

**ZXMN2AMC**

**20V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on) max}$	$I_D max$ $T_A = 25^\circ C$ (Notes 4 & 7)
20V	120m $\Omega$ @ $V_{GS} = 4.5V$	3.7A
	300m $\Omega$ @ $V_{GS} = 2.5V$	2.3A

**Description and Applications**

This 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.

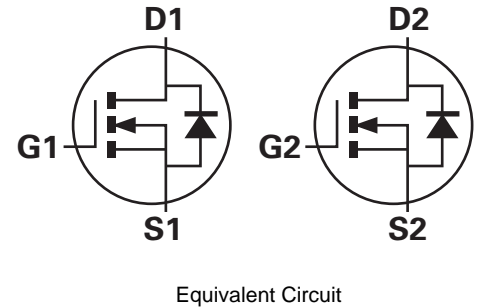
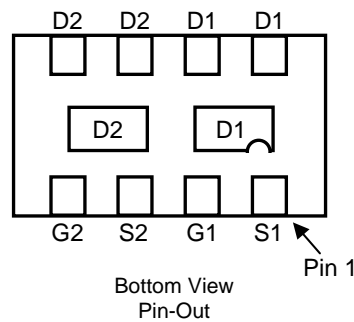
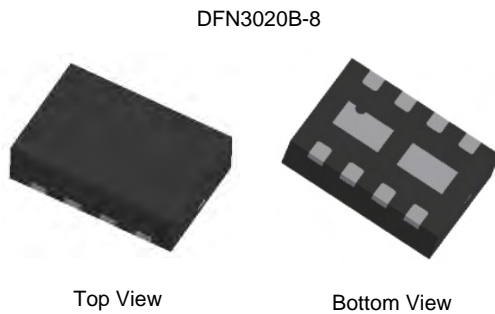
- DC-DC Converters
- Power management functions
- Disconnect switches
- Portable applications

**Features and Benefits**

- Low profile package, for thin applications
- Low  $R_{thj-a}$ , thermally efficient package
- 6mm<sup>2</sup> footprint, 50% smaller than TSOP6 and SOT23-6
- Low on-resistance
- Fast switching speed
- "Lead-Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

**Mechanical Data**

- Case: DFN3020B-8
- Terminals: Pre-Plated NiPdAu leadframe
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)



**Ordering Information** (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN2AMCTA	DNA	7	8	3000

- Notes:
1. No purposefully added lead
  2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
  3. For packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**



DNA = Product Type Marking Code  
Top View, Dot Denotes Pin 1

**ZXMN2AMC**

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

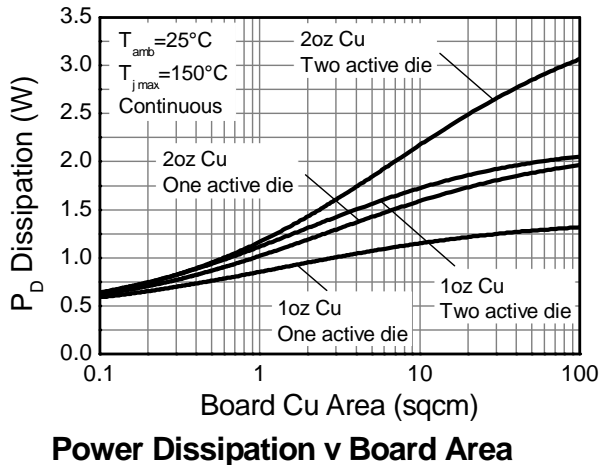
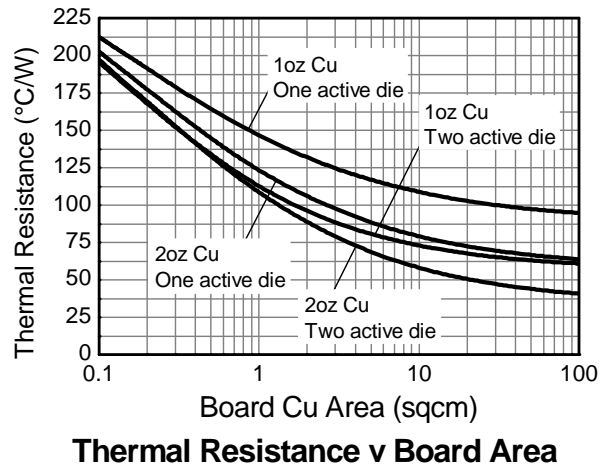
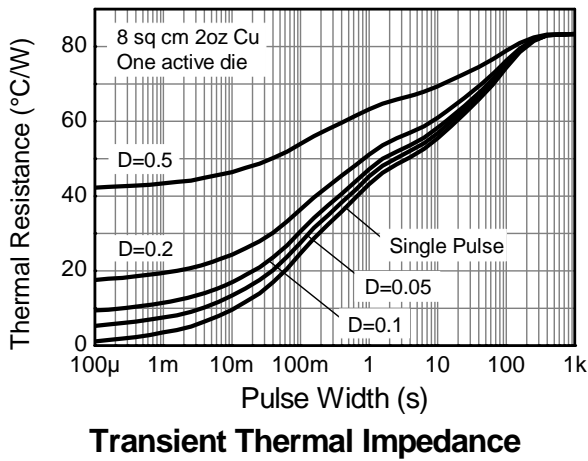
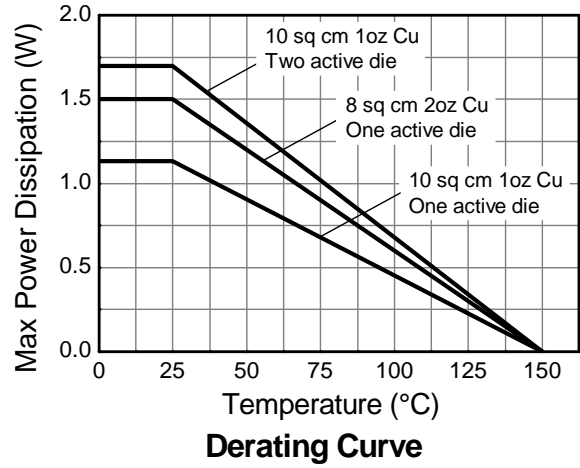
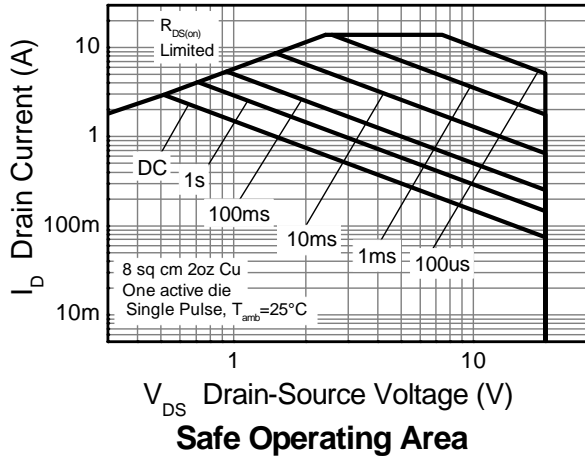
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	
Continuous Drain Current	V <sub>GS</sub> = 4.5V	(Notes 4 & 7)	I <sub>D</sub>	3.7	A
		T <sub>A</sub> = 70°C (Notes 4 & 7)		3.0	
		(Notes 3 & 7)		2.9	
Pulsed Drain Current	V <sub>GS</sub> = 4.5V	(Notes 6 & 7)	I <sub>DM</sub>	13	
Continuous Source Current (Body diode)			I <sub>S</sub>	3.0	
Pulse Source Current (Body diode)			I <sub>SM</sub>	13	

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 3 & 7)	P <sub>D</sub>	1.50	W mW/°C
	(Notes 4 & 7)		12	
	(Notes 5 & 7)		2.45	
	(Notes 5 & 8)		19.6	
	(Notes 5 & 8)		1.13	
Thermal Resistance, Junction to Ambient	(Notes 3 & 7)	R <sub>θJA</sub>	9	°C/W
	(Notes 4 & 7)		1.70	
	(Notes 5 & 7)		13.6	
	(Notes 5 & 8)		83.3	
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	R <sub>θJL</sub>	111	°C
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150		

- Notes:
3. For a device surface mounted on 28mm x 28mm (8 sq cm) FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed drain pads connected to each half.
  4. Same as note (3) except the device is measured at t < 5 sec.
  5. Same as note (3), except the device is surface mounted on 31mm x 31mm (10 sq cm) FR4 PCB with high coverage of single sided 1oz copper.
  6. Same as note (3), except the device is pulsed with D = 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
  7. For a dual device with one active die.
  8. For dual device with 2 active die running at equal power.
  9. Thermal resistance from junction to solder-point (at the end of the drain lead).

**Thermal Characteristics**

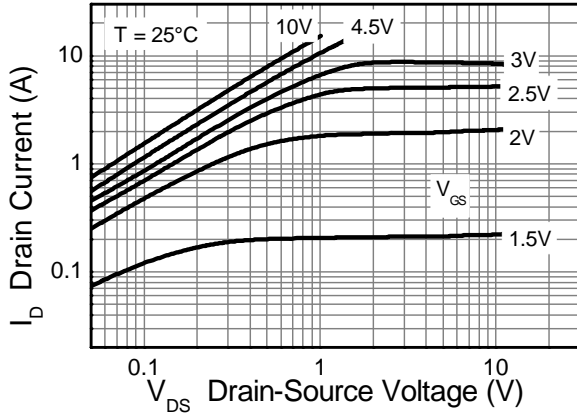


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

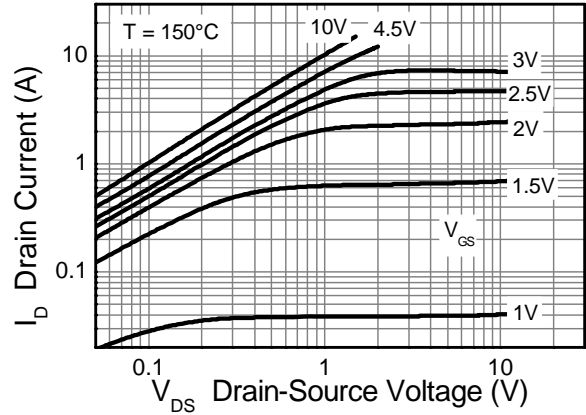
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	-	-	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.7	-	3.0	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 10)	R <sub>DS(on)</sub>	-	0.085	0.120	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4A
			0.140	0.300		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 1.5A
Forward Transconductance (Note 10 & 11)	g <sub>fs</sub>	-	6.2	-	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4A
Diode Forward Voltage (Note 10)	V <sub>SD</sub>	-	0.9	0.95	V	I <sub>S</sub> = 3.2A, V <sub>GS</sub> = 0V
Reverse Recover Time (Note 11)	t <sub>rr</sub>	-	23	-	ns	I <sub>S</sub> = 4A, di/dt = 100A/μs
Reverse Recover Charge (Note 11)	Q <sub>rr</sub>	-	5.7	-	nC	
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance	C <sub>iSS</sub>	-	299	-	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	60	-	pF	
Reverse Transfer Capacitance	C <sub>rSS</sub>	-	33	-	pF	
Total Gate Charge (Note 12)	Q <sub>g</sub>	-	0.8	-	nC	V <sub>GS</sub> = 2.5V
Total Gate Charge (Note 12)	Q <sub>g</sub>	-	3.1	-	nC	V <sub>GS</sub> = 4.5V
Gate-Source Charge (Note 12)	Q <sub>gs</sub>	-	0.7	-	nC	
Gate-Drain Charge (Note 12)	Q <sub>gd</sub>	-	1.0	-	nC	
Turn-On Delay Time (Note 12)	t <sub>D(on)</sub>	-	2.3	-	ns	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4A V <sub>GS</sub> = 5V, R <sub>G</sub> = 6Ω
Turn-On Rise Time (Note 12)	t <sub>r</sub>	-	2.6	-	ns	
Turn-Off Delay Time (Note 12)	t <sub>D(off)</sub>	-	1.6	-	ns	
Turn-Off Fall Time (Note 12)	t <sub>f</sub>	-	1.3	-	ns	

- Notes: 10. Measured under pulsed conditions. Width ≤ 300μs. Duty cycle ≤ 2%.  
 11. For design aid only, not subject to production testing.  
 12. Switching characteristics are independent of operating junction temperature.

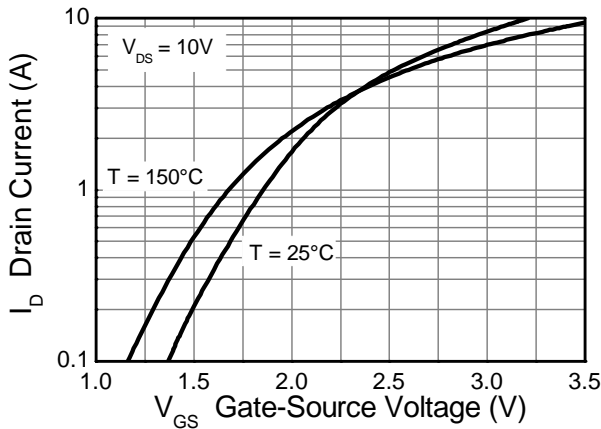
**Typical Electrical Characteristics**



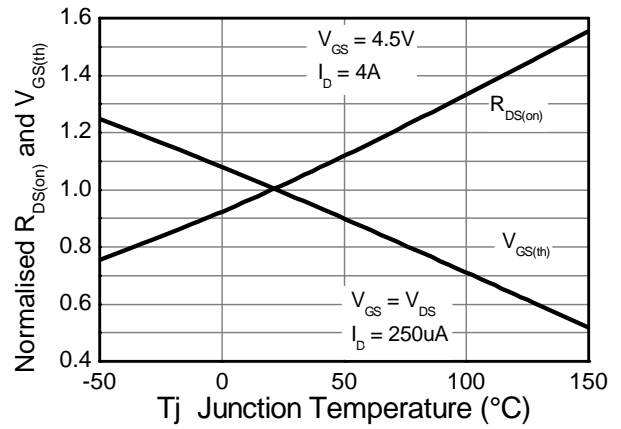
**Output Characteristics**



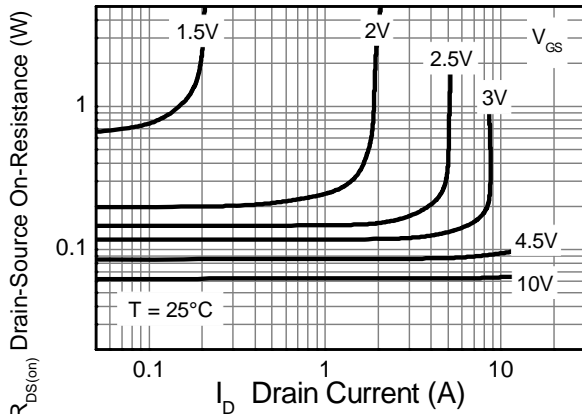
**Output Characteristics**



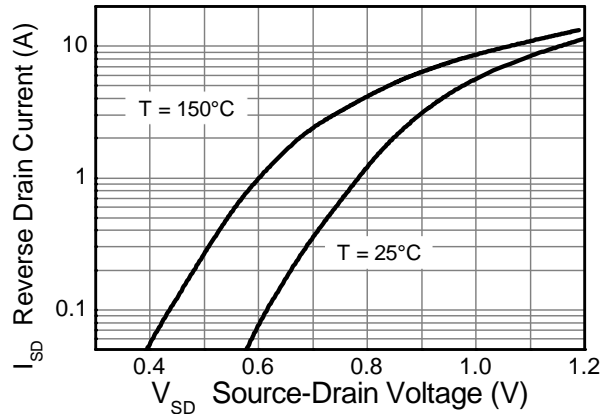
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

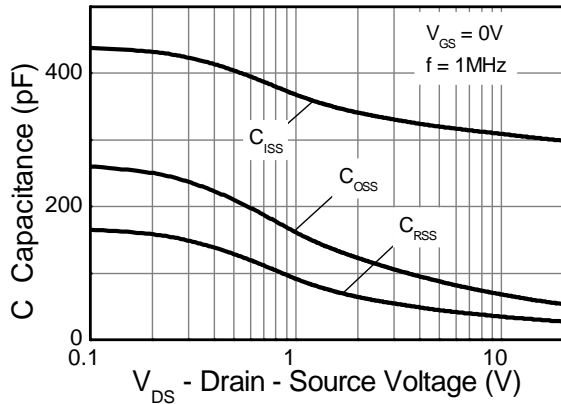


**On-Resistance v Drain Current**

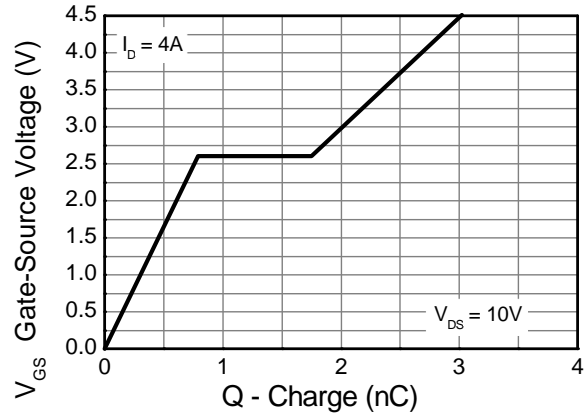


**Source-Drain Diode Forward Voltage**

**Typical Electrical Characteristics - Continued**

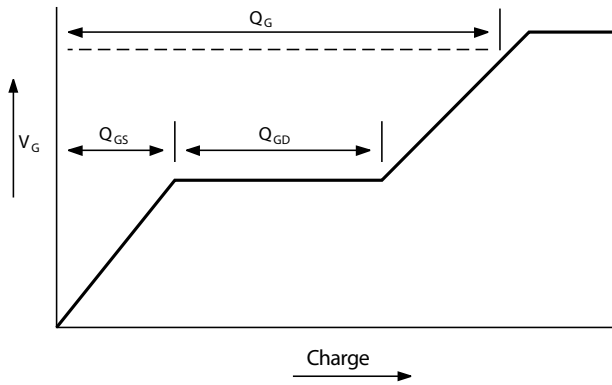


**Capacitance v Drain-Source Voltage**

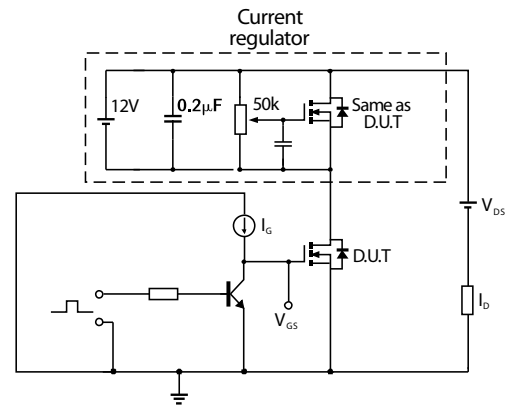


**Gate-Source Voltage v Gate Charge**

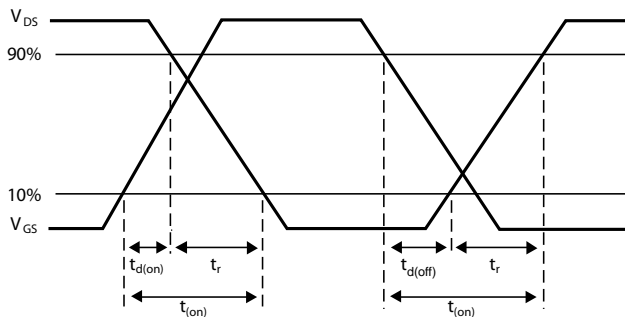
**Test Circuits**



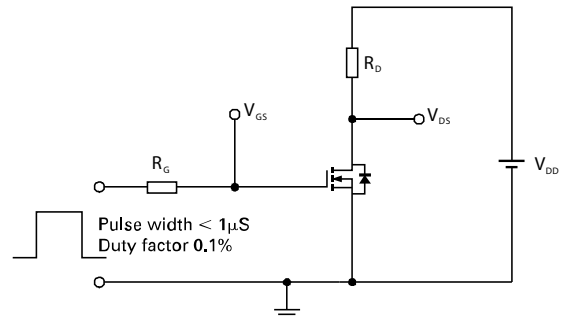
**Basic gate charge waveform**



**Gate charge test circuit**

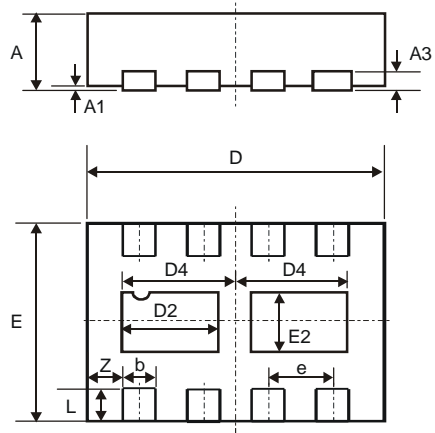


**Switching time waveforms**



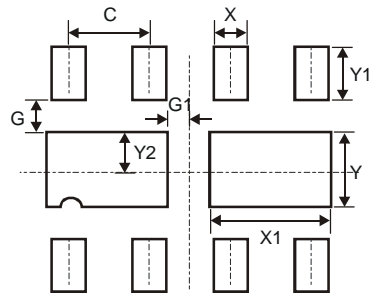
**Switching time test circuit**

**Package Outline Dimensions**



DFN3020B-8			
Dim	Min	Max	Typ
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
C	0.650
G	0.285
G1	0.090
X	0.400
X1	1.120
Y	0.730
Y1	0.500
Y2	0.365

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