

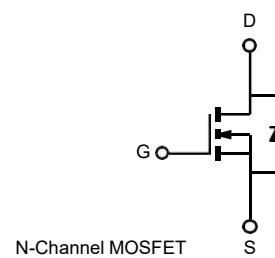
NP80N055PDG-E1B-AY-VB Datasheet

N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS}	60	V
$R_{DS(on)}$ $V_{GS} = 10$ V	4	$\text{m}\Omega$
I_D	150	A
Configuration	Single	

FEATURES

- Trench powerMOSFET
- Package with low thermal resistance
- 100 % R_g and UIS tested



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)					
PARAMETER		SYMBOL	LIMIT	UNIT	
Drain-Source Voltage		V_{DS}	60	V	
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current	$T_C = 25$ °C ^a	I_D	150	A	
	$T_C = 125$ °C		65		
Continuous Source Current (Diode Conduction) ^a			120		
Pulsed Drain Current ^b			350		
Single Pulse Avalanche Current	$L = 0.1$ mH	I_{AS}	65	mJ	
Single Pulse Avalanche Energy		E_{AS}	211		
Maximum Power Dissipation ^b	$T_C = 25$ °C	P_D	220	W	
	$T_C = 125$ °C		70		
Operating Junction and Storage Temperature Range			T_J, T_{stg}	-55 to +175 °C	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount ^c	R_{thJA}	40	°C/W
Junction-to-Case (Drain)		R_{thJC}	0.65	

Notes

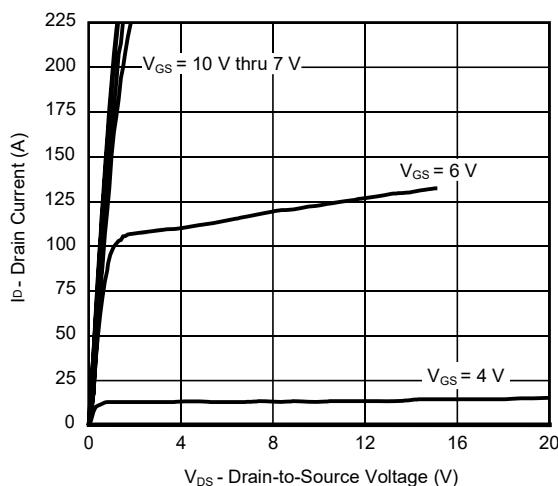
- Package limited.
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS ($T_C = 25^\circ\text{C}$, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0$, $I_D = 250 \mu\text{A}$		60	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$		2.0		4.0		
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$		-	-	± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0 \text{ V}$	$V_{DS} = 60 \text{ V}$	-	-	1	μA	
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 60 \text{ V}$, $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0 \text{ V}$	$V_{DS} = 60 \text{ V}$, $T_J = 175^\circ\text{C}$	-	-	250		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{GS} = 10 \text{ V}$	$V_{DS} \geq 5 \text{ V}$	120	-	-	A	
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$	$I_D = 30 \text{ A}$	-	4	-	$\text{m}\Omega$	
		$V_{GS} = 10 \text{ V}$	$I_D = 30 \text{ A}$, $T_J = 125^\circ\text{C}$	-	12	-		
		$V_{GS} = 10 \text{ V}$	$I_D = 30 \text{ A}$, $T_J = 175^\circ\text{C}$	-	15	-		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 30 \text{ A}$		-	94	-	S	
Dynamic ^b								
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$	$V_{DS} = 25 \text{ V}$, $f = 1 \text{ MHz}$	-	-	7000	pF	
Output Capacitance	C_{oss}			-	-	715		
Reverse Transfer Capacitance	C_{rss}			-	-	360		
Total Gate Charge ^c	Q_g	$V_{GS} = 10 \text{ V}$	$V_{DS} = 30 \text{ V}$, $I_D = 75 \text{ A}$	-	96	145	nC	
Gate-Source Charge	Q_{gs}			-	24	-		
Gate-Drain Charge ^c	Q_{gd}			-	27	-		
Gate Resistance	R_g	$f = 1 \text{ MHz}$		0.3	1	1.7	Ω	
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 30 \text{ V}$, $R_L = 0.4 \Omega$ $I_D \approx 75 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$		-	16	24	ns	
Rise Time ^c	t_r			-	14	21		
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			-	34	51		
Fall Time ^c	t_f			-	9	14		
Source-Drain Diode Ratings and Characteristics ^b								
Pulsed Current ^a	I_{SM}			-	-	450	A	
Forward Voltage	V_{SD}	$I_F = 75 \text{ A}$, $V_{GS} = 0$		-	0.9	1.5	V	

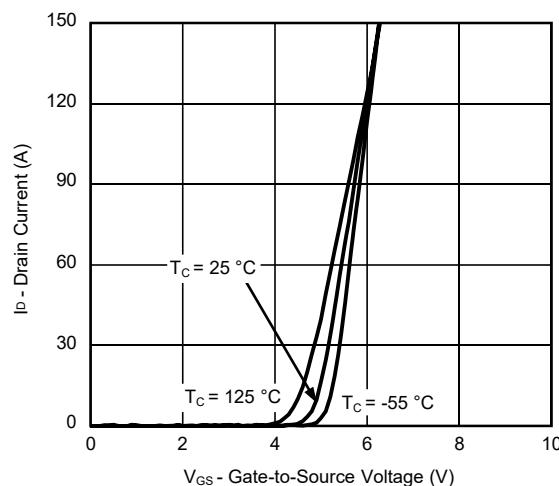
Notes

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

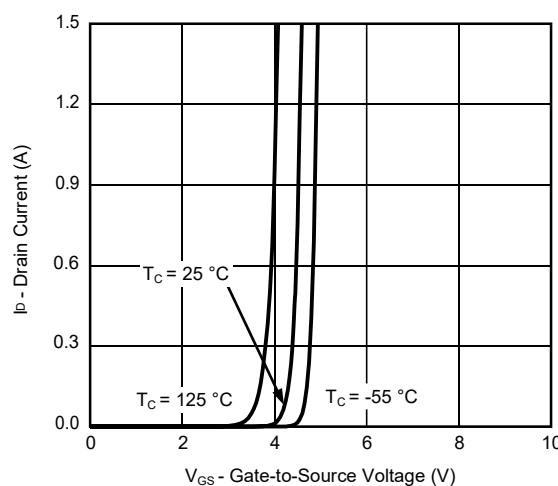
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

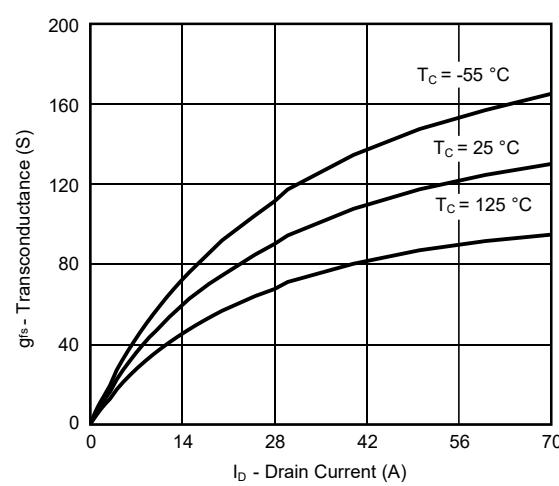
Output Characteristics



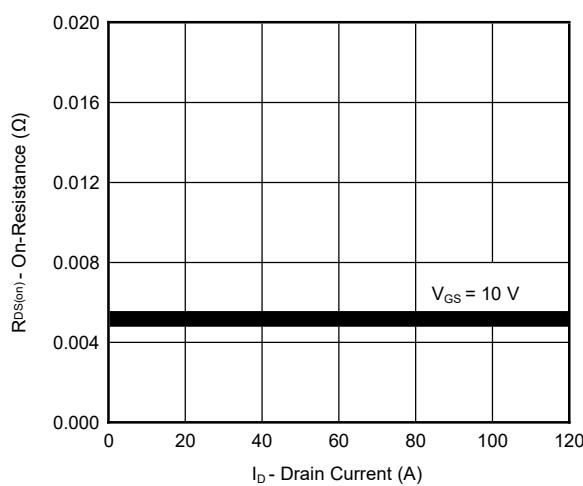
Transfer Characteristics



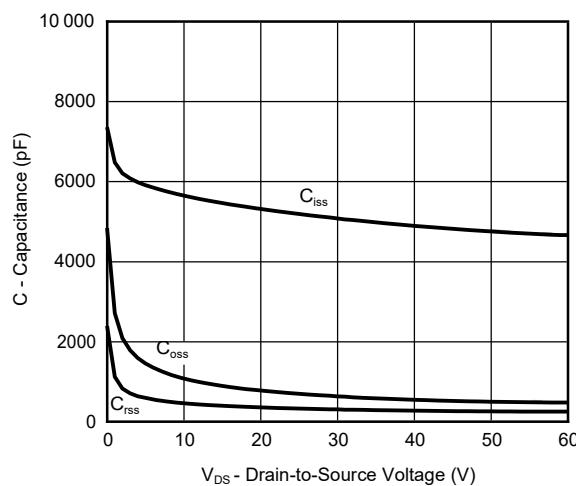
Transfer Characteristics



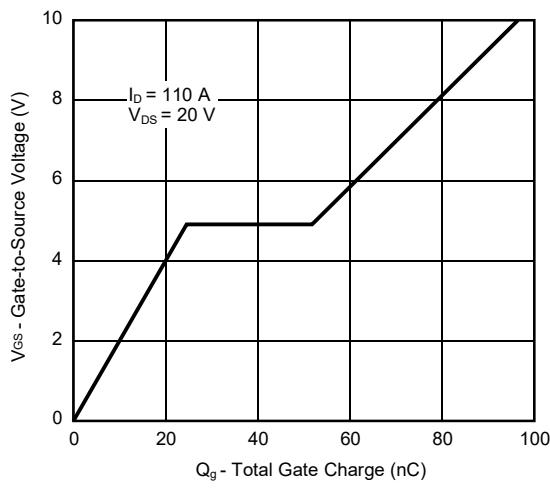
Transconductance



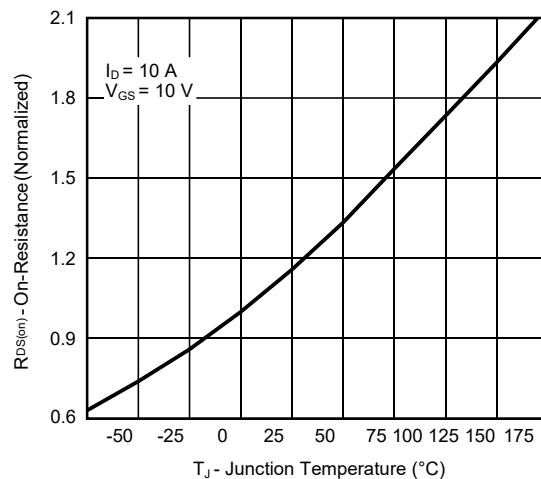
On-Resistance vs. Drain Current



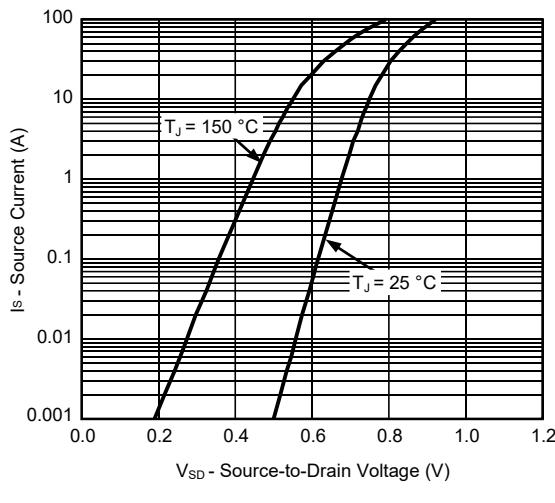
Capacitance

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

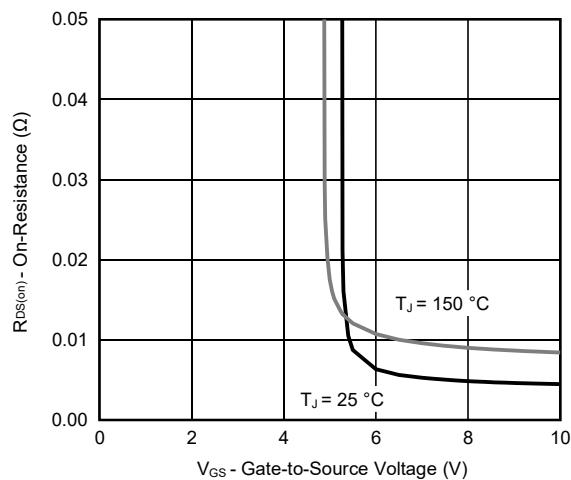
Gate Charge



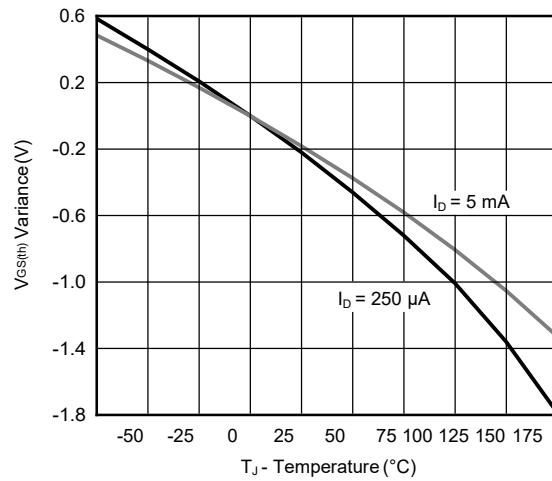
On-Resistance vs. Junction Temperature



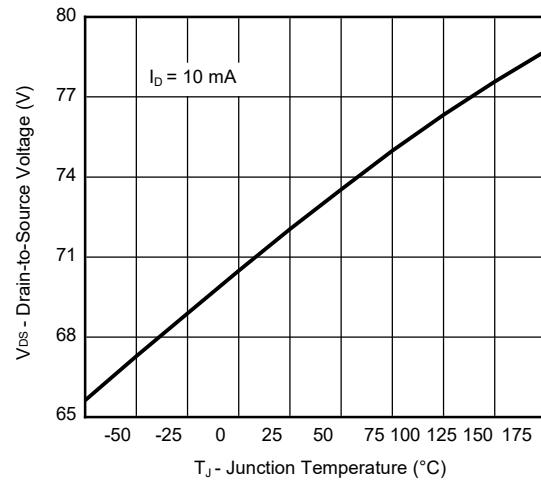
Source Drain Diode Forward Voltage



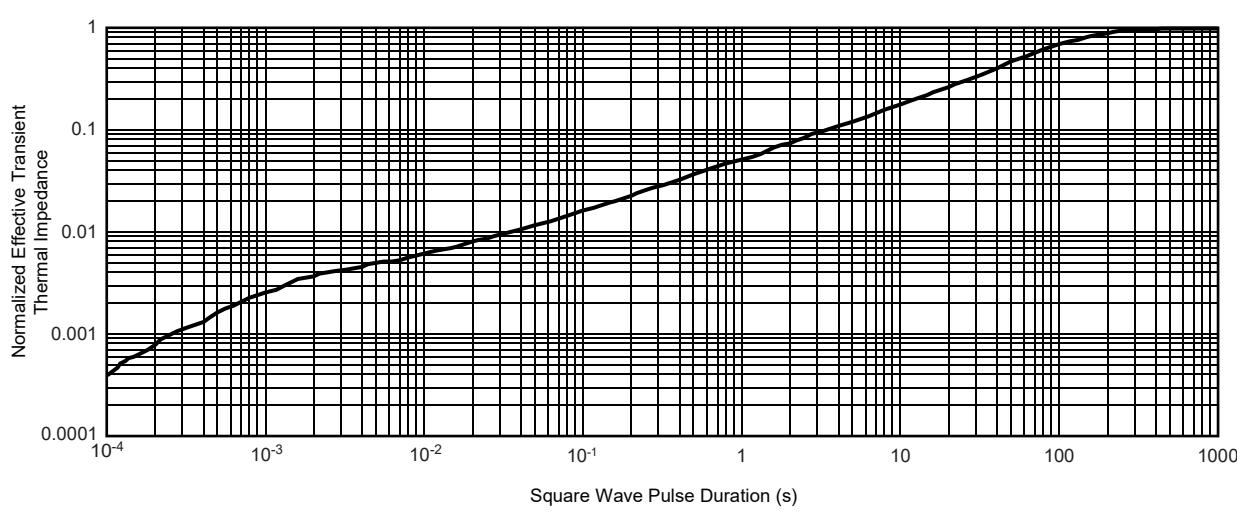
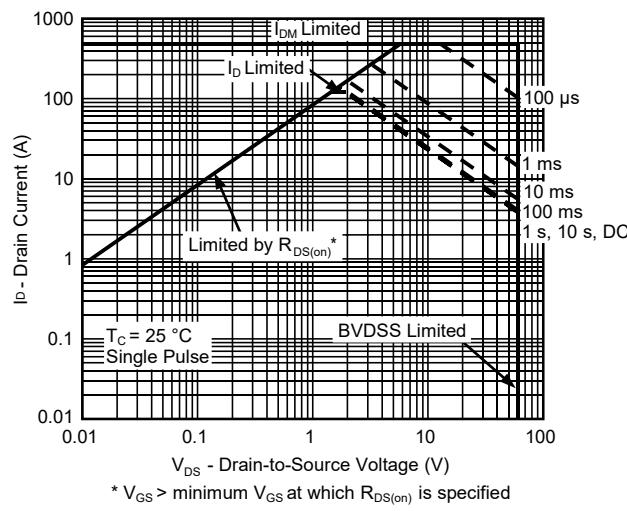
On-Resistance vs. Gate-to-Source Voltage

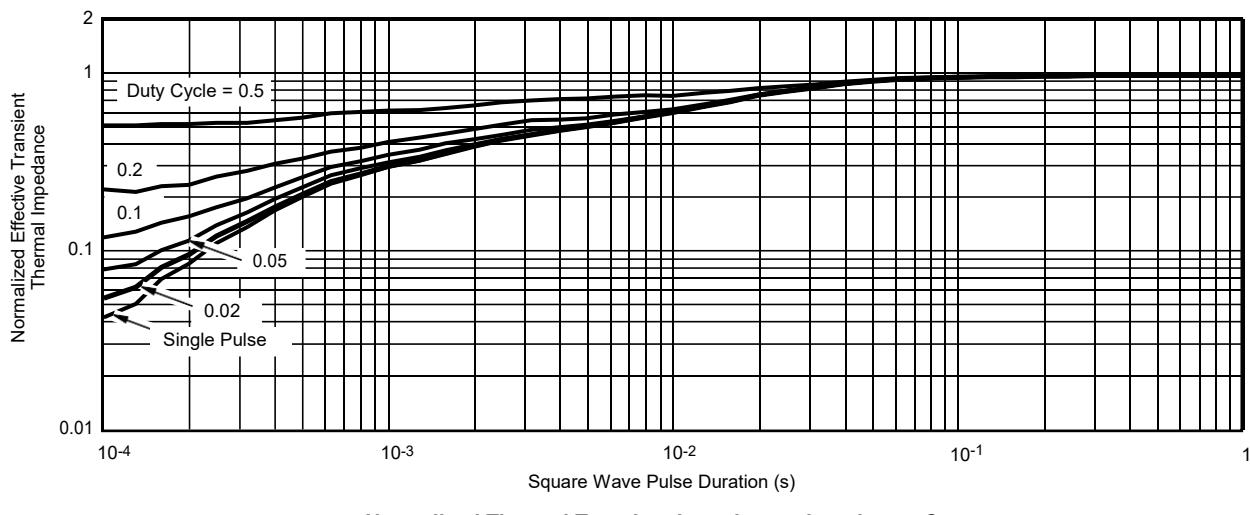


Threshold Voltage



Drain Source Breakdown vs. Junction Temperature

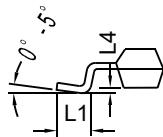
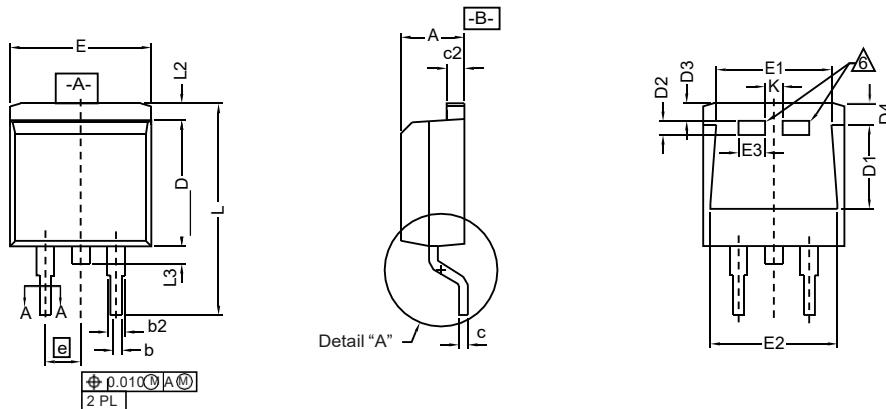
THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)


THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)

Normalized Thermal Transient Impedance, Junction-to-Case
Note

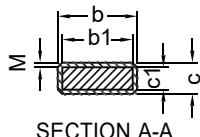
- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Case (25 °C)

are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

TO-263 (D²PAK): 3-LEAD



DETAIL A (ROTATED 90°)

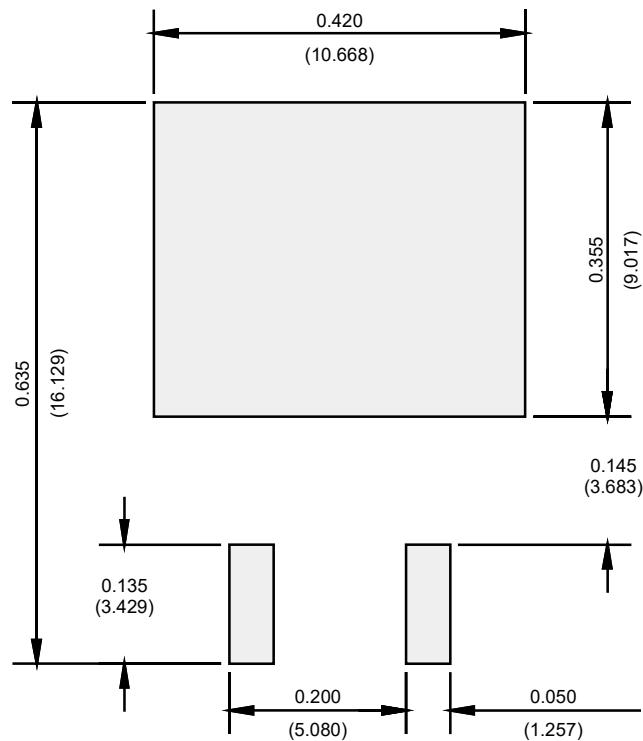


SECTION A-A

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.
6.  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)

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