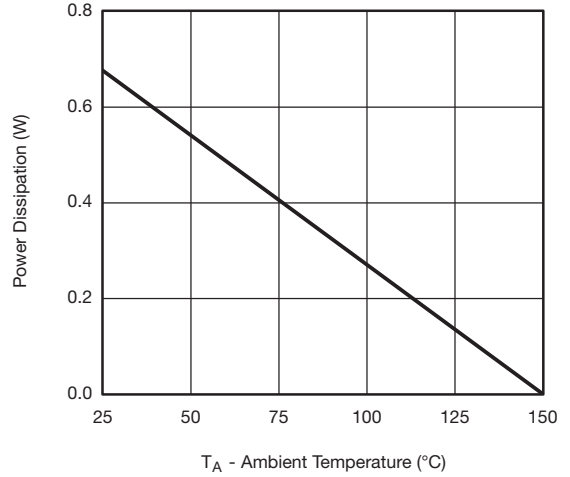
Safe Operating Area, Junction-to-Ambient



**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**Current Derating\***



**Power Derating**

Note:

When mounted on 1" x 1" FR4 with full copper.

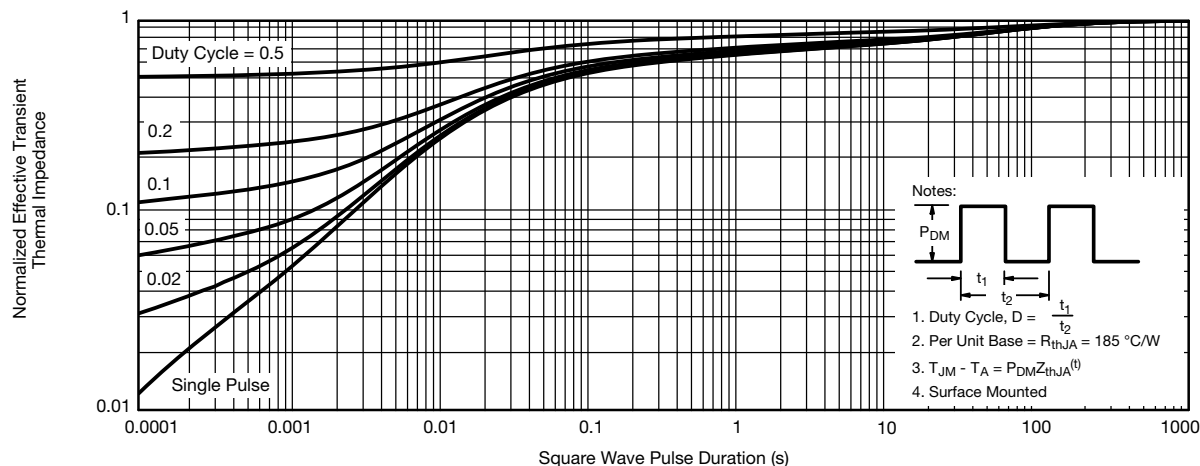
\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150\text{ °C}$ , using junction-to-ambient thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below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

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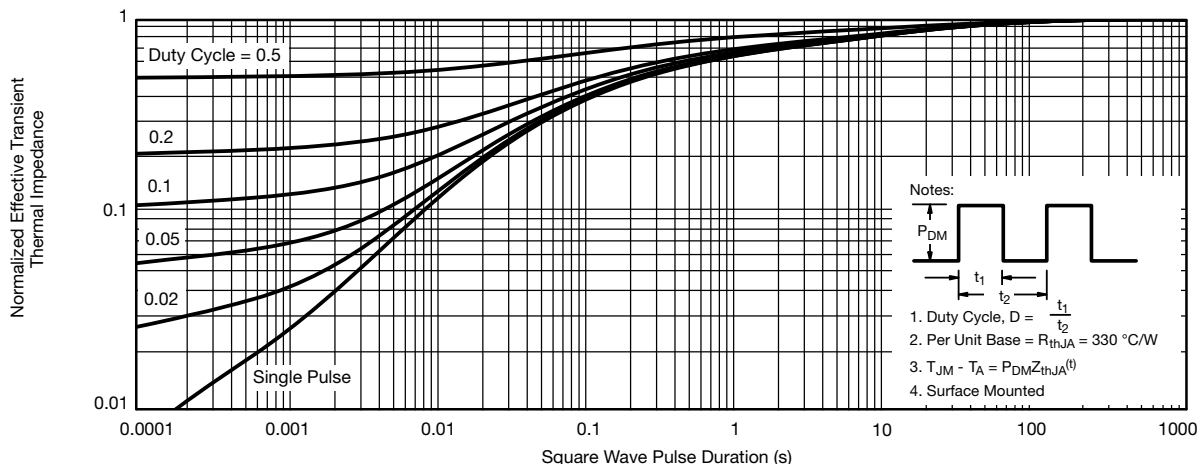
Vishay Siliconix



## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient (On 1" x 1" FR4 board with maximum copper)

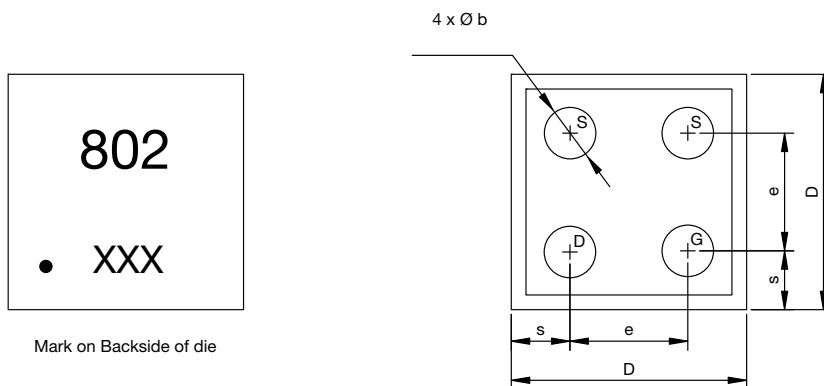


Normalized Thermal Transient Impedance, Junction-to-Ambient (On 1" x 1" FR4 board with minimum copper)



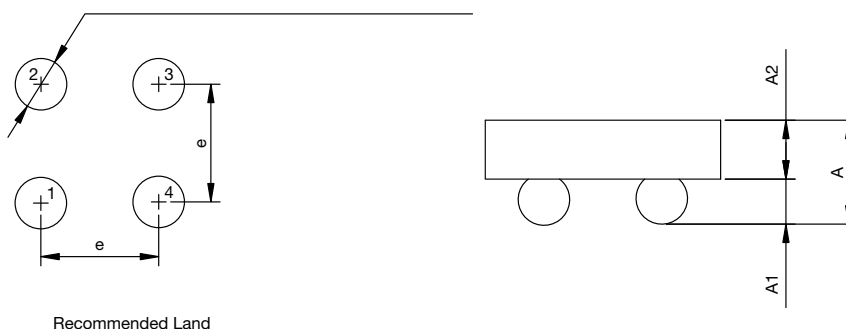
**PACKAGE OUTLINE**

**MICRO FOOT 0.8 mm x 0.8 mm: 4-BUMP (2 x 2, 0.4 mm PITCH)**



Mark on Backside of die

4 x Ø 0.205 to 0.225 Note 4  
Solder Mask ~ Ø 0.215



Recommended Land

Notes (Unless otherwise specified):

1. All dimensions are in millimeters.
2. Four (4) solder bumps are lead (Pb)-free 95.5Sn/3.5Ag/0.7Cu with diameter Ø 0.165 mm to Ø 0.185 mm.
3. Backside surface is coated with a Ti/Ni/Ag layer.
4. Non-solder mask defined copper landing pad.
5. • is location of pin 1.

Dim.	Millimeters <sup>a</sup>			Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.314	0.357	0.400	0.0124	0.0141	0.0157
A <sub>1</sub>	0.127	0.157	0.187	0.0050	0.0062	0.0074
A <sub>2</sub>	0.187	0.200	0.213	0.0074	0.0079	0.0084
b	0.165	0.175	0.185	0.0064	0.0068	0.0072
e		0.400			0.0157	
s	0.180	0.200	0.220	0.0070	0.0078	0.0086
D	0.760	0.800	0.840	0.0299	0.0314	0.0330

Notes:

- a. Use millimeters as the primary measurement.

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