

PHB27NQ10T,118-VB Datasheet

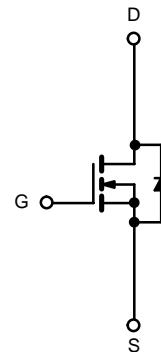
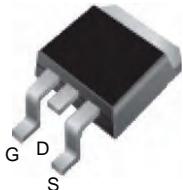
N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
100	0.030 at $V_{GS} = 10$ V	45
	0.035 at $V_{GS} = 4.5$ V	40

FEATURES

- Trench Power MOSFETs
- 175 °C Junction Temperature
- Low Thermal Resistance Package

D²PAK (TO-263)

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	45	A
		30	
Pulsed Drain Current	I_{DM}	135	A
Avalanche Current	I_{AR}	35	
Repetitive Avalanche Energy ^a	E_{AR}	61	mJ
Maximum Power Dissipation ^a	P_D	127 ^b	W
		3.75	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	1.4	

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

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

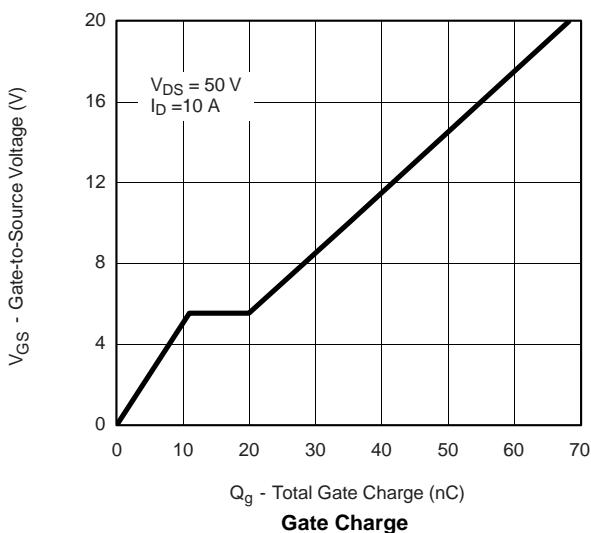
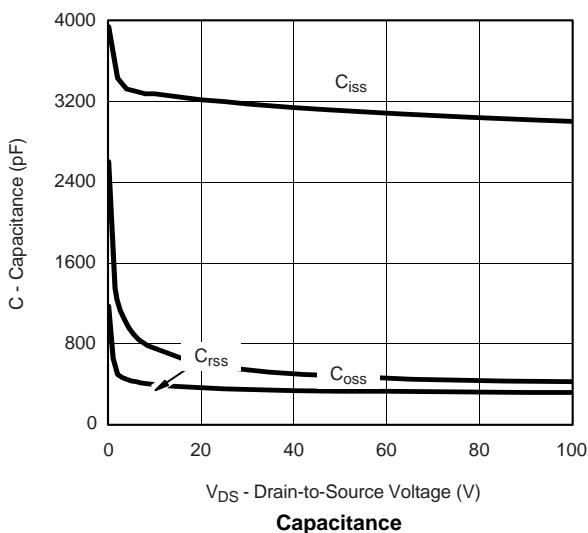
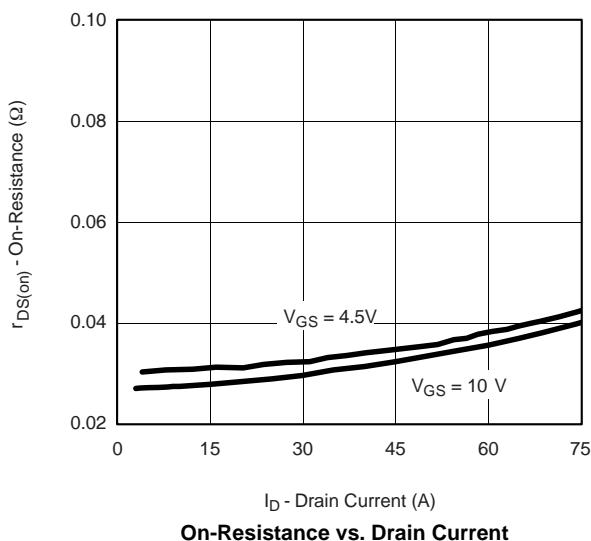
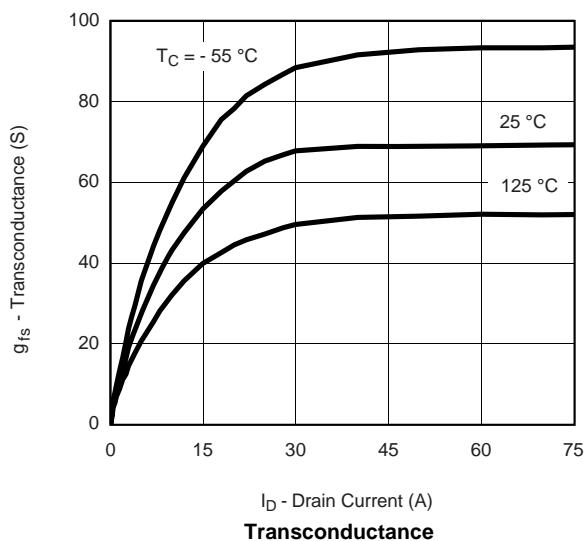
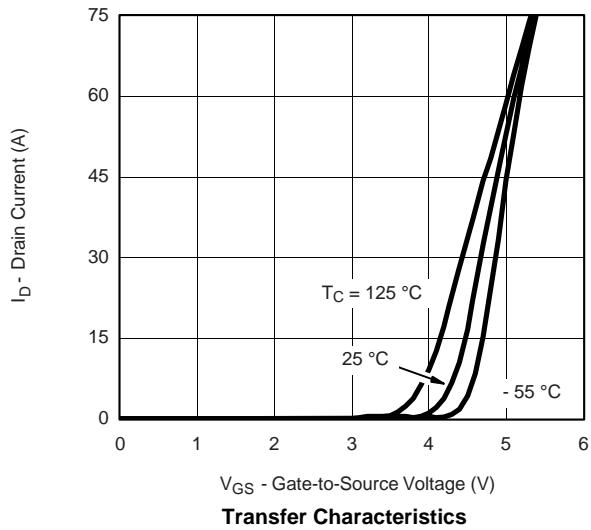
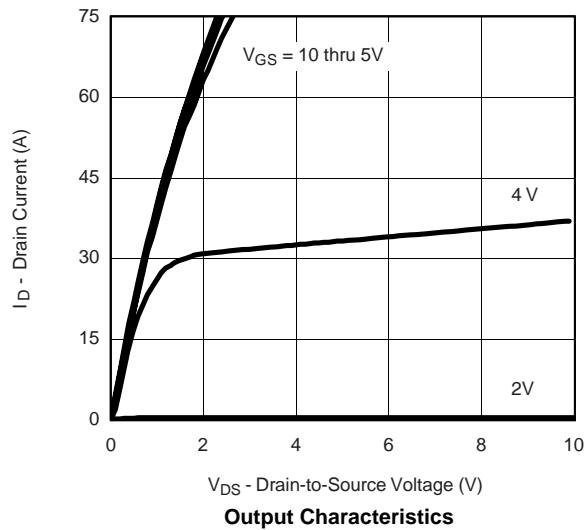
* Pb containing terminations are not RoHS compliant, exemptions may apply.

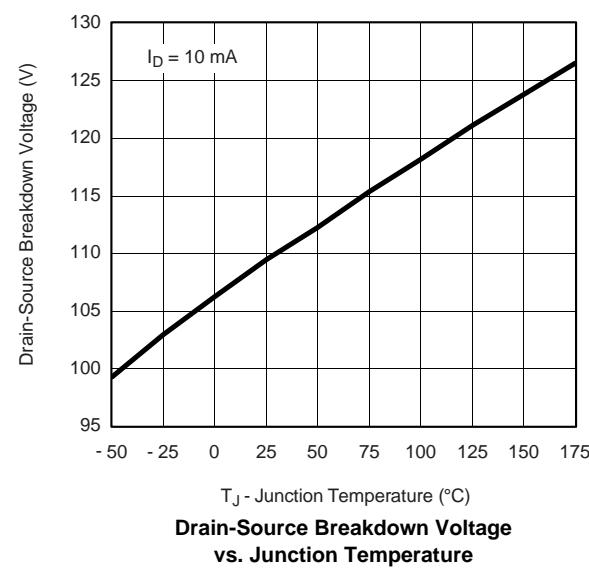
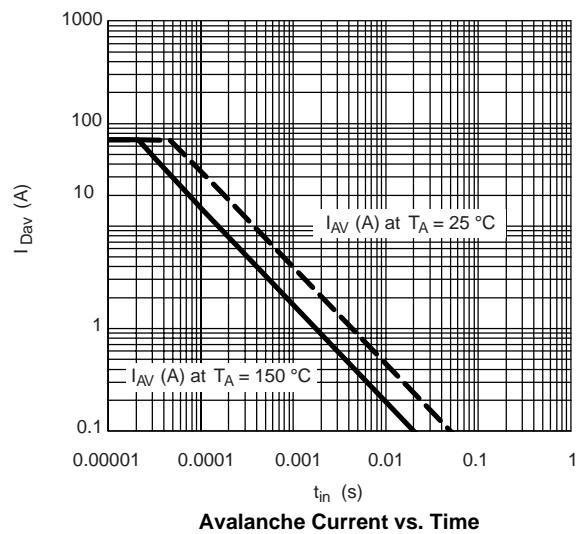
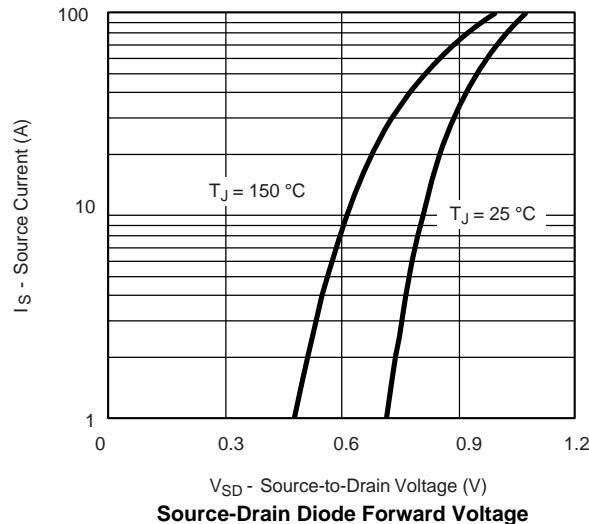
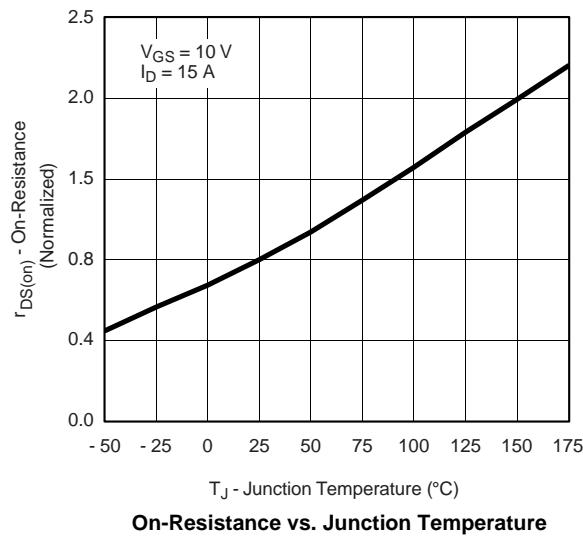
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{SS}} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V
Gate-Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250 \mu\text{A}$	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}	$V_{\text{DS}} = 80 \text{ V}, V_{\text{GS}} = 0 \text{ V}$			1	μA
		$V_{\text{DS}} = 80 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{\text{DS}} = 80 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 175^\circ\text{C}$			250	
On-State Drain Current ^a	$I_{\text{D}(\text{on})}$	$V_{\text{DS}} \geq 5 \text{ V}, V_{\text{GS}} = 10 \text{ V}$	75			A
Drain-Source On-State Resistance ^a	$r_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10 \text{ V}, I_D = 5 \text{ A}$		0.030		Ω
		$V_{\text{GS}} = 4.5 \text{ V}, I_D = 3 \text{ A}$		0.035		
		$V_{\text{GS}} = 10 \text{ V}, I_D = 5 \text{ A}, T_J = 125^\circ\text{C}$		0.050		
		$V_{\text{GS}} = 10 \text{ V}, I_D = 3 \text{ A}, T_J = 175^\circ\text{C}$		0.062		
Forward Transconductance ^a	g_{fs}	$V_{\text{DS}} = 15 \text{ V}, I_D = 15 \text{ A}$	10			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 25 \text{ V}, f = 1 \text{ MHz}$		3100		pF
Output Capacitance	C_{oss}			410		
Reverse Transfer Capacitance	C_{rss}			150		
Total Gate Charge ^c	Q_g	$V_{\text{DS}} = 50 \text{ V}, V_{\text{GS}} = 10 \text{ V}, I_D = 40 \text{ A}$		35	60	nC
Gate-Source Charge ^c	Q_{gs}			11		
Gate-Drain Charge ^c	Q_{gd}			9		
Gate Resistance	R_G			1.7		Ω
Turn-On Delay Time ^c	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = 50 \text{ V}, R_L = 1.25 \Omega$ $I_D \geq 40 \text{ A}, V_{\text{GEN}} = 10 \text{ V}, R_G = 2.5 \Omega$		11	20	ns
Rise Time ^c	t_r			12	20	
Turn-Off Delay Time ^c	$t_{\text{d}(\text{off})}$			30	45	
Fall Time ^c	t_f			12	20	
Source-Drain Diode Ratings and Characteristics $T_C = 25^\circ\text{C}^b$						
Continuous Current	I_S				40	A
Pulsed Current	I_{SM}				120	
Forward Voltage ^a	V_{SD}	$I_F = 30 \text{ A}, V_{\text{GS}} = 0 \text{ V}$		1.0	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 30 \text{ A}, \text{di/dt} = 100 \text{ A}/\mu\text{s}$		60	100	ns
Peak Reverse Recovery Current	$I_{\text{RM}(\text{REC})}$			5	8	A
Reverse Recovery Charge	Q_{rr}			0.15	0.4	μC

Notes:

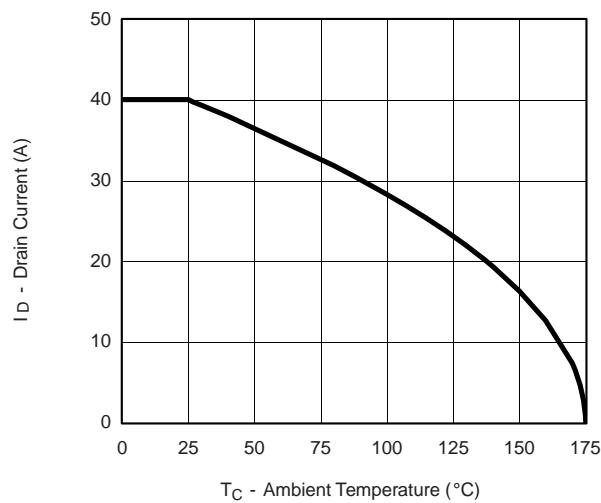
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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.

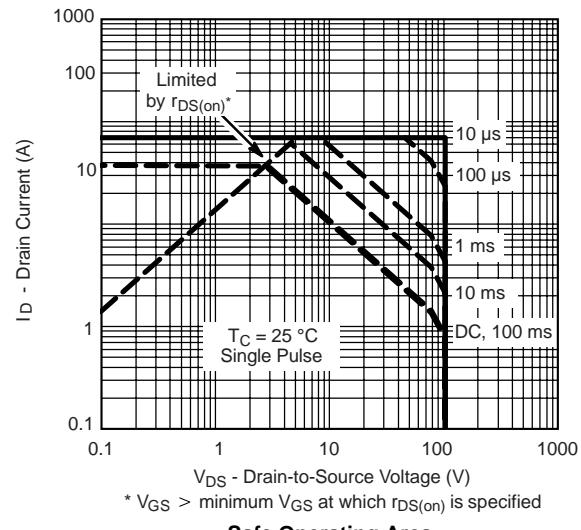
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


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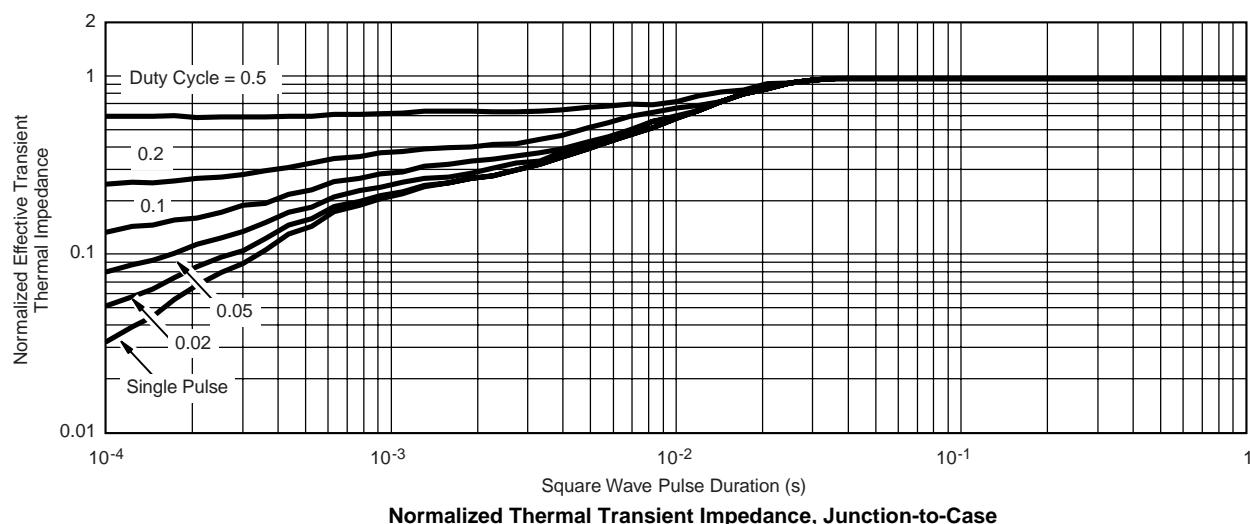
THERMAL RATINGS



Maximum Avalanche and Drain Current
vs. Case Temperature

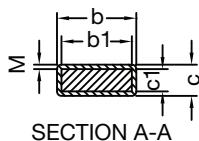
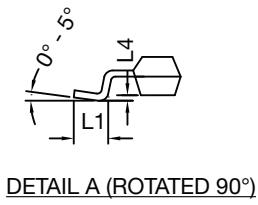
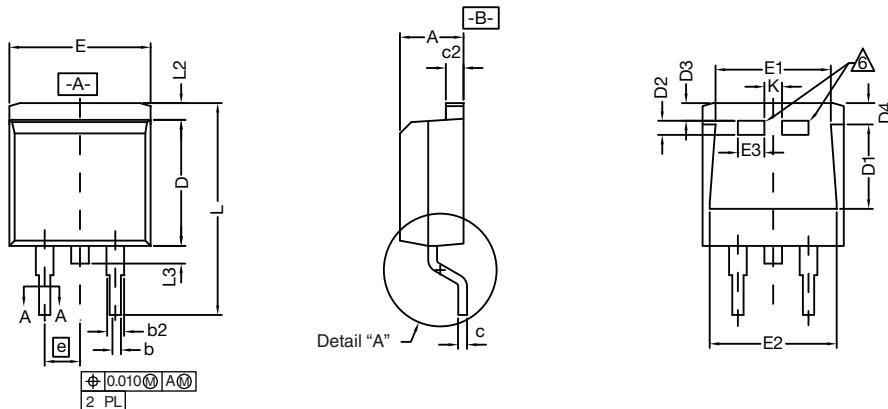


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

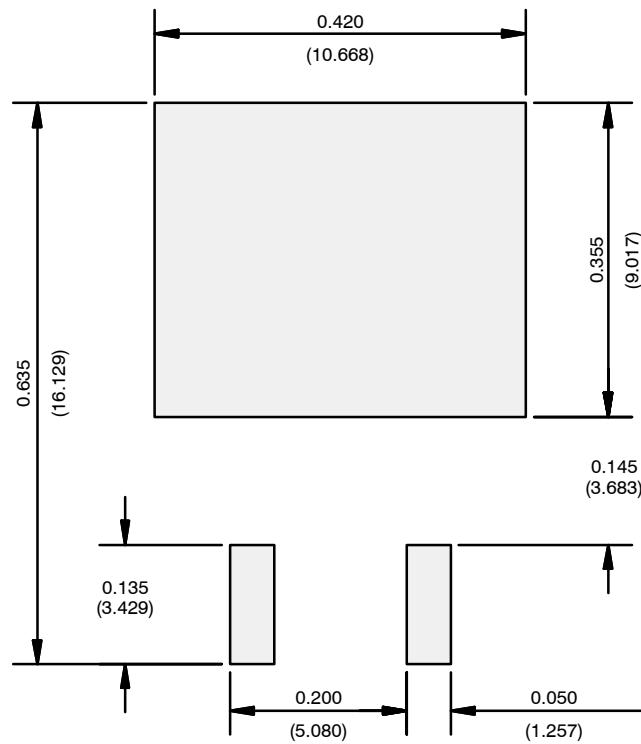
TO-263 (D²PAK): 3-LEAD



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					

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.
6. This feature is for thick lead.

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead

Recommended Minimum Pads
Dimensions in Inches/(mm)

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