

N-Channel 40-V (D-S) 175 °C MOSFET

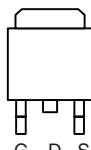
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.0023 at $V_{GS} = 10$ V	110 ^a
	0.003 at $V_{GS} = 4.5$ V	

FEATURES

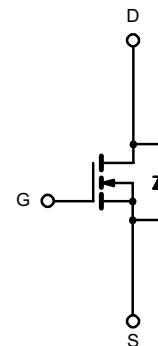
- TrenchFET® Power MOSFET
- 100 % R_g Tested



TO-263



Top View



Ordering Information: SUM110N04-2m3L-E3 (Lead (Pb)-free)

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	$T_C = 25$ °C	I_D	110 ^a	A
	$T_C = 125$ °C		110 ^a	
Pulsed Drain Current		I_{DM}	440	
Avalanche Current, Single Pulse		I_{AS}	75	
Repetitive Avalanche Energy, Single Pulse	$L = 0.1$ mH	E_{AS}	280	mJ
Maximum Power Dissipation	$T_C = 25$ °C	P_D	375 ^b	W
	$T_A = 25$ °C		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Typical	Unit
Junction-to-Ambient	PCB Mount ^c	R_{thJA}	40	°C/W
Junction-to-Case (Drain)		R_{thJC}	0.4	

Notes:

a. Package limited.

b. See SOA curve for voltage derating.

c. When Mounted on 1" square PCB (FR-4 material).

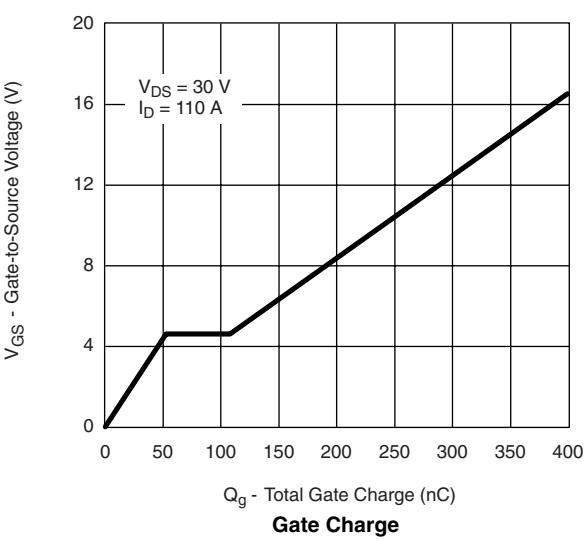
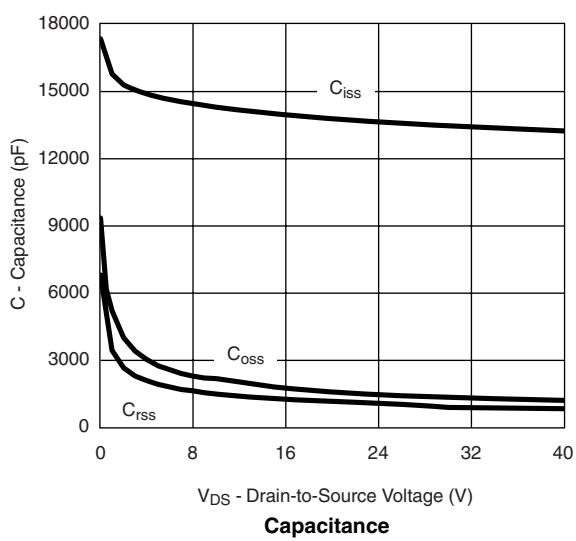
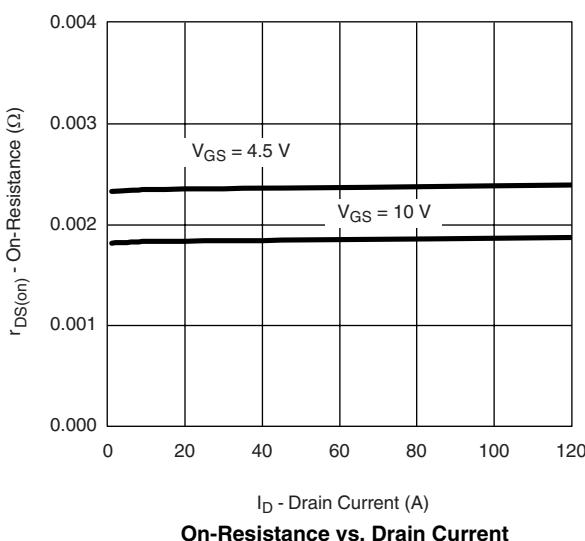
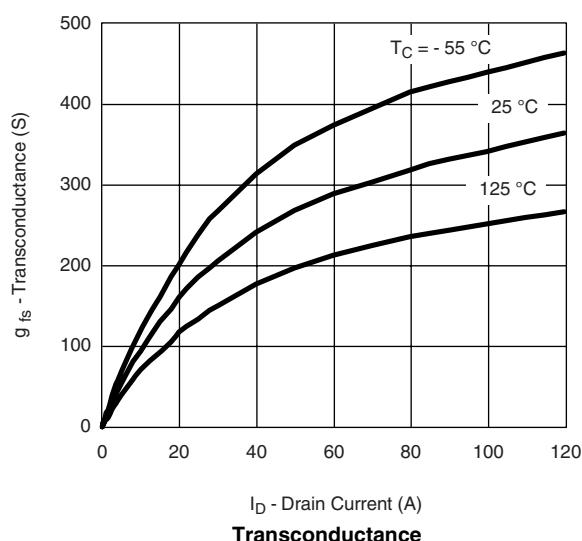
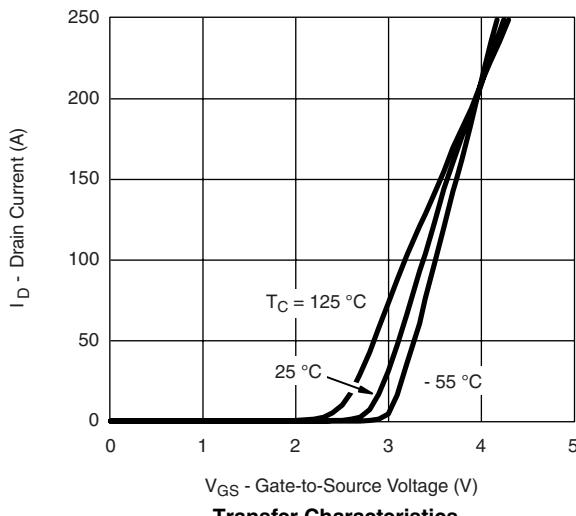
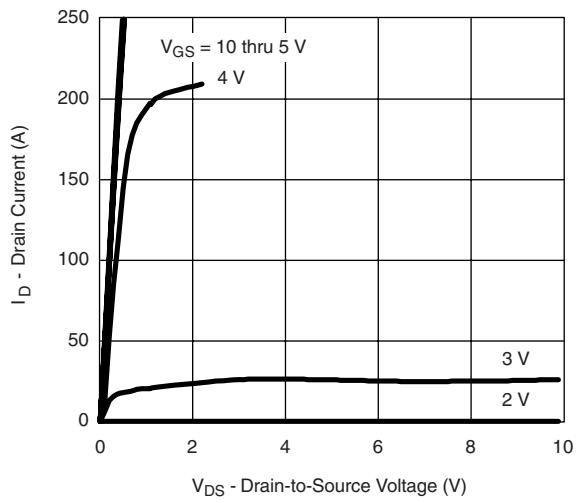
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

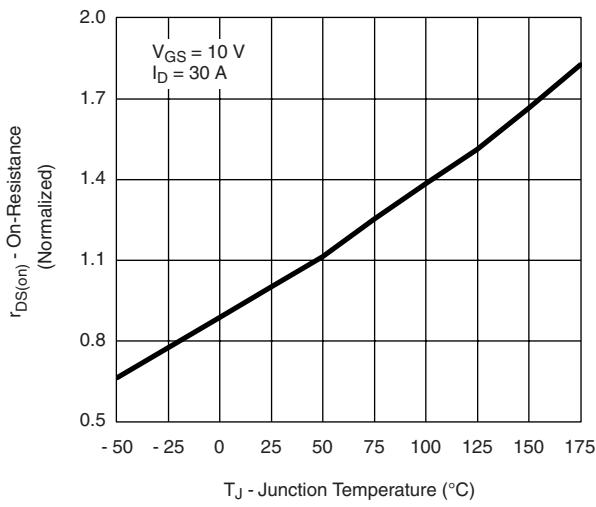
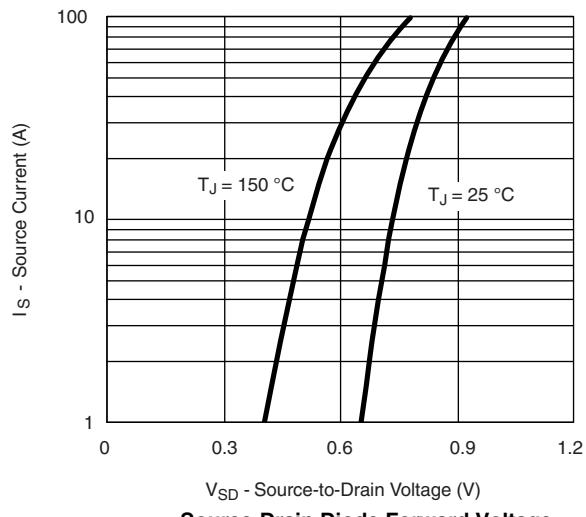
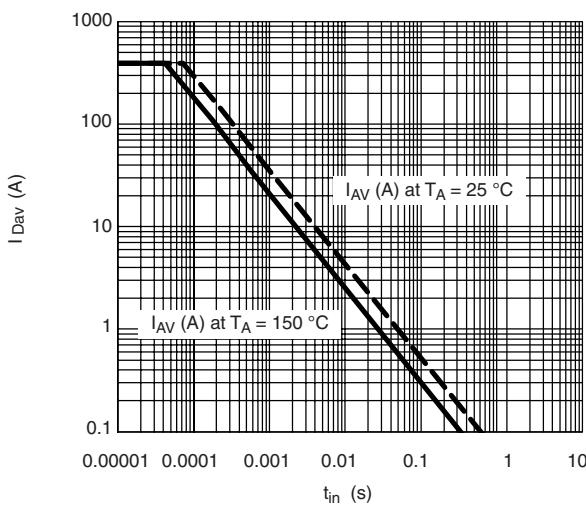
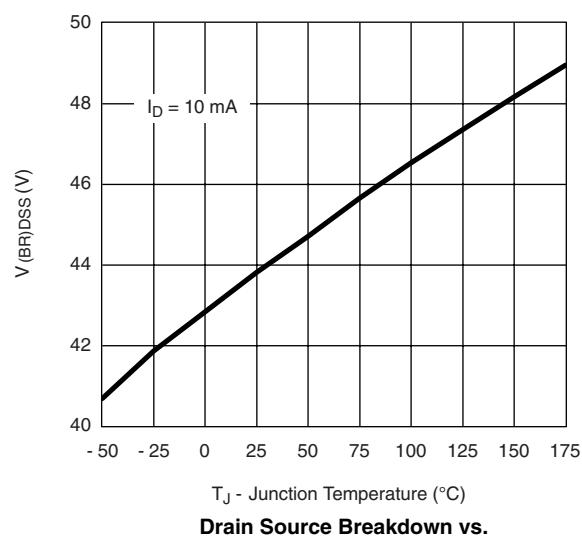
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, I_D = 250 \mu\text{A}$	40			V
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250 \mu\text{A}$	1		3	
Gate-Body Leakage	I_{GSS}	$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 20 \text{ V}$			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = 40 \text{ V}, V_{\text{GS}} = 0 \text{ V}$			1	
		$V_{\text{DS}} = 40 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{\text{DS}} = 40 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 175^\circ\text{C}$			10	mA
On-State Drain Current ^a	$I_{\text{D}(\text{on})}$	$V_{\text{DS}} \geq 5 \text{ V}, V_{\text{GS}} = 10 \text{ V}$	120			A
Drain-Source On-State Resistance ^a	$r_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10 \text{ V}, I_D = 30 \text{ A}$		0.0019	0.0023	
		$V_{\text{GS}} = 4.5 \text{ V}, I_D = 20 \text{ A}$		0.0024	0.003	
		$V_{\text{GS}} = 10 \text{ V}, I_D = 30 \text{ A}, T_J = 125^\circ\text{C}$			0.0035	
		$V_{\text{GS}} = 10 \text{ V}, I_D = 30 \text{ A}, T_J = 175^\circ\text{C}$			0.0044	
Forward Transconductance ^a	g_{fs}	$V_{\text{DS}} = 15 \text{ V}, I_D = 30 \text{ A}$	30			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 25 \text{ V}, f = 1 \text{ MHz}$		13600		
Output Capacitance	C_{oss}			1420		
Reverse Transfer Capacitance	C_{rss}			1040		pF
Total Gate Charge ^c	Q_g	$V_{\text{DS}} = 30 \text{ V}, V_{\text{GS}} = 10 \text{ V}, I_D = 110 \text{ A}$		240	360	
Gate-Source Charge ^c	Q_{gs}			53		nC
Gate-Drain Charge ^c	Q_{gd}			55		
Gate Resistance	R_g		$f = 1.0 \text{ MHz}$	0.65	1.3	2
Turn-On Delay Time ^c	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = 30 \text{ V}, R_L = 0.27 \Omega$ $I_D \geq 110 \text{ A}, V_{\text{GEN}} = 10 \text{ V}, R_g = 2.5 \Omega$		25	40	
Rise Time ^c	t_r			100	150	
Turn-Off Delay Time ^c	$t_{\text{d}(\text{off})}$			125	190	ns
Fall Time ^c	t_f			200	300	
Source-Drain Diode Ratings and Characteristics $T_C = 25^\circ\text{C}^b$						
Continuous Current	I_S				110	
Pulsed Current	I_{SM}				240	A
Forward Voltage ^a	V_{SD}	$I_F = 85 \text{ A}, V_{\text{GS}} = 0 \text{ V}$		1.1	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 85 \text{ A}, \text{di}/\text{dt} = 100 \text{ A}/\mu\text{s}$		56	85	ns
Peak Reverse Recovery Charge	$I_{\text{RM}(\text{REC})}$			3.1	4.7	A
Reverse Recovery Charge	Q_{rr}			0.087	0.2	μC

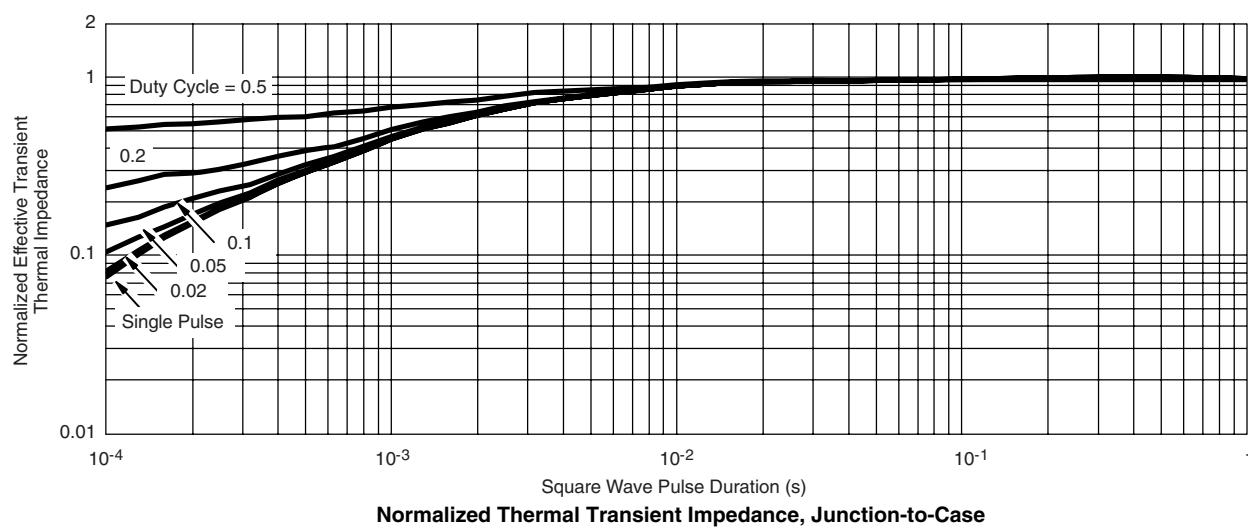
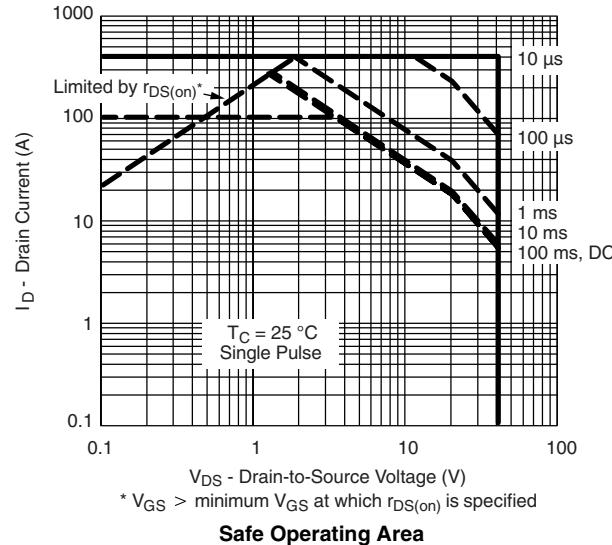
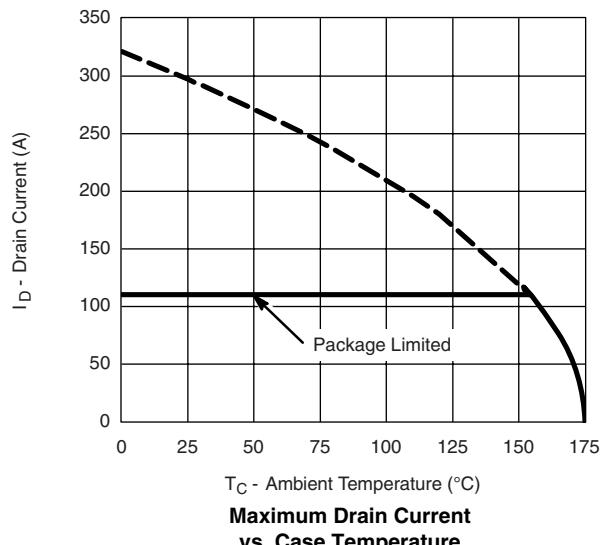
Notes:

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

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.

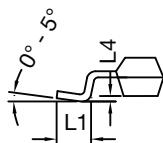
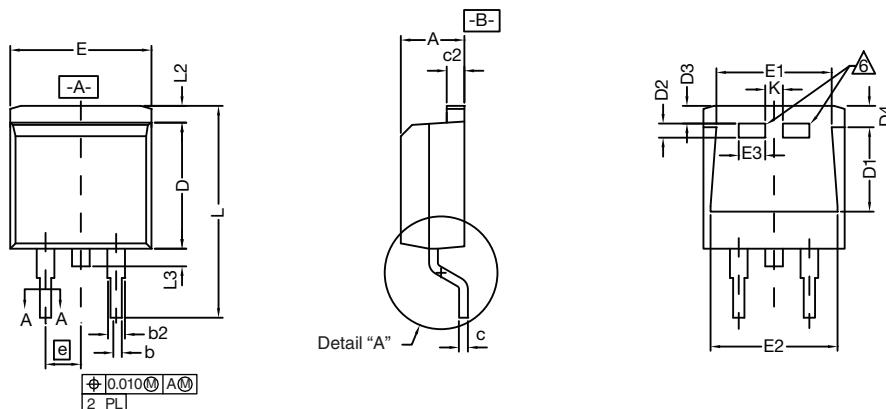
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****Avalanche Current vs. Time****Drain Source Breakdown vs. Junction Temperature**

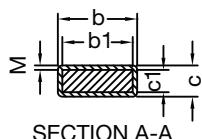
THERMAL RATINGS


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 <http://www.vishay.com/ppg?73040>.

TO-263 (D²PAK): 3-LEAD



DETAIL A (ROTATED 90°)



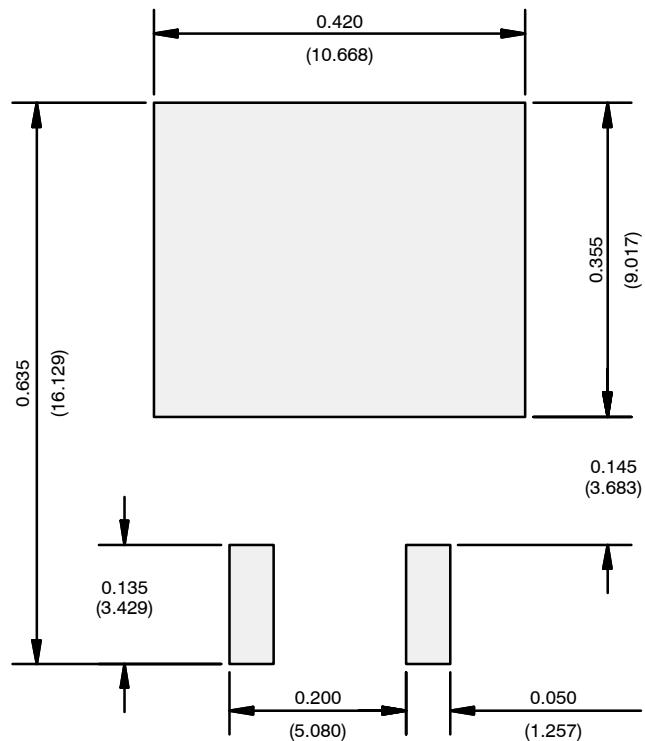
SECTION A-A

Notes

1. Plane B includes maximum features of heat sink tab and plastic.
2. No more than 25 % of L1 can fall above seating plane by max. 8 mils.
3. Pin-to-pin coplanarity max. 4 mils.
4. *: Thin lead is for SUB, SYB.
Thick lead is for SUM, SYM, SQM.
5. Use inches as the primary measurement.

 This feature is for thick lead.

DIM.	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	0.160	0.190	4.064	4.826	
b	0.020	0.039	0.508	0.990	
b1	0.020	0.035	0.508	0.889	
b2	0.045	0.055	1.143	1.397	
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2	0.045	0.055	1.143	1.397	
D	0.340	0.380	8.636	9.652	
D1	0.220	0.240	5.588	6.096	
D2	0.038	0.042	0.965	1.067	
D3	0.045	0.055	1.143	1.397	
D4	0.044	0.052	1.118	1.321	
E	0.380	0.410	9.652	10.414	
E1	0.245	-	6.223	-	
E2	0.355	0.375	9.017	9.525	
E3	0.072	0.078	1.829	1.981	
e	0.100 BSC		2.54 BSC		
K	0.045	0.055	1.143	1.397	
L	0.575	0.625	14.605	15.875	
L1	0.090	0.110	2.286	2.794	
L2	0.040	0.055	1.016	1.397	
L3	0.050	0.070	1.270	1.778	
L4	0.010 BSC		0.254 BSC		
M	-	0.002	-	0.050	
ECN: T13-0707-Rev. K, 30-Sep-13					
DWG: 5843					

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead

Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)

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.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. 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.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Vishay](#):

[SUM110N04-2M3L-E3](#)