ZXTC6720MC

DUAL 80V NPN & 70V PNP LOW SATURATION TRANSISTOR COMBINATION

Features and Benefits

NPN Transistor
- BV_{CEO} > 80V
- I_C = 3.5A Continuous Collector Current
- Low Saturation Voltage (185mV max @ 1A)
- R_{SAT} = 68mΩ for a low equivalent On-Resistance

PNP Transistor
- BV_{CEO} > -70V
- I_C = -2.5A Continuous Collector Current
- Low Saturation Voltage (-220mV max @ -1A)
- R_{SAT} = 117mΩ for a low equivalent On-Resistance

- h_{FE} characterized up to -5A for high current gain hold up
- Low profile 0.8mm high package for thin applications
- $R_{\theta JA}$ efficient, 40% lower than SOT26
- $6mm^2$ footprint, 50% smaller than TSOP6 and SOT26
- **Lead-Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

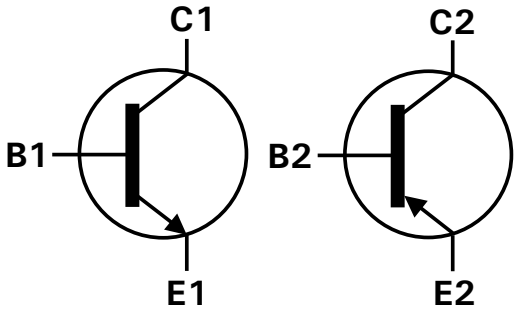
Mechanical Data

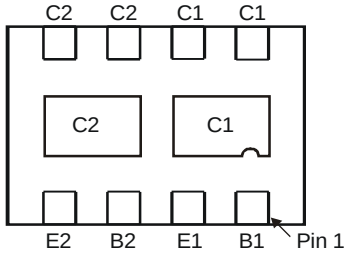
- Case: DFN3020B-8
- Case Material: Molded Plastic. "Green" Molding Compound.
- Terminals: Pre-Plated NiPdAu leadframe.
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.013 grams (approximate)

Applications

- DC – DC Converters
- Charging circuits
- Power switches
- Motor control
- Portable applications

DFN3020B-8





Top View | Bottom View | NPN Transistor | PNP Transistor | Bottom View Pin Out

Equivalent Circuit

Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC6720MCTA	DE4	7	8	3,000

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

DE4 = Product type marking code
Top View, Dot Denotes Pin 1

Maximum Ratings @ T_A = 25°C unless otherwise specified

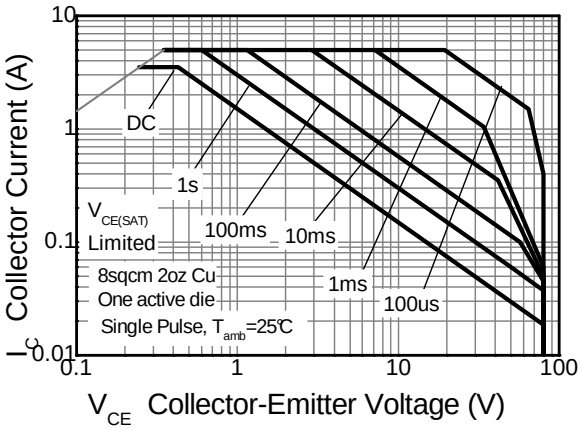
Parameter		Symbol	NPN	PNP	Unit
Collector-Base Voltage		V_{CBO}	100	-70	V
Collector-Emitter Voltage		V_{CEO}	80	-70	
Emitter-Base Voltage		V_{EBO}	7	-7	
Peak Pulse Current		I_{CM}	5	-3	A
Continuous Collector Current	(Notes 4 & 7)	I_C	3.5	-2.5	
	(Notes 5 & 7)		4	-3	
Base Current		I_B	1		

Thermal Characteristics @ T_A = 25°C unless otherwise specified

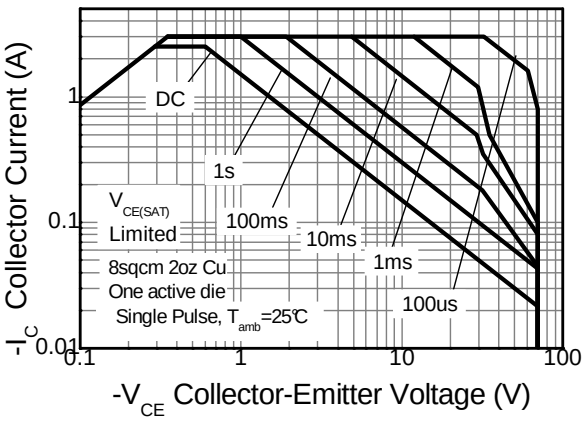
Characteristic		Symbol	NPN	PNP	Unit
Power Dissipation Linear Derating Factor	(Notes 4 & 7)	P_D	1.5 12		W mW/°C
	(Notes 5 & 7)		2.45 19.6		
	(Notes 6 & 7)		1.13 8		
	(Notes 6 & 8)		1.7 13.6		
Thermal Resistance, Junction to Ambient	(Notes 4 & 7)	$R_{\theta JA}$	83.3		°C/W
	(Notes 5 & 7)		51.0		
	(Notes 6 & 7)		111		
	(Notes 6 & 8)		73.5		
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	$R_{\theta JL}$	17.1		
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150		°C

Notes:
4. For a dual device surface mounted on 28mm x 28mm (8cm^2) FR4 PCB with high coverage of single sided 2 oz 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 collector pads connected to each half.
5. Same as note (4), except the device is measured at t <5 sec.
6. Same as note (4), except the device is surface mounted on 31mm x 31mm (10cm^2) FR4 PCB with high coverage of single sided 1oz copper.
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 collector lead).

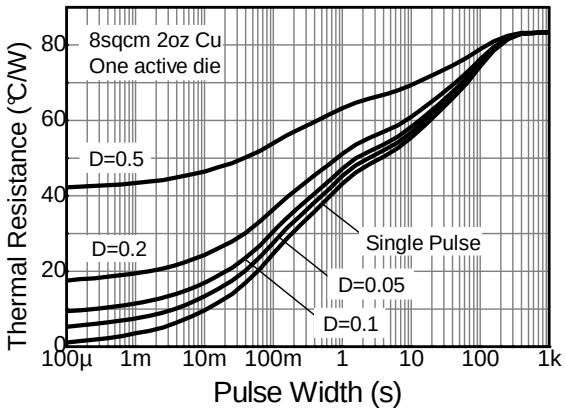
Thermal Characteristics



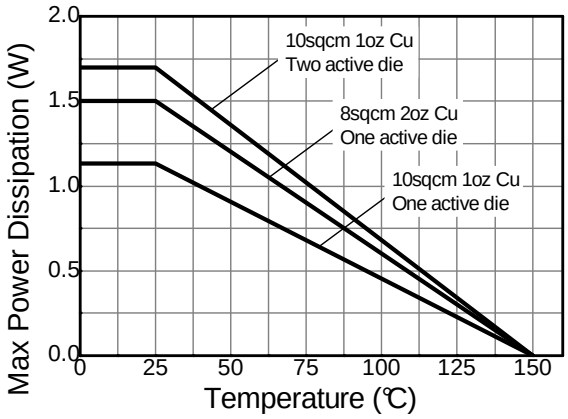
NPN Safe Operating Area



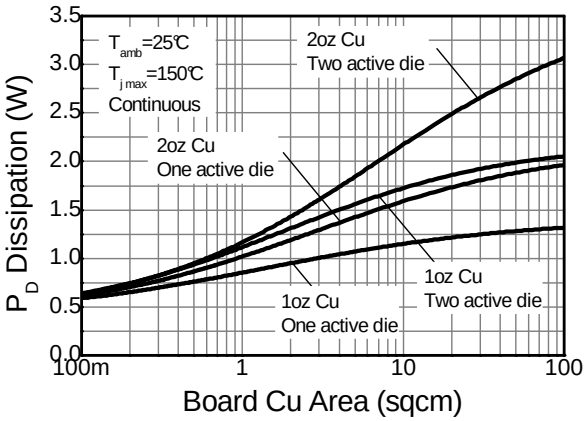
PNP Safe Operating Area



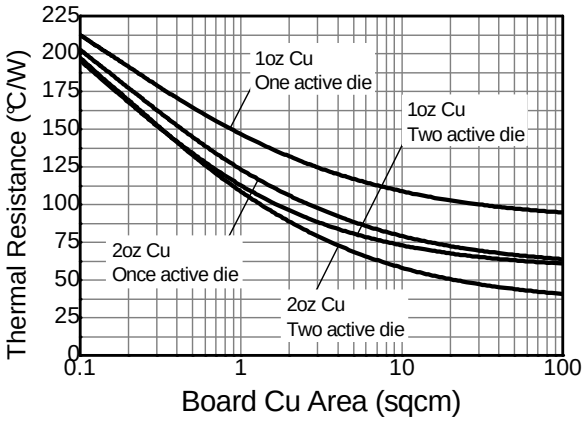
Transient Thermal Impedance



Derating Curve



Power Dissipation v Board Area



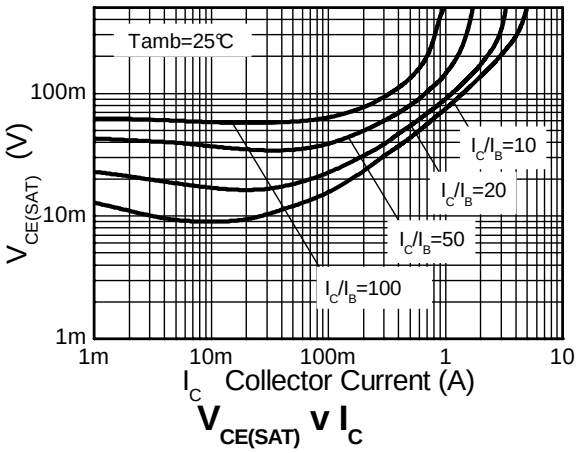
Thermal Resistance v Board Area

Electrical Characteristics, NPN Transistor (at T_A = 25°C unless otherwise specified)

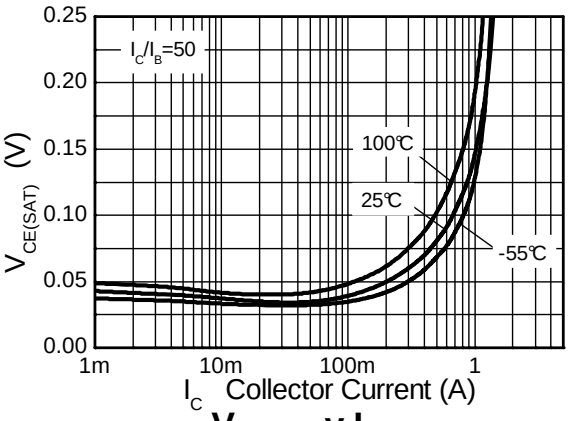
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	100	180	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	80	110	-	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.2	-	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	-	-	100	nA	V_{CB} = 80V
Emitter Cutoff Current	I_{EBO}	-	-	100	nA	V_{EB} = 6V
Collector Emitter Cutoff Current	I_{CES}	-	-	100	nA	V_{CE} = 65V
Static Forward Current Transfer Ratio (Note 10)	h_{FE}	200 300 110 60 20 -	450 450 170 90 30 10	- 900 - - - -	-	I_C = 10mA, V_{CE} = 2V I_C = 200mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 1.5A, V_{CE} = 2V I_C = 3A, V_{CE} = 2V I_C = 5A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	- - - - -	15 45 145 160 240	20 60 185 200 340	mV	I_C = 0.1A, I_B = 10mA I_C = 0.5A, I_B = 50mA I_C = 1A, I_B = 20mA I_C = 1.5A, I_B = 50mA I_C = 3.5A, I_B = 300mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	-	0.96	1.05	V	I_C = 3.5A, V_{CE} = 2V
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	-	1.09	1.175	V	I_C = 3.5A, I_B = 300mA
Output Capacitance	C_{obo}	-	11.5	18	pF	V_{CB} = 10V. f = 1MHz
Transition Frequency	f_T	100	160	-	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Turn-on Time	t_{on}	-	86	-	ns	V_{CC} = 10V, I_C = 1A
Turn-off Time	t_{off}	-	1128	-	ns	I_{B1} = I_{B2} = 25mA

Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

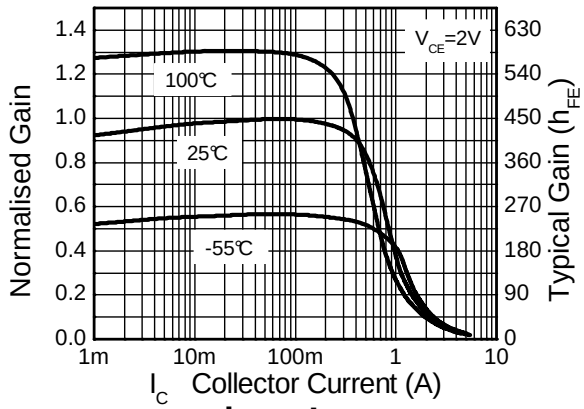
NPN - Typical Electrical Characteristics



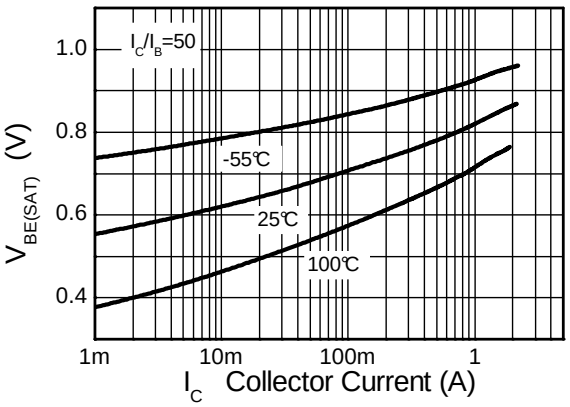
$V_{CE(SAT)}$ v I_C



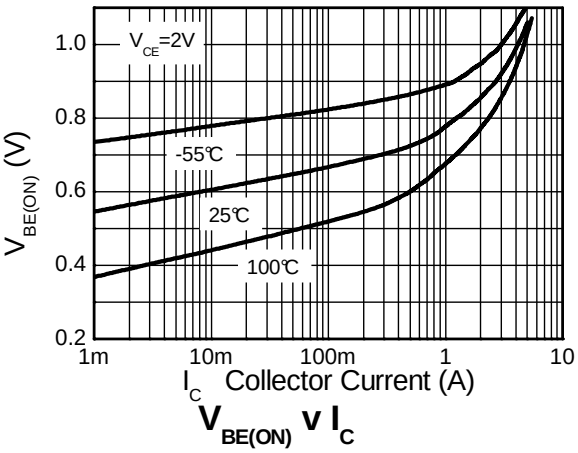
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



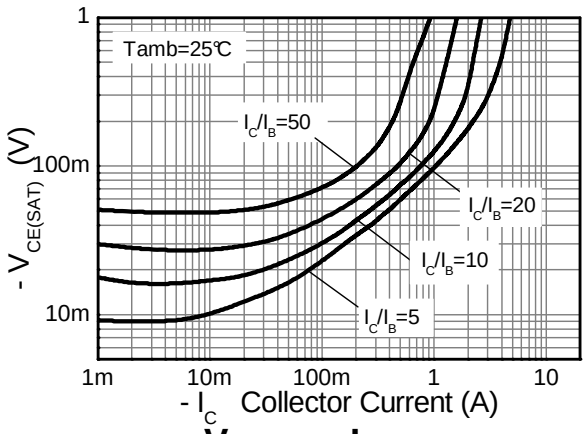
$V_{BE(ON)}$ v I_C

PNP - Electrical Characteristics @T_A = 25°C unless otherwise specified

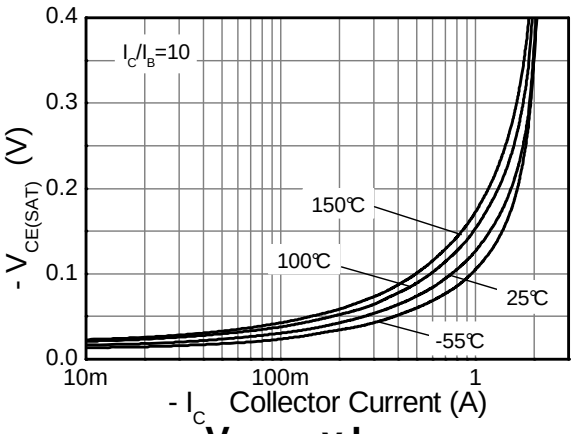
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-70	-150	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 11)	$V_{(BR)CEO}$	-70	-125	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-7	-8.5	-	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	V_{CB} = -55V
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	V_{EB} = -6V
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	V_{CE} = -55V
Static Forward Current Transfer Ratio (Note 11)	h_{FE}	200 300 175 40 -	470 450 275 60 10	- - - - -	-	I_C = -10mA, V_{CE} = -5V I_C = -100mA, V_{CE} = -5V I_C = -1A, V_{CE} = -5V I_C = -1.5A, V_{CE} = -5V I_C = -3A, V_{CE} = -5V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	- - - -	-35 -135 -140 -175	-50 -200 -220 -270	mV	I_C = -0.1A, I_B = -10mA I_C = -0.5A, I_B = -20mA I_C = -1.0A, I_B = -100mA I_C = -1.5A, I_B = -200mA
Base-Emitter Turn-On Voltage (Note 11)	$V_{BE(on)}$	-	0.78	1.00	V	I_C = -1.5A, V_{CE} = -5V
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	-	0.94	1.05	V	I_C = -1.5A, I_B = -200mA
Output Capacitance	C_{obo}	-	14	20	pF	V_{CB} = -10V. f = 1MHz
Transition Frequency	f_T	150	180	-	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Turn-on Time	t_{on}	-	40	-	ns	V_{CC} = -50V, I_C = -1A
Turn-off Time	t_{off}	-	700	-	ns	I_{B1} = I_{B2} = -50mA

Notes: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

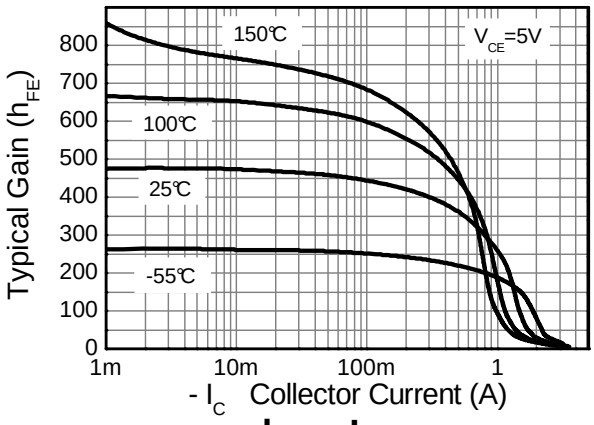
PNP - Typical Electrical Characteristics



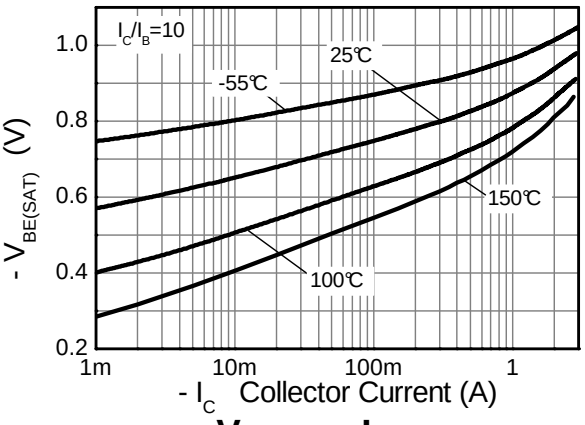
$V_{CE(SAT)}$ v I_C



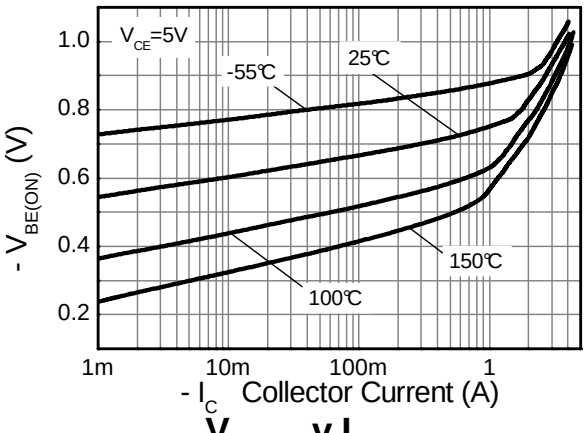
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C

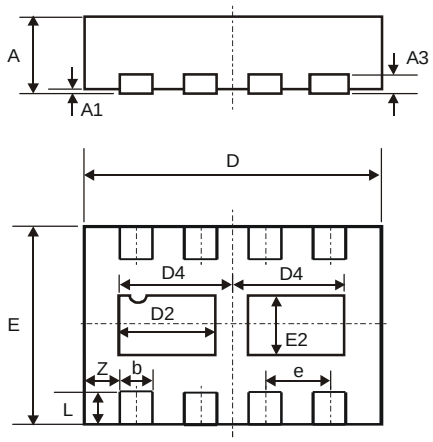


$V_{BE(SAT)}$ v I_C



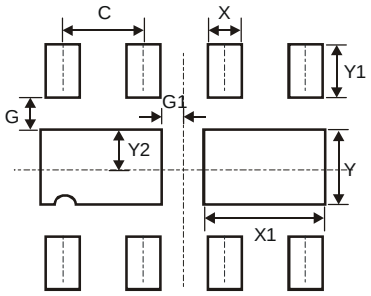
$V_{BE(ON)}$ v I_C

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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