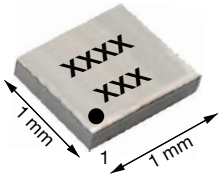
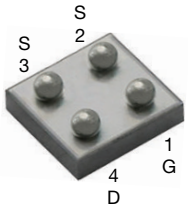
P-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A) [a, e]	Q_g (TYP.)
-20	0.044 at V_{GS} = -10 V	-5.4	9.5 nC
	0.054 at V_{GS} = -4.5 V	-4.9	
	0.082 at V_{GS} = -2.5 V	-3.9	

MICRO FOOT® 1 x 1



Backside View



Bump Side View

Marking Code: xxxx = 8489
xxx = Date / lot traceability code

Ordering Information:
Si8489EDB-T2-E1 (lead (Pb)-free and halogen-free)

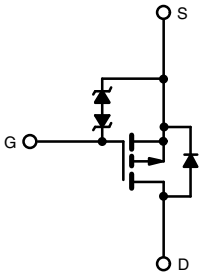
FEATURES

- TrenchFET® power MOSFET
- Small 1 mm x 1 mm max. outline area
- Low 0.548 mm max. profile
- Typical ESD protection 2500 V HBM
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- Load switches and charger switches
- Battery management
- For smart phones and tablet PCs



P-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}	± 12	
Continuous Drain Current (T_J = 150 °C)	T_A = 25 °C	I_D	-5.4 [a]	A
	T_A = 70 °C		-4.3 [a]	
	T_A = 25 °C		-3.6 [b]	
	T_A = 70 °C		-2.8 [b]	
Pulsed Drain Current (t = 300 µs)		I_{DM}	-20	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	-1.5 [a]	
	T_A = 25 °C		-0.65 [b]	
Maximum Power Dissipation	T_A = 25 °C	P_D	1.8 [a]	W
	T_A = 70 °C		1.1 [a]	
	T_A = 25 °C		0.78 [b]	
	T_A = 70 °C		0.5 [b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Package Reflow Conditions [c]	VPR		260	
	IR/Convection		260	

Notes

a. Surface mounted on 1" x 1" FR4 board with full copper, t = 10 s.
b. Surface mounted on 1" x 1" FR4 board with minimum copper, t = 10 s.
c. Refer to IPC/JEDEC® (J-STD-020), no manual or hand soldering.
d. In this document, any reference to case represents the body of the MICRO FOOT device and foot is the bump.
e. Based on T_A = 25 °C.

For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

THERMAL RESISTANCE RATINGS					
PARAMETER		**SYMBOL**	**TYPICAL**	**MAXIMUM**	**UNIT**
Maximum Junction-to-Ambient [a, b]	t = 10 s	R_{thJA}	55	70	°C/W
Maximum Junction-to-Ambient [c, d]	t = 10 s		125	160	

Notes

a. Surface mounted on 1" x 1" FR4 board with full copper.
b. Maximum under steady state conditions is 100 °C/W.
c. Surface mounted on 1" x 1" FR4 board with minimum copper.
d. Maximum under steady state conditions is 190 °C/W.

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	$\Delta V_{DS}/T_J$	I_D = -250 µA	-	-15	-	mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		-	2.4	-	
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 µA	-0.5	-	-1.2	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 4.5 V	-	-	± 1	µA
		V_{DS} = 0 V, V_{GS} = ± 12 V	-	-	± 5	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -20 V, V_{GS} = 0 V	-	-	-1	
		V_{DS} = -20 V, V_{GS} = 0 V, T_J = 70 °C	-	-	-10	
On-State Drain Current [a]	$I_{D(on)}$	$V_{DS} \leq$ -5 V, V_{GS} = -4.5 V	-10	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = -10 V, I_D = -1.5 A	-	0.036	0.044	Ω
		V_{GS} = -4.5 V, I_D = -1.5 A	-	0.045	0.054	
		V_{GS} = -2.5 V, I_D = -1 A	-	0.065	0.082	
Forward Transconductance [a]	g_{fs}	V_{DS} = -10 V, I_D = -1.5 A	-	10	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS} = -10 V, V_{GS} = 0 V, f = 1 MHz	-	765	-	pF
Output Capacitance	C_{oss}		-	125	-	
Reverse Transfer Capacitance	C_{rss}		-	115	-	
Total Gate Charge	Q_g	V_{DS} = -10 V, V_{GS} = -10 V, I_D = -1.5 A	-	17.5	27	nC
		V_{DS} = -10 V, V_{GS} = -4.5 V, I_D = -1.5 A	-	8.6	13	
Gate-Source Charge	Q_{gs}		-	1.5	-	
Gate-Drain Charge	Q_{gd}		-	2.6	-	
Gate Resistance	R_g	V_{GS} = -0.1 V, f = 1 MHz	-	14	-	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -10 V, R_L = 10 Ω $I_D \cong$ -1.5 A, V_{GEN} = -4.5 V, R_g = 1 Ω	-	27	50	ns
Rise Time	t_r		-	20	40	
Turn-Off Delay Time	$t_{d(off)}$		-	50	100	
Fall Time	t_f		-	25	50	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -10 V, R_L = 10 Ω $I_D \cong$ -1.5 A, V_{GEN} = -8 V, R_g = 1 Ω	-	6	15	
Rise Time	t_r		-	8	20	
Turn-Off Delay Time	$t_{d(off)}$		-	68	130	
Fall Time	t_f		-	28	60	

For technical questions, contact: pmostechsupport@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_A = 25 °C	-	-	-1.5	A
Pulse Diode Forward Current	I_{SM}		-	-	-20	
Body Diode Voltage	V_{SD}	I_S = -1.5 A, V_{GS} = 0 V	-	-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = -1.5 A, dI/dt = 100 A/µs, T_J = 25 °C	-	25	50	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	9	20	nC
Reverse Recovery Fall Time	t_a		-	15	-	ns
Reverse Recovery Rise Time	t_b		-	10	-	

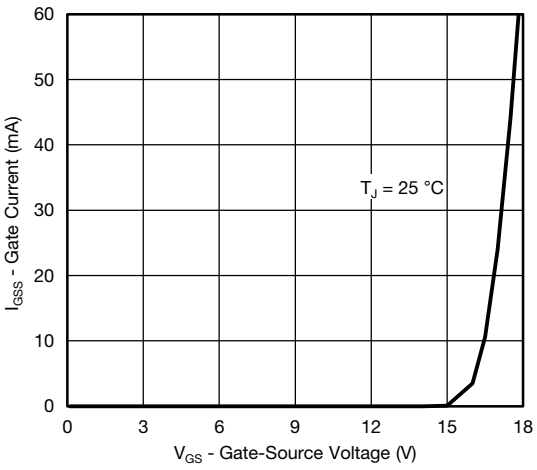
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

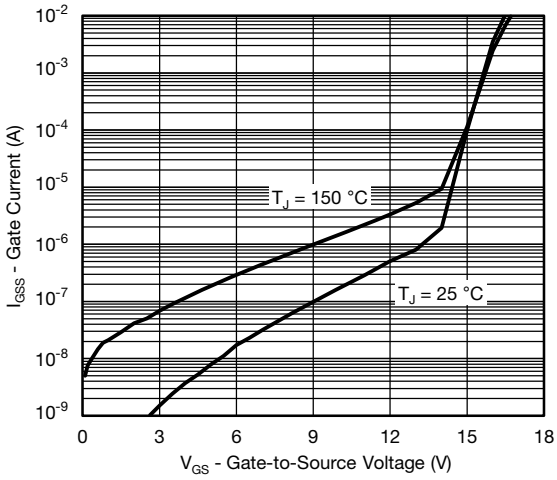
b. Guaranteed by design, not subject to production testing.

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.

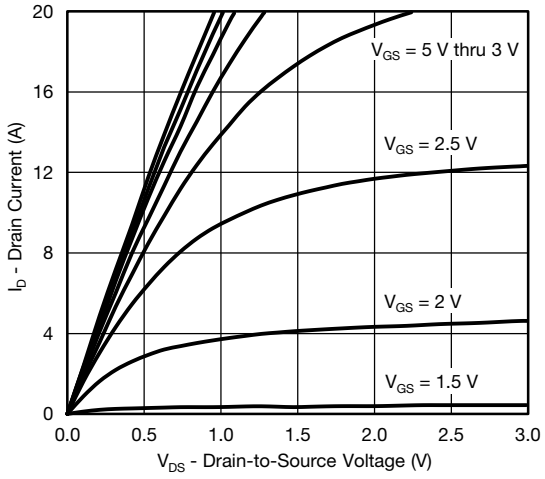
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



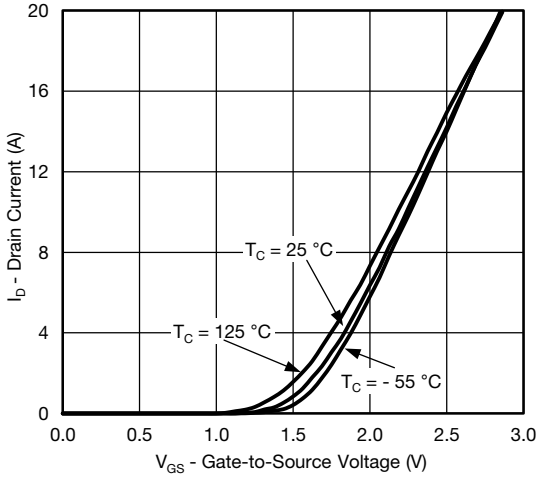
Gate Current vs. Gate-Source Voltage



Gate Current vs. Gate-Source Voltage



Output Characteristics

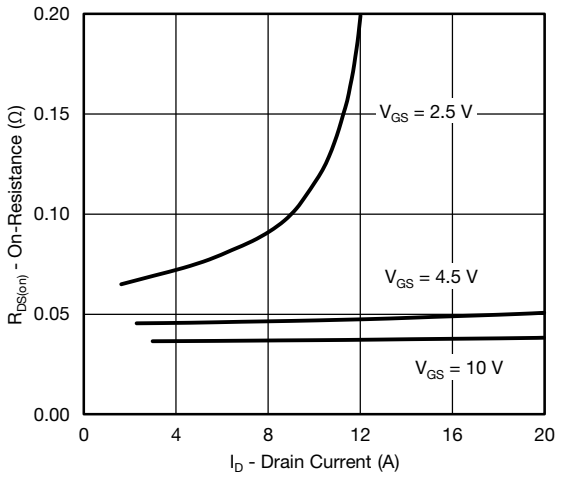


Transfer Characteristics

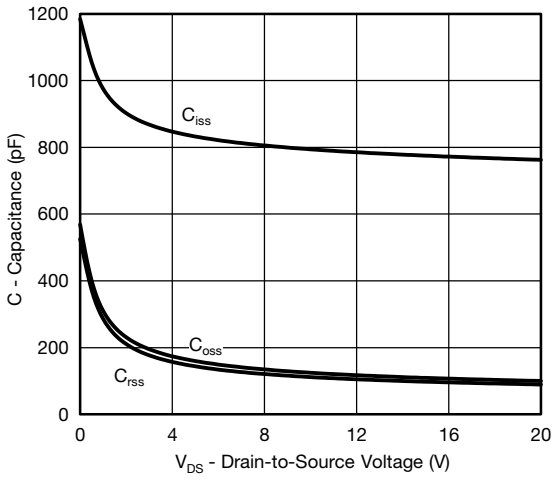
For technical questions, contact: pmostechsupport@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

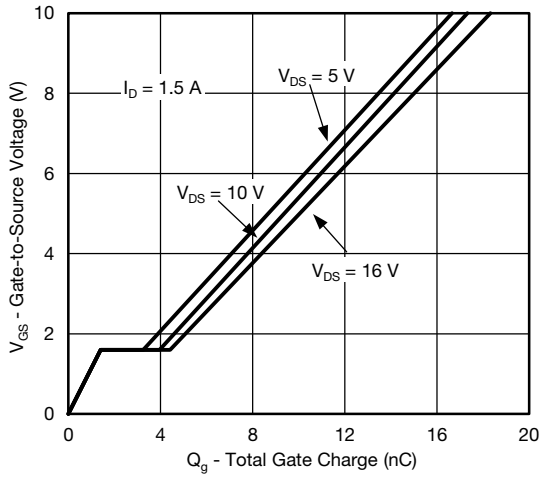
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



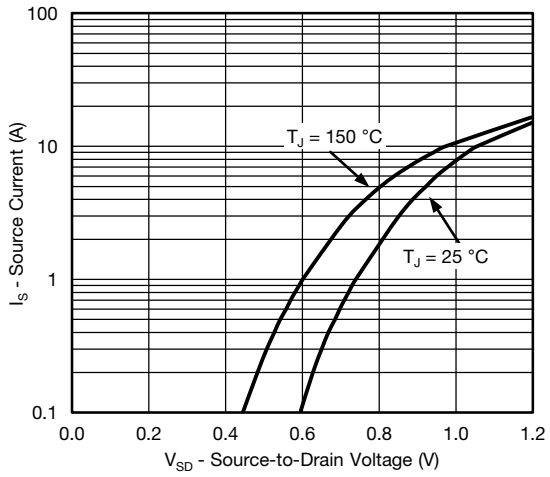
On-Resistance vs. Drain Current and Gate Voltage



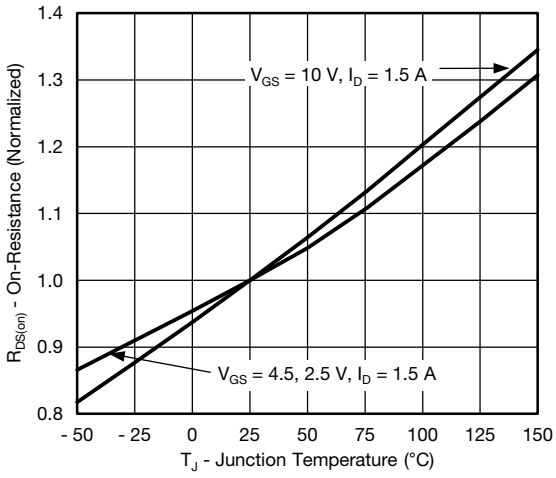
Capacitance



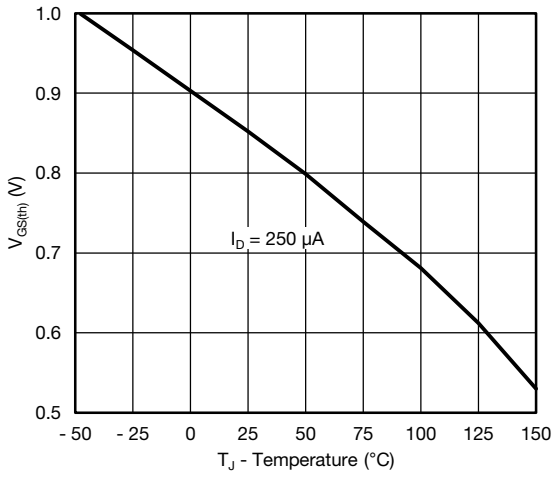
Gate Charge



Source-Drain Diode Forward Voltage



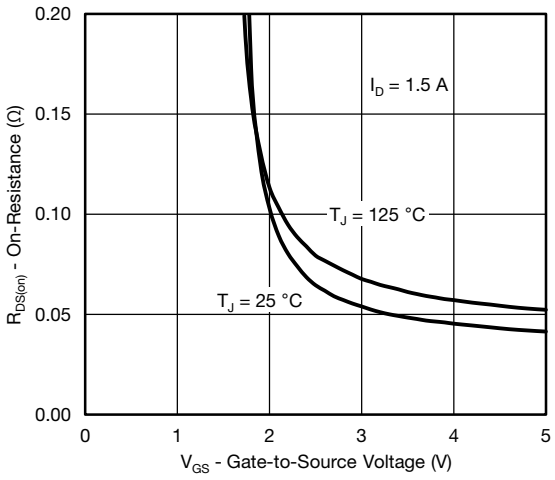
On-Resistance vs. Junction Temperature



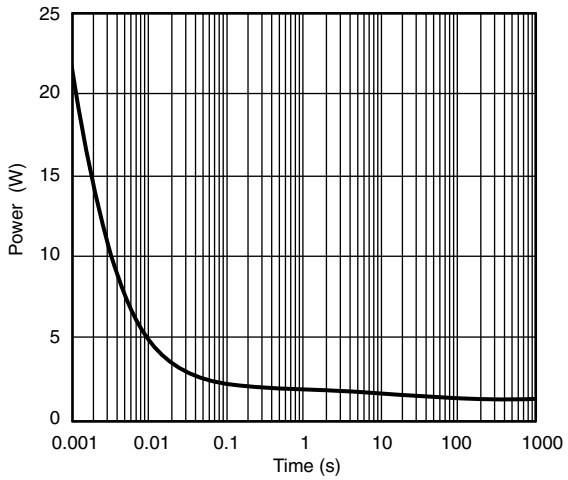
Threshold Voltage

For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

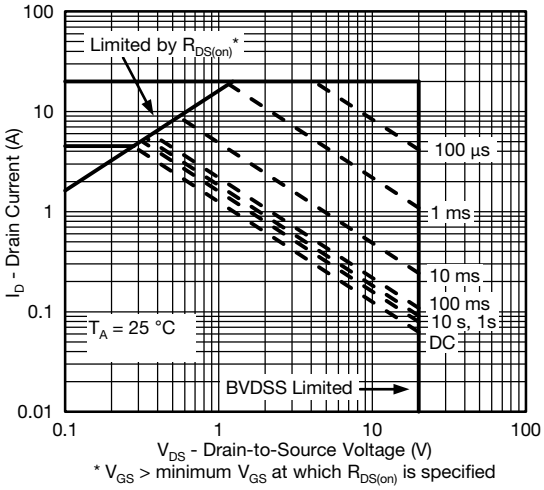
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient



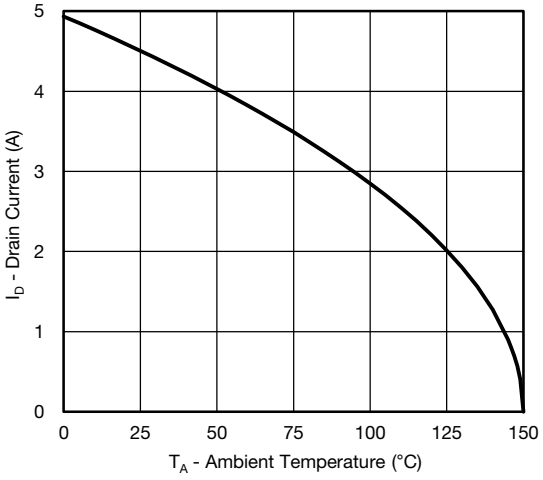
Safe Operating Area, Junction-to-Ambient

Note

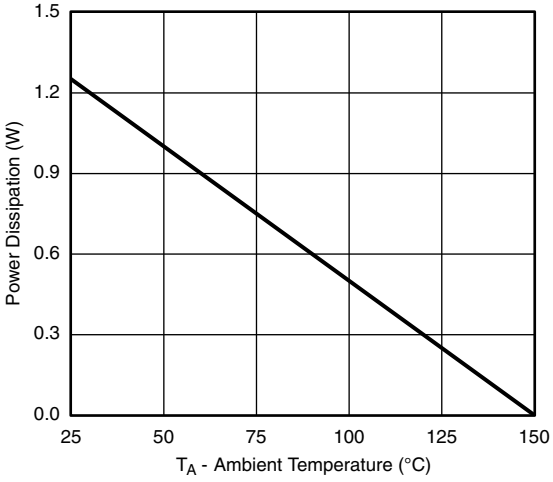
- When mounted on 1" x 1" FR4 with full copper.

Note

a. The power dissipation P_D is based on T_J (max.) = 150 °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.



Current Derating [a]

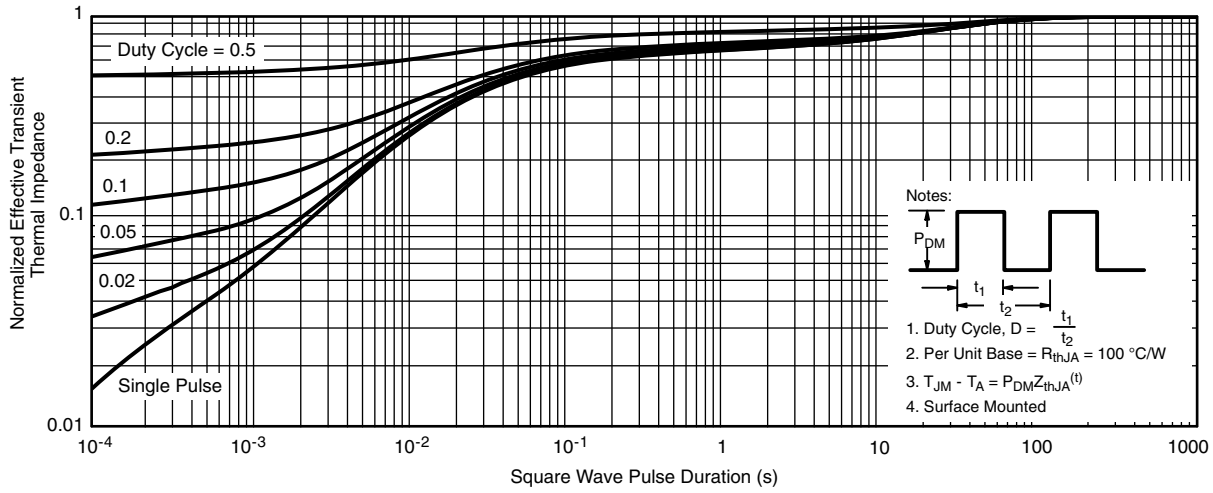


Power Derating

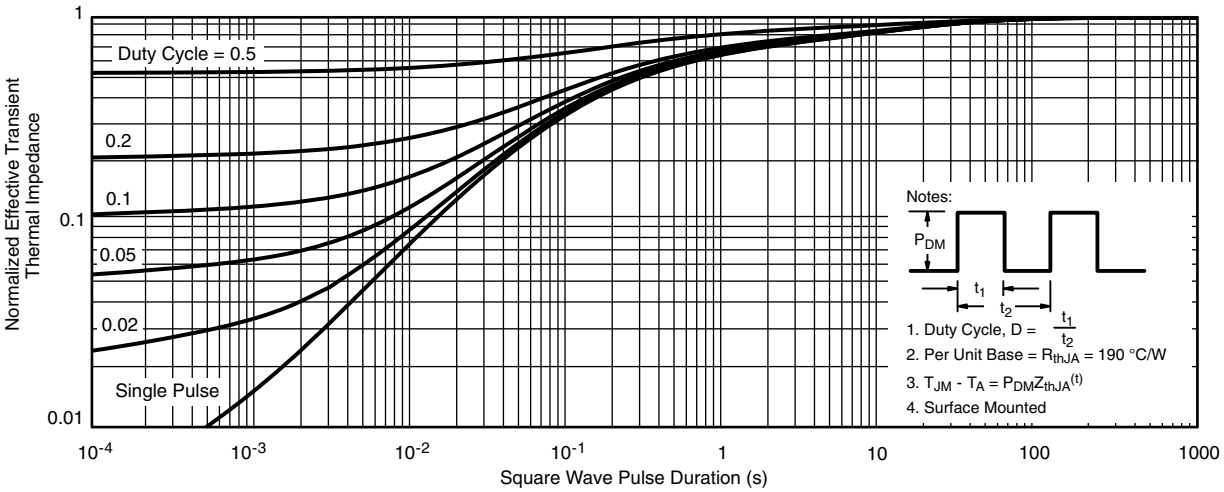
For technical questions, contact: pmostechsupport@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient (1" x 1" FR4 Board with Full Copper)

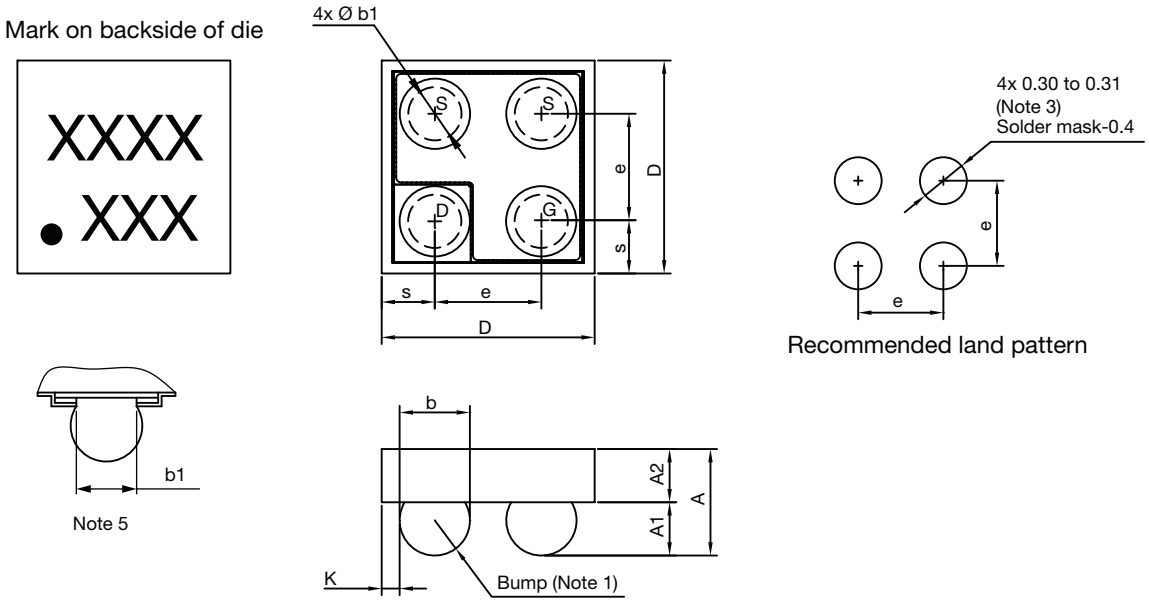


Normalized Thermal Transient Impedance, Junction-to-Ambient (1" x 1" FR4 Board with Minimum Copper)

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?62752.

For technical questions, contact: pmostechsupport@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

MICRO FOOT®: 4-Bumps
(1 mm x 1 mm, 0.5 mm Pitch, 0.286 mm Bump Height)



Notes

1. Bumps are 95.5/3.8/0.7 Sn/Ag/Cu.
2. Backside surface is coated with a Ti/Ni/Ag layer.
3. Non-solder mask defined copper landing pad.
4. Laser mark on the backside surface of die.
5. “b1” is the diameter of the solderable substrate surface, defined by an opening in the solder resist layer solder mask defined.
6. • is the location of pin 1

DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.458	0.504	0.550	0.0180	0.0198	0.0217
A1	0.214	0.250	0.286	0.0084	0.0098	0.0113
A2	0.244	0.254	0.264	0.0096	0.0100	0.0104
b	0.297	0.330	0.363	0.0117	0.0130	0.0143
b1		0.250			0.0098	
e		0.500			0.0197	
s	0.210	0.230	0.250	0.0083	0.0091	0.0096
D	0.920	0.960	1.000	0.0362	0.0378	0.0394
K	0.029	0.065	0.102	0.0011	0.0026	0.0040

Note

- Use millimeters as the primary measurement.

ECN: T15-0176-Rev. A, 27-Apr-15
DWG: 6039

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2026 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ENTEGRECİ

Bu belge www.entegreci.com üzerinden sunulmaktadır.

Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.