

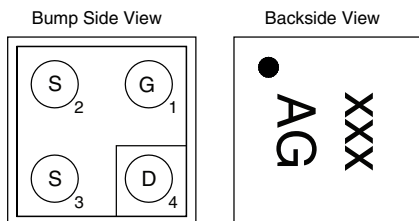


N-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A) ^a	Q_g (Typ.)
20	0.059 at $V_{GS} = 4.5$ V	3.2	6.3 nC
	0.061 at $V_{GS} = 3.7$ V	3.1	
	0.065 at $V_{GS} = 2.5$ V	3.0	
	0.085 at $V_{GS} = 1.8$ V	2.7	

MICRO FOOT



Device Marking: xxx = Date/Lot Traceability Code
 AG = Device Marking Code

Ordering Information: Si8812DB-T2-E1 (Lead (Pb)-free and Halogen-free)

FEATURES

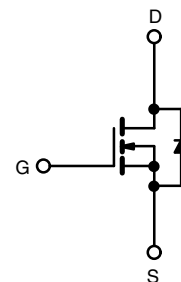
- TrenchFET[®] Power MOSFET
- Small 0.8 mm x 0.8 mm Outline Area
- Low 0.4 mm max. profile
- Low On-Resistance
- Material categorization:
 For definitions of compliance please see
www.vishay.com/doc?99912



RoHS
 COMPLIANT
 HALOGEN
 FREE

APPLICATIONS

- Load Switch with Low Voltage Drop
- Power Management
- For Smart Phones, Tablet PCs, Mobile Computing



N-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}	± 8	
Continuous Drain Current ($T_J = 150$ °C)	I_D	3.2 ^a	A
		2.6 ^a	
		2.3 ^b	
		1.8 ^b	
Pulsed Drain Current ($t = 300$ μ s)	I_{DM}	20	
Continuous Source-Drain Diode Current	I_S	0.7 ^a	
		0.4 ^b	
Maximum Power Dissipation	P_D	0.9 ^a	W
		0.6 ^a	
		0.5 ^b	
		0.3 ^b	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^c		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, d}	R_{thJA}	105	135	°C/W
Maximum Junction-to-Ambient ^{b, e}		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-020), no manual or hand soldering.
- Maximum under steady state conditions is 185 °C/W.
- Maximum under steady state conditions is 330 °C/W.

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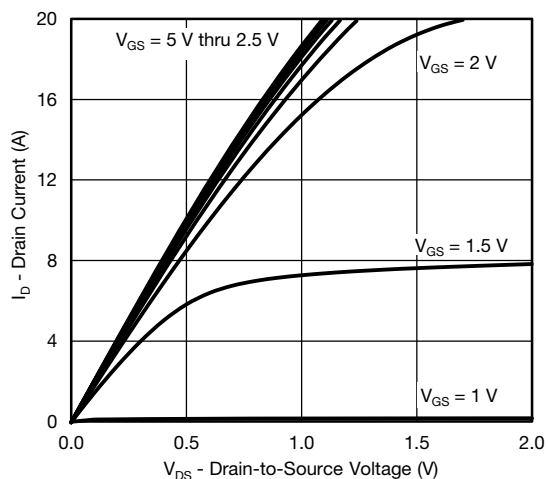
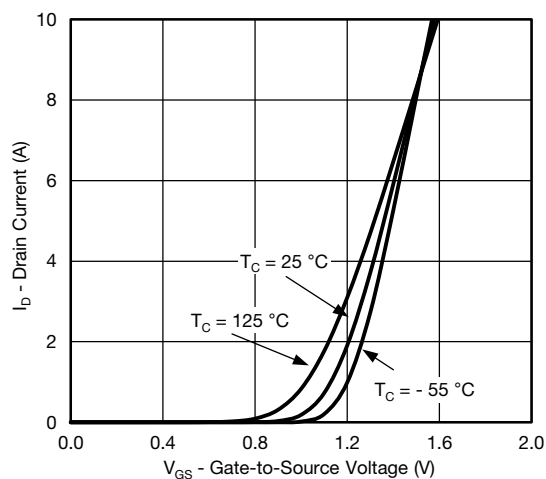
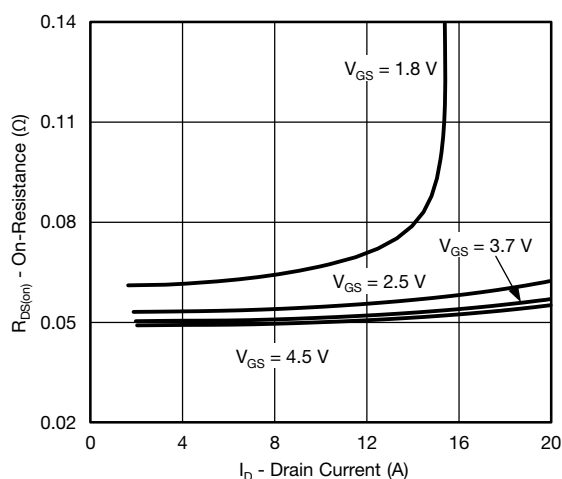
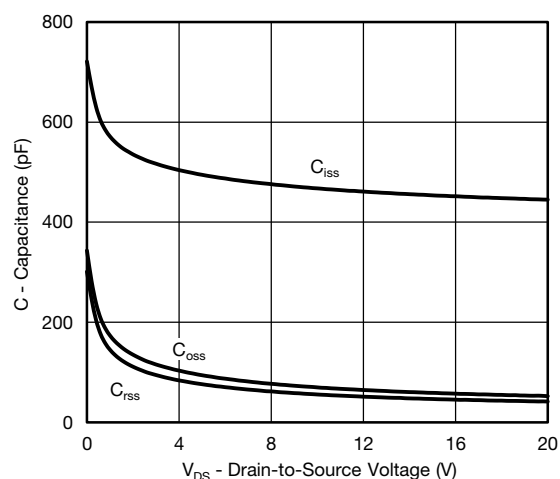
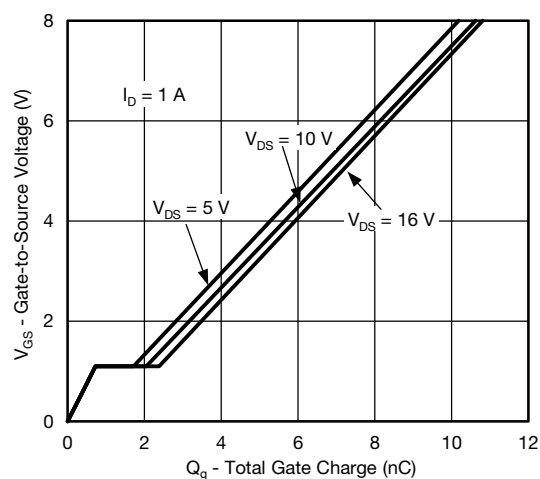
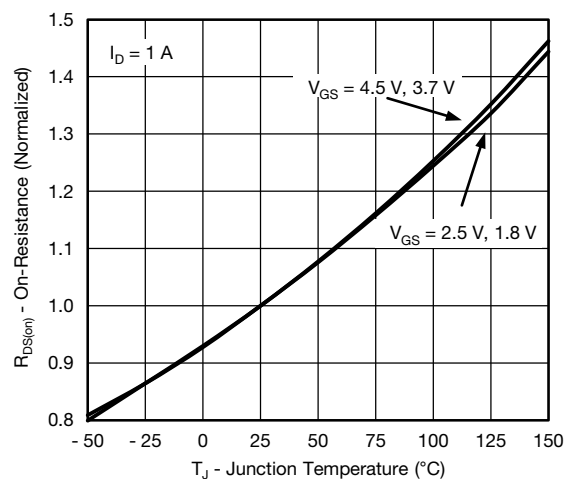
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	20			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		29		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 2.6		
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} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 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	10			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 1 A		0.048	0.059	Ω
		V _{GS} = 3.7 V, I _D = 1 A		0.049	0.061	
		V _{GS} = 2.5 V, I _D = 1 A		0.052	0.065	
		V _{GS} = 1.8 V, I _D = 0.5 A		0.060	0.085	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 1 A		12		S
Dynamic ^b						
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 8 V, I _D = 1 A		11	17	nC
Gate-Source Charge	Q _{gs}	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 1 A		6.3	10	
Gate-Drain Charge	Q _{gd}			0.8		
Gate Resistance	R _g	f = 1 MHz		6		
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 4.5 V, R _g = 1 Ω		10	20	ns
Rise Time	t _r			13	25	
Turn-Off Delay Time	t _{d(off)}			33	60	
Fall Time	t _f			10	20	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 8 V, R _g = 1 Ω		5	10	
Rise Time	t _r			11	20	
Turn-Off Delay Time	t _{d(off)}			25	50	
Fall Time	t _f			10	20	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _A = 25 °C			0.7	A
Pulse Diode Forward Current	I _{SM}				20	
Body Diode Voltage	V _{SD}	I _S = 1 A, V _{GS} = 0 V		0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 1 A, dI/dt = 100 A/μs, T _J = 25 °C		10	20	ns
Body Diode Reverse Recovery Charge	Q _{rr}			3	10	nC
Reverse Recovery Fall Time	t _a			6		ns
Reverse Recovery Rise Time	t _b			4		

Notes:

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

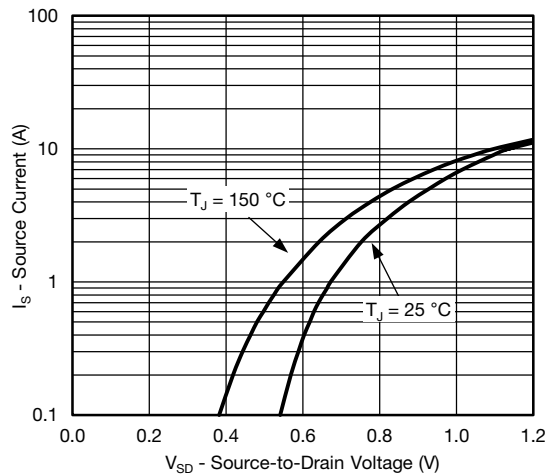
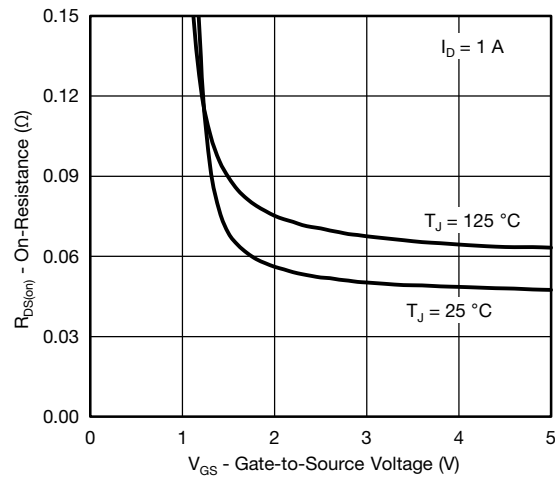
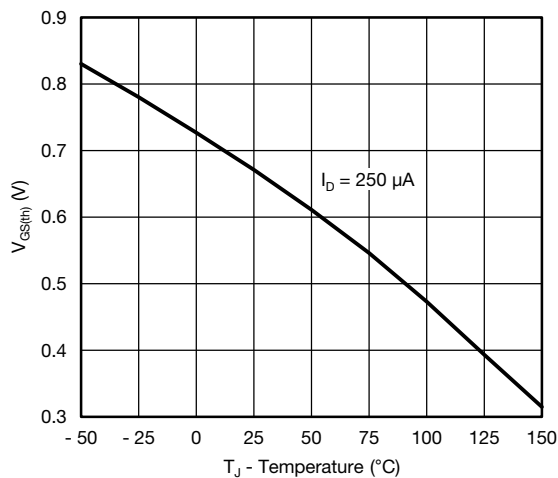
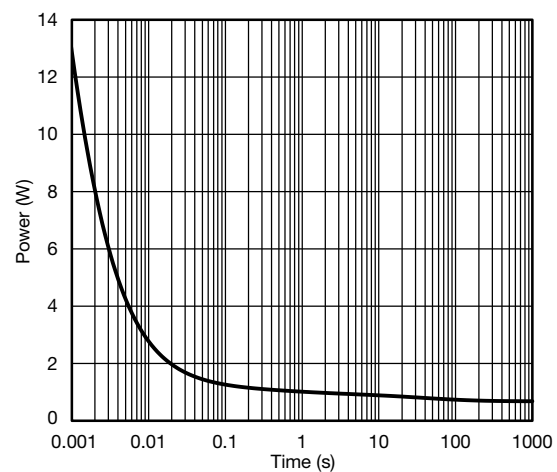
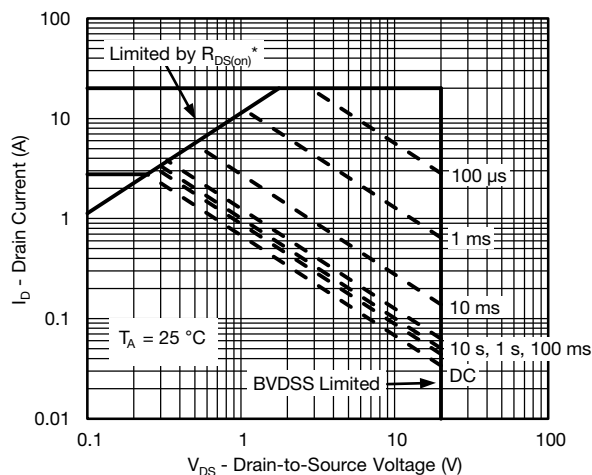
b. Guaranteed by design, not subject to production testing.

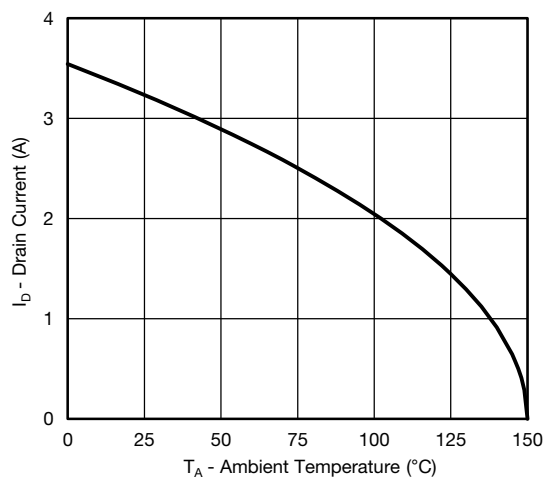
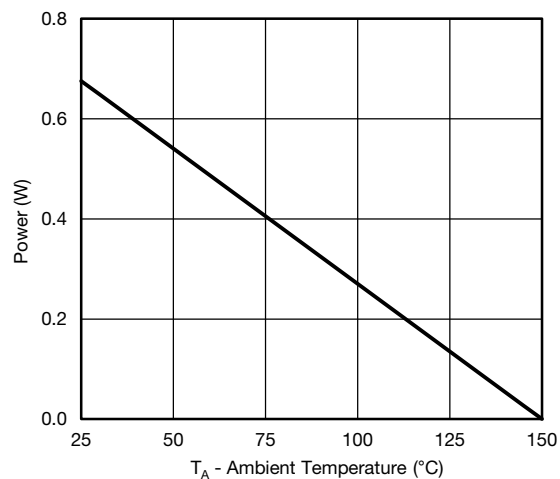
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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**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

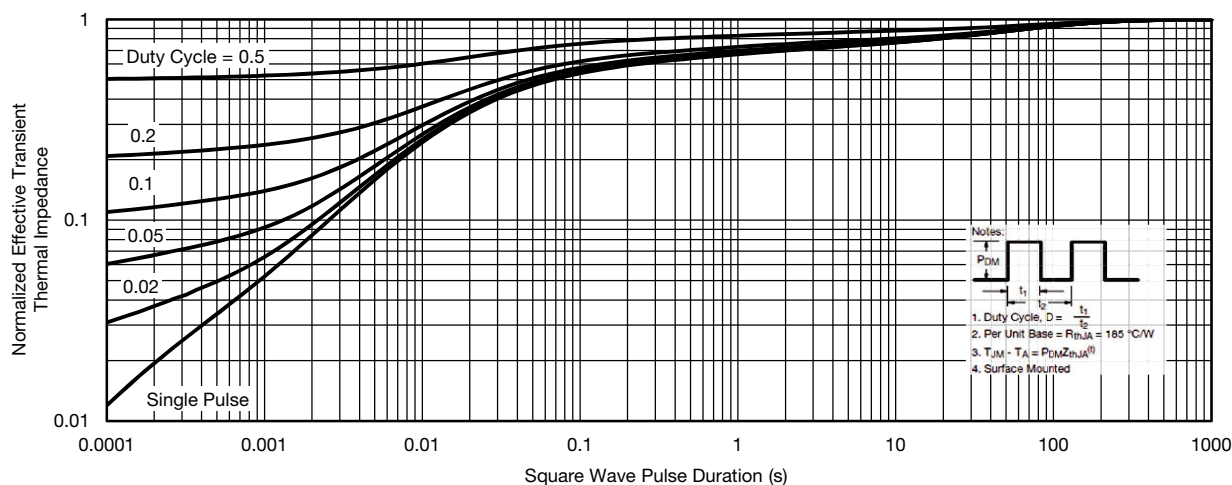
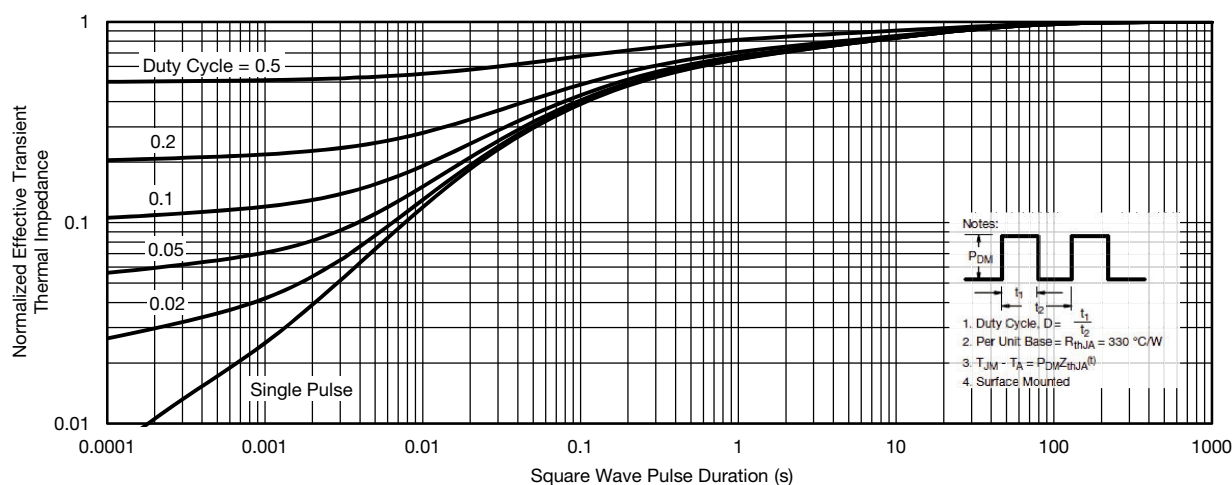
Note:

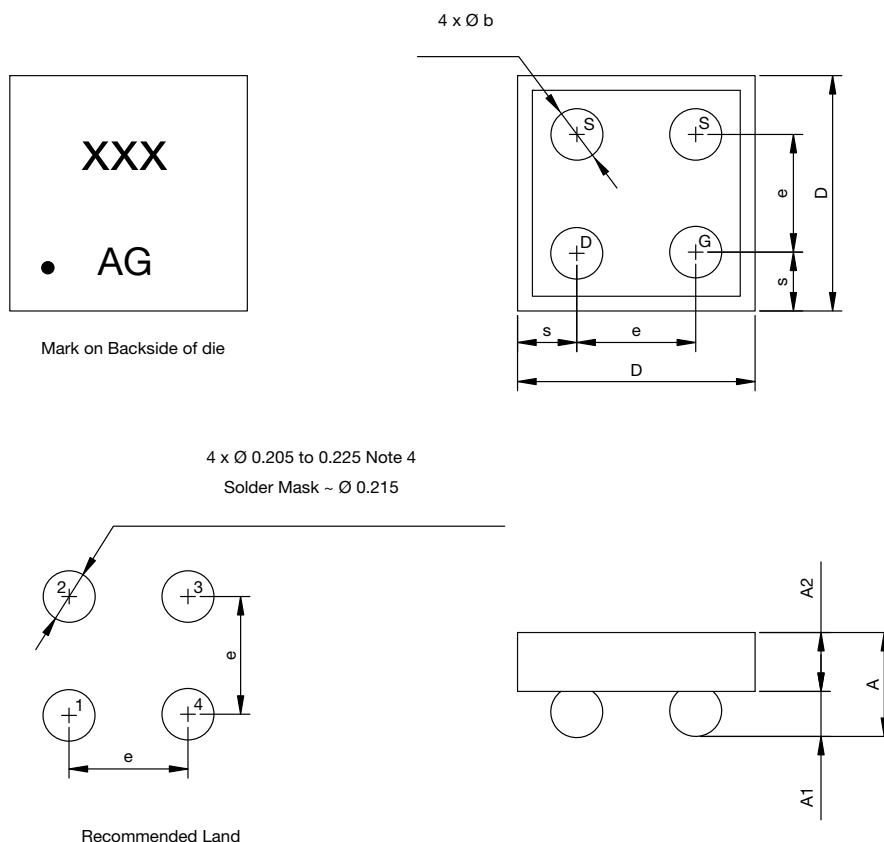
When mounted on 1" x 1" FR4 with full copper.

* The power dissipation P_D is based on $T_{J(max)} = 150$ °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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**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)


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 $\varnothing$ 0.165 mm to $\varnothing$ 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 ^a			Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.314	0.357	0.400	0.0124	0.0141	0.0157
A₁	0.127	0.157	0.187	0.0050	0.0062	0.0074
A₂	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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