

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	$I_D$ $T_A = +25^\circ C$
30V	18mΩ @ $V_{GS} = 10V$	POWERDI	8.6A
	27mΩ @ $V_{GS} = 4.5V$	3333-8	5.5A

## Description

This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- Backlighting
- DC-DC Converters
- Power Management Functions

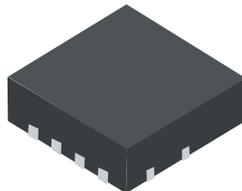
## Features

- Low  $R_{DS(ON)}$  – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

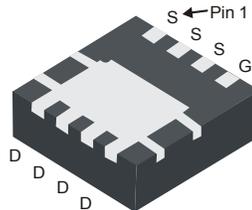
## Mechanical Data

- Case: POWERDI3333-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.072 grams (approximate)

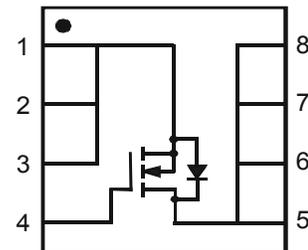
POWERDI3333-8



Top View



Bottom View



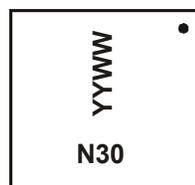
Top View  
Internal Schematic

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3030LFG-7	POWERDI3333-8	2000 / Tape & Reel
DMN3030LFG-13	POWERDI3333-8	3000 / Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



N30 = Product marking code  
 YYWW = Date code marking  
 YY = Last digit of year (ex: 10 for 2010)  
 WW = Week code (01 – 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±25	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	5.3 4.2	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	6.8 5.2	A
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	8.6 6.8	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	11 8.8	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I <sub>DM</sub>	70	A
Maximum Body Diode continuous Current			I <sub>S</sub>	3	A

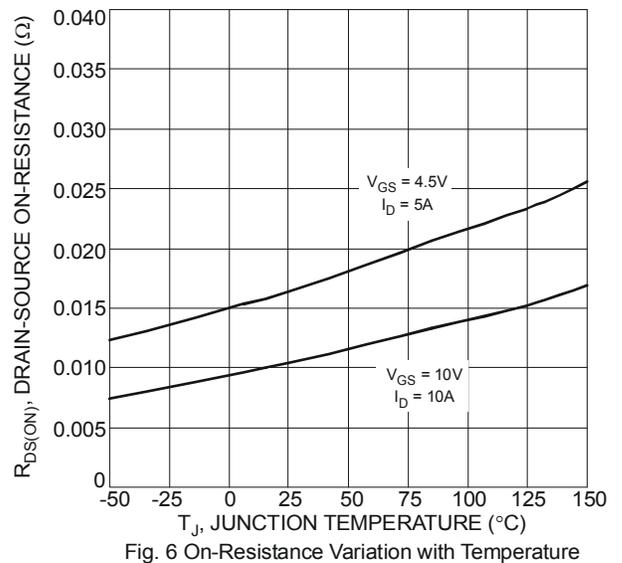
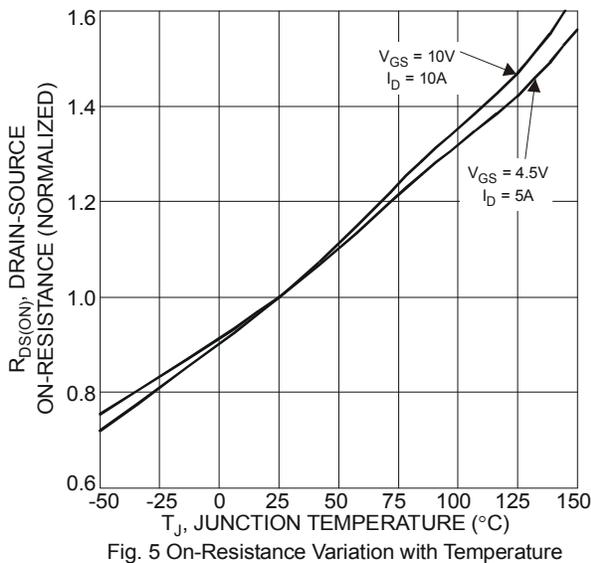
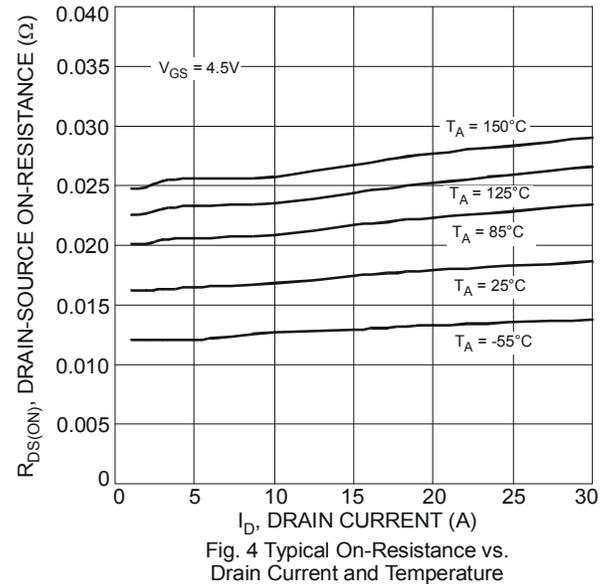
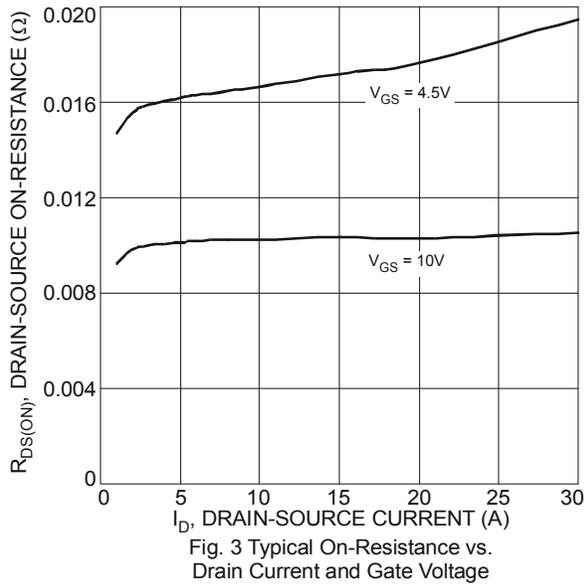
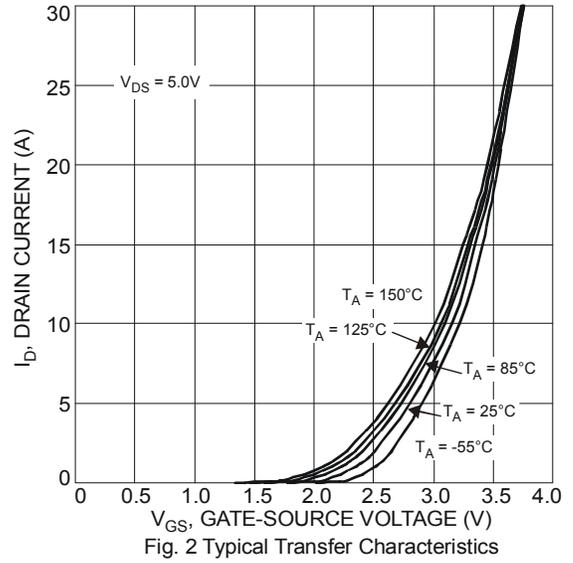
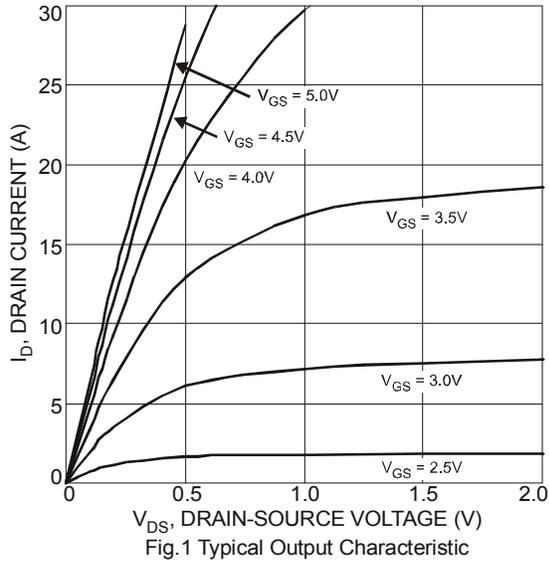
**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.9	W
	T <sub>A</sub> = +70°C		0.5	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R <sub>θJA</sub>	148	°C/W
	t < 10s		89	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.3	W
	T <sub>A</sub> = +70°C		1.4	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R <sub>θJA</sub>	56	°C/W
	t < 10s		34	
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	6.9	°C
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	100	nA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±1	µA	V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V
		—	—	100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.8	1.2	2.1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	10	18	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A
		—	16	27		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7.5A
Forward Transfer Admittance	Y <sub>fs</sub>	—	6	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 10A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	751	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	121	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	110	—		
Gate Resistance	R <sub>g</sub>	—	1.5	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	—	9	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 6A
Total Gate Charge V <sub>GS</sub> = 10V	Q <sub>g</sub>	—	17.4	—		
Gate-Source Charge	Q <sub>gs</sub>	—	2.2	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	3	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	2.5	—	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 6Ω, R <sub>L</sub> = 1.8Ω, I <sub>D</sub> = 6.7A
Turn-On Rise Time	t <sub>r</sub>	—	6.6	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	19.0	—		
Turn-Off Fall Time	t <sub>f</sub>	—	6.3	—		

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.



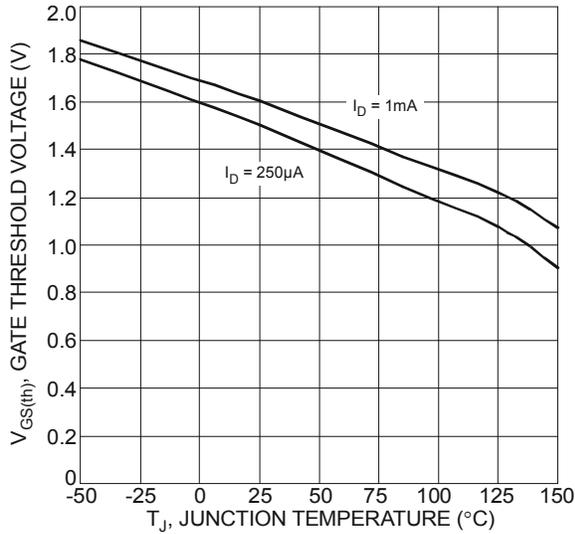


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

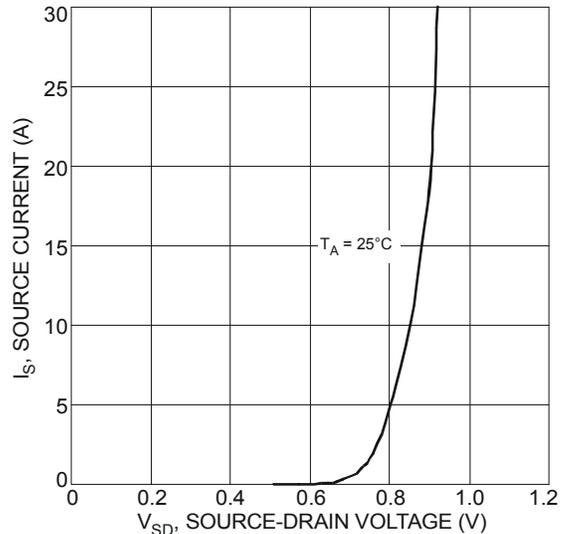


Fig. 8 Diode Forward Voltage vs. Current

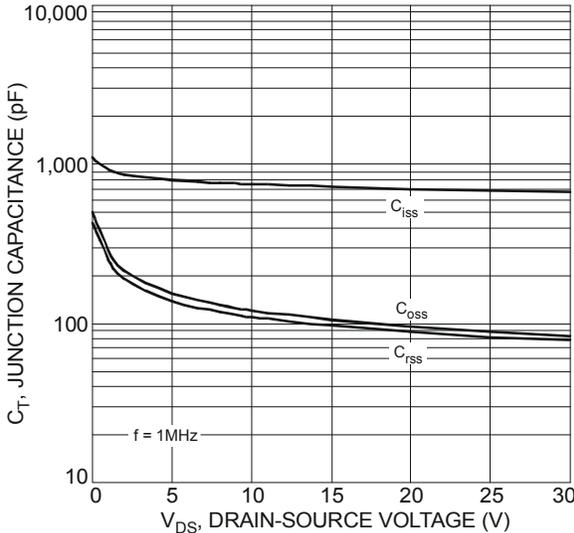


Fig. 9 Typical Junction Capacitance

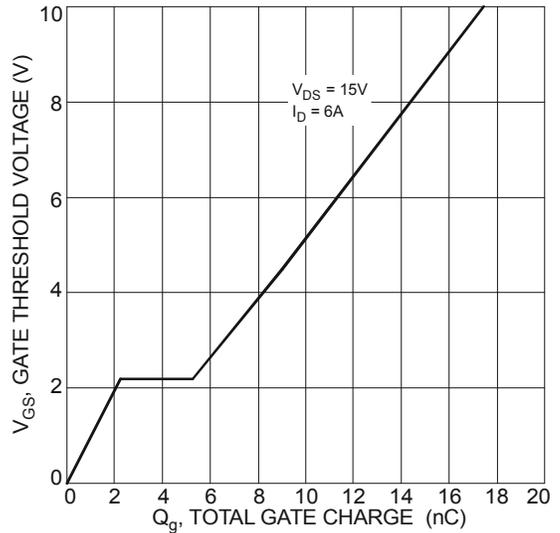


Fig. 10 Gate Charge

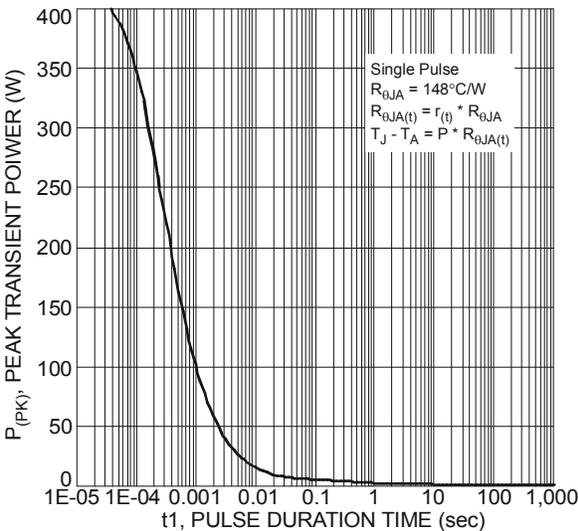


Fig. 11 Single Pulse Maximum Power Dissipation

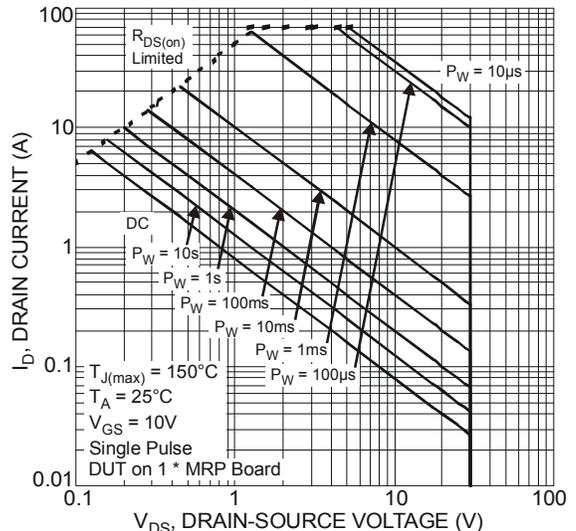
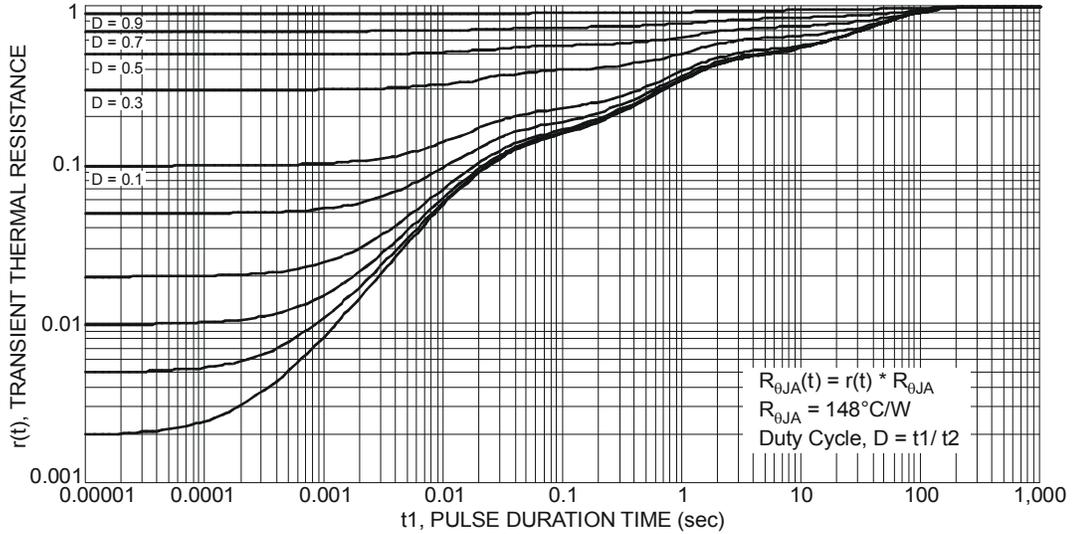
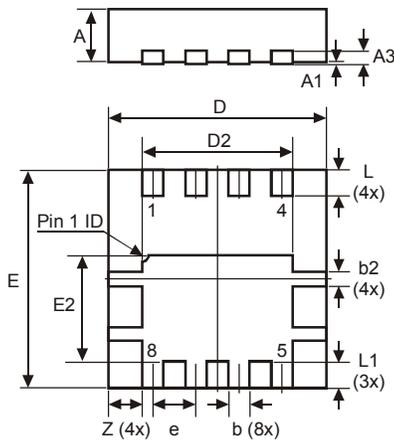


Fig. 12 SOA, Safe Operation Area

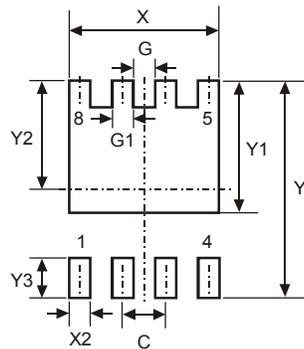


**Package Outline Dimensions**



POWERDI <sup>®</sup> 3333-8			
Dim	Min	Max	Typ
D	3.25	3.35	3.30
E	3.25	3.35	3.30
D2	2.22	2.32	2.27
E2	1.56	1.66	1.61
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3			0.203
b	0.27	0.37	0.32
b2			0.20
L	0.35	0.45	0.40
L1			0.39
e			0.65
Z			0.515
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
C	0.650
G	0.230
G1	0.420
Y	3.700
Y1	2.250
Y2	1.850
Y3	0.700
X	2.370
X2	0.420

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