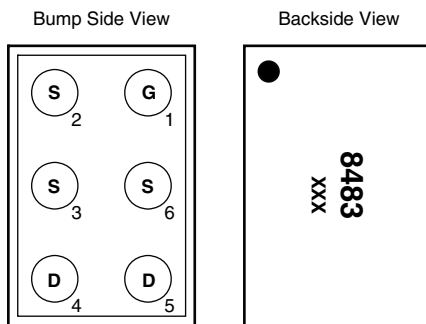


## P-Channel 12 V (D-S) MOSFET

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) (Max.)	I <sub>D</sub> (A) <sup>e</sup>	Q <sub>g</sub> (Typ.)
- 12	0.026 at V <sub>GS</sub> = - 4.5 V	- 16	21 nC
	0.035 at V <sub>GS</sub> = - 2.5 V	- 16	
	0.055 at V <sub>GS</sub> = - 1.8 V	- 13	
	0.092 at V <sub>GS</sub> = - 1.5 V	- 2.5	

### MICRO FOOT



Device Marking: 8483  
xxx = Date/Lot Traceability Code

Ordering Information: Si8483DB-T2-E1 (Lead (Pb)-free and Halogen-free)

### FEATURES

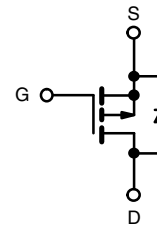
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET<sup>®</sup> Power MOSFET
- Ultra-small 1.5 mm x 1 mm Maximum Outline
- Ultra-thin 0.59 Maximum Height
- Compliant to RoHS Directive 2002/95/EC



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

### APPLICATIONS

- Load Switch for Smart Phones, Tablet PCs, and Mobile Computing
  - Low Voltage Drop
  - Low Power Consumption
  - Increased Battery Life



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C, unless otherwise noted)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	- 12	V	
Gate-Source Voltage	V <sub>GS</sub>	± 10		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	- 16	A
		T <sub>C</sub> = 70 °C	- 15	
		T <sub>A</sub> = 25 °C	- 8.7 <sup>a, b</sup>	
		T <sub>A</sub> = 70 °C	- 7 <sup>a, b</sup>	
Pulsed Drain Current (t = 300 μs)	I <sub>DM</sub>	- 25		
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C	- 10.8	
		T <sub>A</sub> = 25 °C	- 2.3 <sup>a, b</sup>	
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	13	W
		T <sub>C</sub> = 70 °C	8.4	
		T <sub>A</sub> = 25 °C	2.77 <sup>a, b</sup>	
		T <sub>A</sub> = 70 °C	1.77 <sup>a, b</sup>	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	
Package Reflow Conditions <sup>c</sup>	IR/Convection	260		

Notes:

- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Refer to IPC/JEDEC (J-STD-020), no manual or hand soldering.
- Case is defined as the top surface of the package.
- Based on T<sub>C</sub> = 25 °C.

**THERMAL RESISTANCE RATINGS**

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a, b</sup>	$R_{thJA}$	37	45	°C/W
Maximum Junction-to-Case (Drain)	Steady State $R_{thJC}$	7	9.5	

## Notes:

- a. Surface mounted on 1" x 1" FR4 board.  
b. Maximum under steady state conditions is 85 °C/W.  
c. Case is defined as top surface of the package.

**SPECIFICATIONS** ( $T_J = 25\text{ °C}$ , unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0, I_D = -250\ \mu\text{A}$	-12			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\ \mu\text{A}$		-7		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		2.8			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	-0.4		-0.8	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 10\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -12\ \text{V}, V_{GS} = 0\ \text{V}$			-1	$\mu\text{A}$
		$V_{DS} = -12\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 70\text{ °C}$			-10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\ \text{V}, V_{GS} = -4.5\ \text{V}$	-5			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5\ \text{V}, I_D = -1.5\ \text{A}$		0.022	0.026	$\Omega$
		$V_{GS} = -2.5\ \text{V}, I_D = -1.5\ \text{A}$		0.028	0.035	
		$V_{GS} = -1.8\ \text{V}, I_D = -1\ \text{A}$		0.040	0.055	
		$V_{GS} = -1.5\ \text{V}, I_D = -0.5\ \text{A}$		0.056	0.092	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -6\ \text{V}, I_D = -1.5\ \text{A}$		10		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -6\ \text{V}, V_{GS} = 0\ \text{V}, f = 1\ \text{MHz}$		1840		pF
Output Capacitance	$C_{oss}$		410			
Reverse Transfer Capacitance	$C_{rss}$		380			
Total Gate Charge	$Q_g$	$V_{DS} = -6\ \text{V}, V_{GS} = -10\ \text{V}, I_D = -1.5\ \text{A}$		43	65	nC
				21	32	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -6\ \text{V}, V_{GS} = -4.5\ \text{V}, I_D = -1.5\ \text{A}$		2.1		
Gate-Drain Charge	$Q_{gd}$		4.8			
Gate Resistance	$R_g$	$V_{GS} = -0.1\ \text{V}, f = 1\ \text{MHz}$		2.2		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\ \text{V}, R_L = 4\ \Omega$ $I_D \equiv -1.5\ \text{A}, V_{GEN} = -4.5\ \text{V}, R_g = 1\ \Omega$		20	40	ns
Rise Time	$t_r$		25	50		
Turn-Off Delay Time	$t_{d(off)}$		40	80		
Fall Time	$t_f$		10	20		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\ \text{V}, R_L = 4\ \Omega$ $I_D \equiv -1.5\ \text{A}, V_{GEN} = -10\ \text{V}, R_g = 1\ \Omega$		10	20	
Rise Time	$t_r$		10	20		
Turn-Off Delay Time	$t_{d(off)}$		40	80		
Fall Time	$t_f$		10	20		



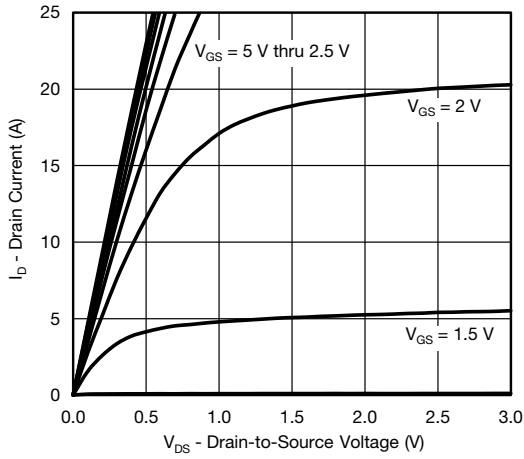
SPECIFICATIONS ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			- 10.8	A
Pulse Diode Forward Current	$I_{SM}$				- 25	
Body Diode Voltage	$V_{SD}$	$I_S = - 1.5\text{ A}, V_{GS} = 0$		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = - 1.5\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		30	60	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			12	25	nC
Reverse Recovery Fall Time	$t_a$			11.5		ns
Reverse Recovery Rise Time	$t_b$			18.5		

Notes:

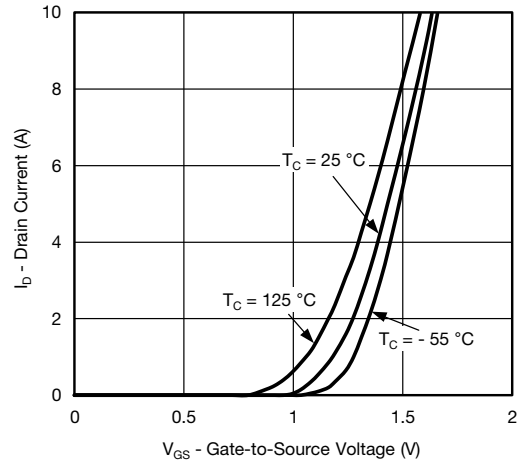
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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.

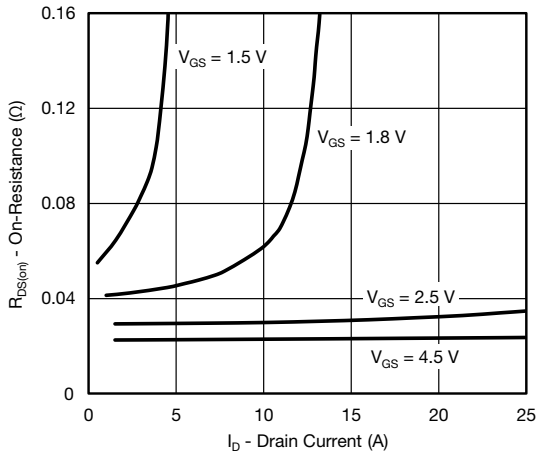
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



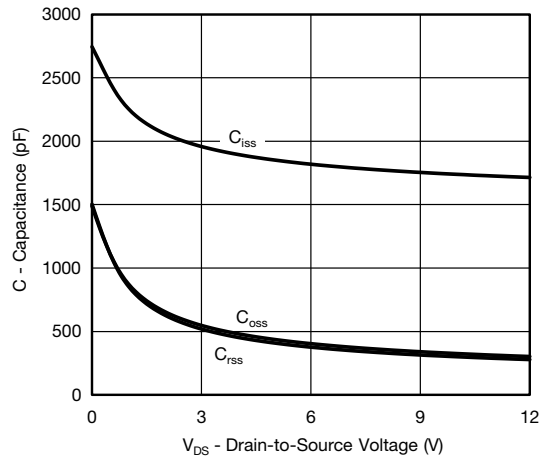
**Output Characteristics**



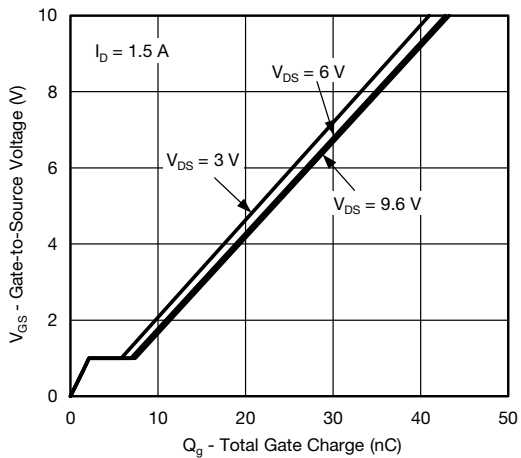
**Transfer Characteristics**



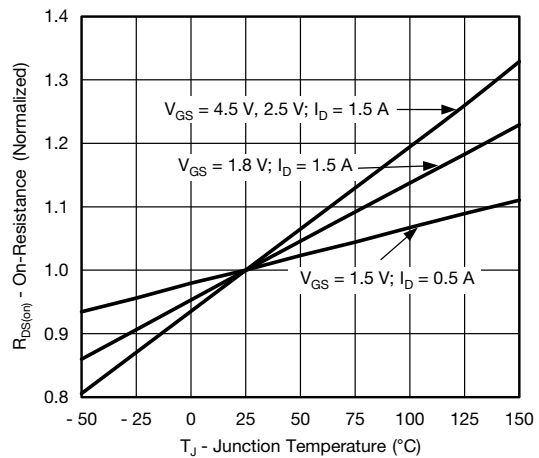
**On-Resistance vs. Drain Current and Gate Voltage**



**Capacitance**

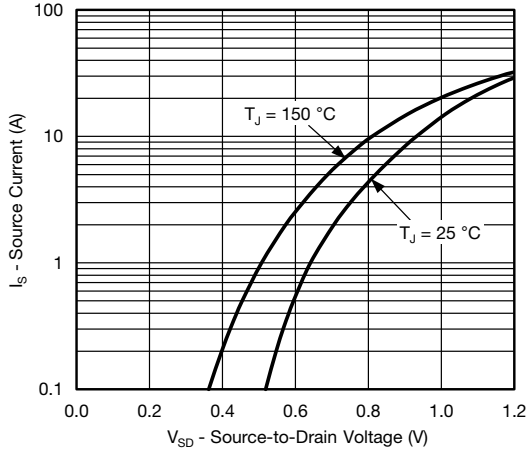


**Gate Charge**

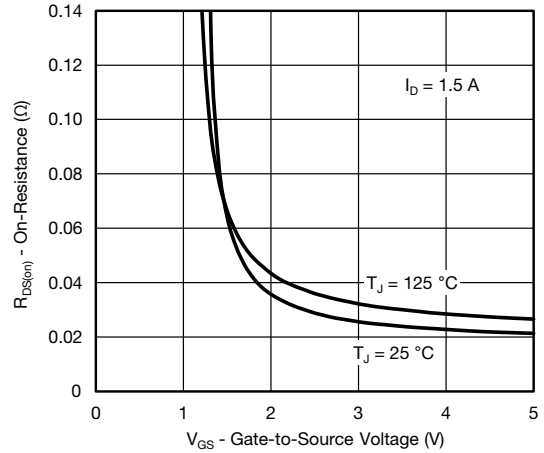


**On-Resistance vs. Junction Temperature**

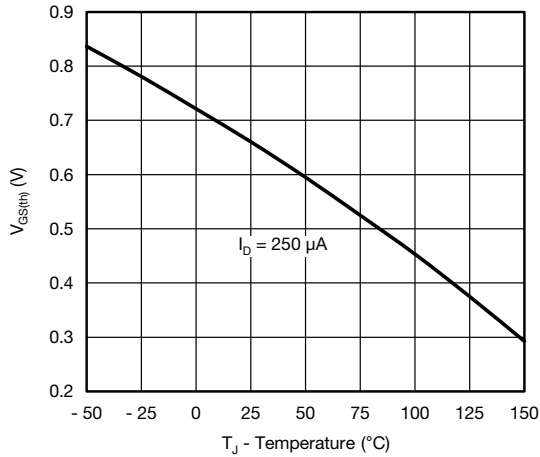
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



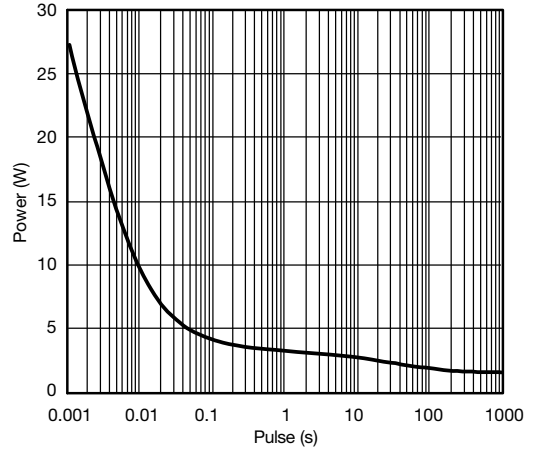
**Source-Drain Diode Forward Voltage**



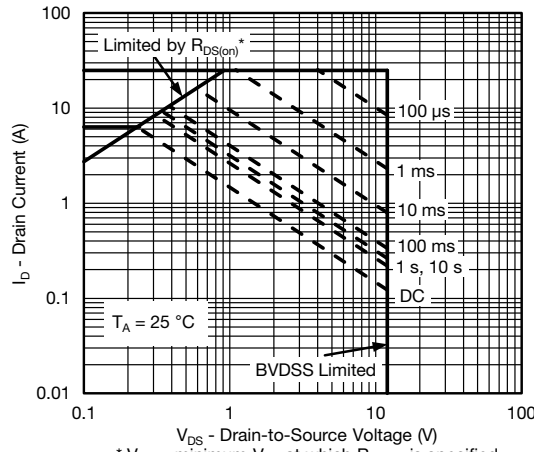
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**

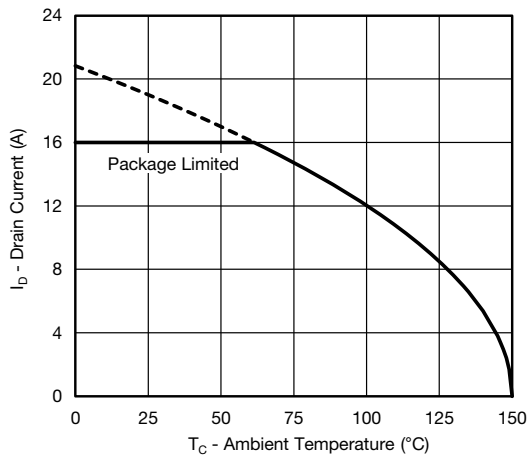


**Single Pulse Power, Junction-to-Ambient**

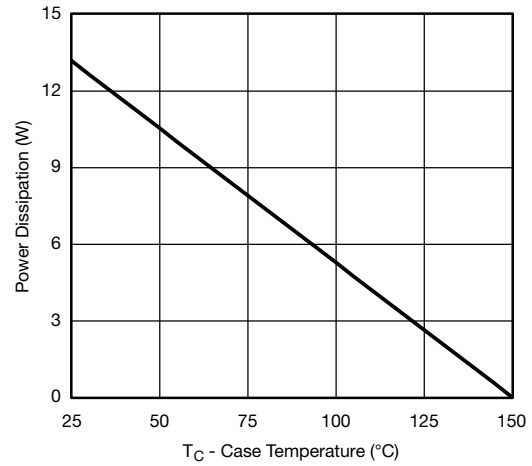


**Safe Operating Area, Junction-to-Ambient**

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



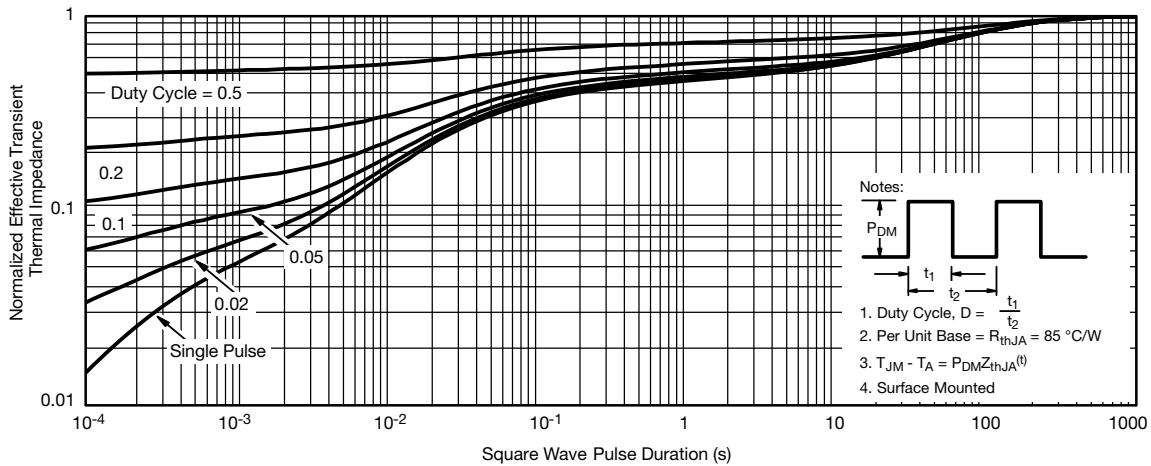
**Current Derating\***



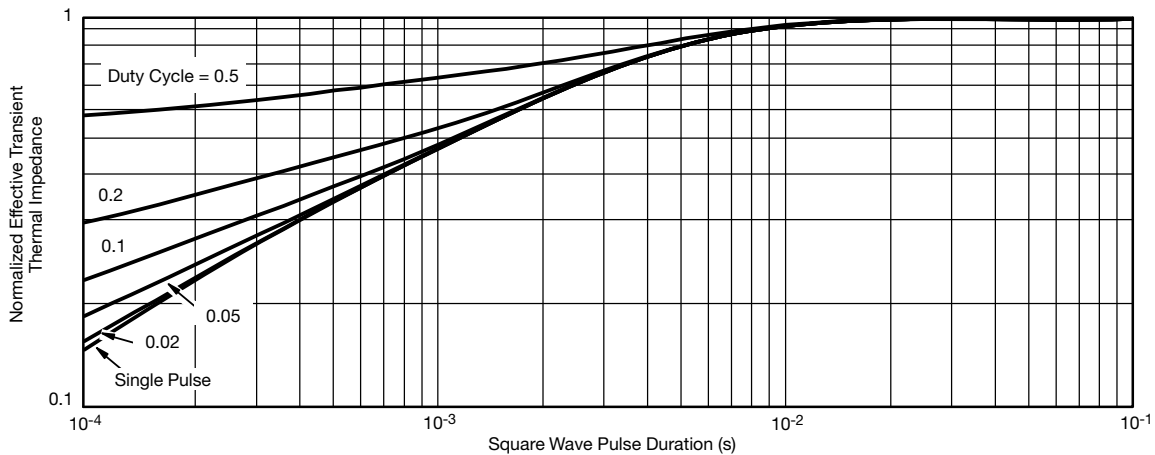
**Power Derating**

\* 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)



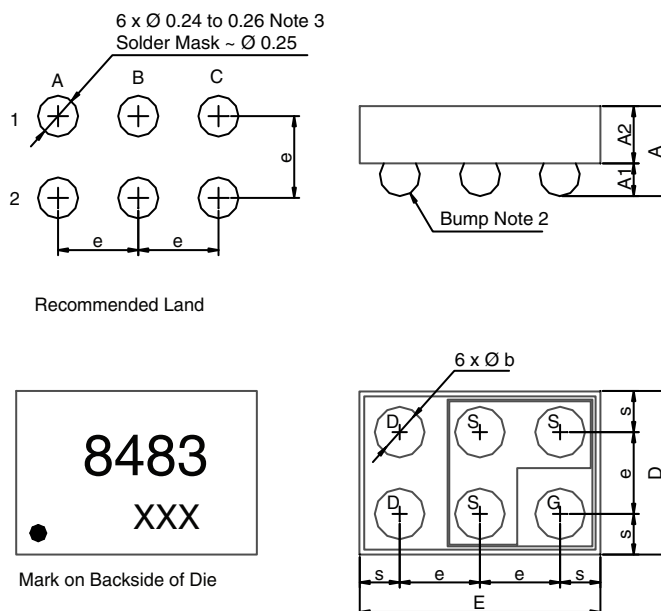
**Normalized Thermal Transient Impedance, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Case**

## PACKAGE OUTLINE

## MICRO FOOT: 6-BUMP (2 x 3, 0.5 mm PITCH)



Notes (unless otherwise specified):

1. All dimensions are in millimeters.
2. Six (6) solder bumps are lead (Pb)-free 95.5Sn, 3.8Ag, 0.7Cu with diameter  $\varnothing$  0.30 mm to  $\varnothing$  0.32 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	0.510	0.575	0.590	0.0201	0.0224	0.0232
A <sub>1</sub>	0.220	0.250	0.280	0.0087	0.0098	0.0110
A <sub>2</sub>	0.290	0.300	0.310	0.0114	0.0118	0.0122
b	0.300	0.310	0.320	0.0118	0.0122	0.0126
e	0.500			0.0197		
s	0.230	0.250	0.270	0.0090	0.0098	0.0106
D	0.920	0.960	1.000	0.0362	0.0378	0.0394
E	1.420	1.460	1.500	0.0559	0.0575	0.0591

Note:

- a. Use millimeters as the primary measurement.

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