

20V P-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

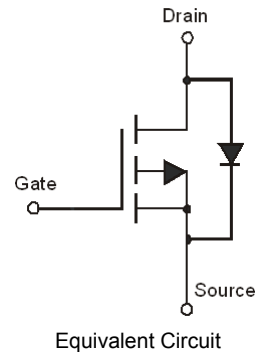
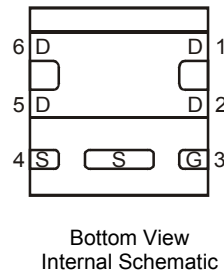
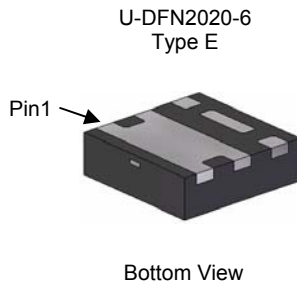
$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	I_D $T_A = +25^\circ\text{C}$
-20V	36m Ω @ $V_{GS} = -4.5\text{V}$	U-DFN2020-6 Type E	-6.2A
	56m Ω @ $V_{GS} = -2.5\text{V}$		-5.0A
	75m Ω @ $V_{GS} = -1.8\text{V}$		-4.2A

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

- General Purpose Interfacing Switch
- Power Management Functions
- Analog Switch


Features

- 0.6mm profile – ideal for low profile applications
- PCB footprint of 4mm²
- Low Gate Threshold Voltage
- Low On-Resistance
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

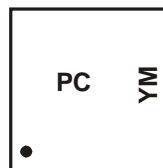
Mechanical Data

- Case: U-DFN2020-6 Type E
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Weight: 0.0065 grams (approximate)

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2066UFDE-7	U-DFN2020-6 Type E	3,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com>.

Marking Information


PC = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Y = 2011)
 M = Month (ex: 9 = September)
 Dot Denotes Pin 1

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-6.2 -4.9	A
	t < 5s	T _A = +25°C T _A = +70°C	I _D	-7.5 -5.9	A
Continuous Drain Current (Note 5) V _{GS} = -1.8V	Steady State	T _A = +25°C T _A = +70°C	I _D	-4.2 -3.4	A
	t < 5s	T _A = +25°C T _A = +70°C	I _D	-5.2 -4.1	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	-25	A
Maximum Continuous Body Diode Forward Current (Note 5)			I _S	2.5	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)		P _D	0.66	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	189	°C/W
	t < 5s		123	°C/W
Total Power Dissipation (Note 5)		P _D	2.03	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	61	°C/W
	t < 5s		40	°C/W
Thermal Resistance, Junction to Case (Note 5)		R _{θJC}	9.3	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	µA	V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12.0V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	-0.4	—	-1.1	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(on)}	—	25	36	mΩ	V _{GS} = -4.5V, I _D = -4.6A
		—	33	56		V _{GS} = -2.5V, I _D = -3.8A
		—	50	75		V _{GS} = -1.8V, I _D = -2.0A
Forward Transfer Admittance	Y _{fs}	—	9	—	S	V _{DS} = -10V, I _D = -4.5A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -2.1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	1537	—	pF	V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	146	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	127	—	pF	
Gate Resistance	R _g	—	10.4	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	—	14.4	—	nC	V _{DS} = -10V, V _{GS} = -4.5V I _D = -4.5A
Gate-Source Charge	Q _{gs}	—	2.6	—		
Gate-Drain Charge	Q _{gd}	—	2.7	—		
Turn-On Delay Time	t _{D(on)}	—	13.7	—	ns	V _{DD} = -10V, V _{GS} = -4.5V, R _G = 6Ω, R _L = 10Ω, I _D = -1A
Turn-On Rise Time	t _r	—	14.0	—		
Turn-Off Delay Time	t _{D(off)}	—	79.1	—		
Turn-Off Fall Time	t _f	—	35.5	—		

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

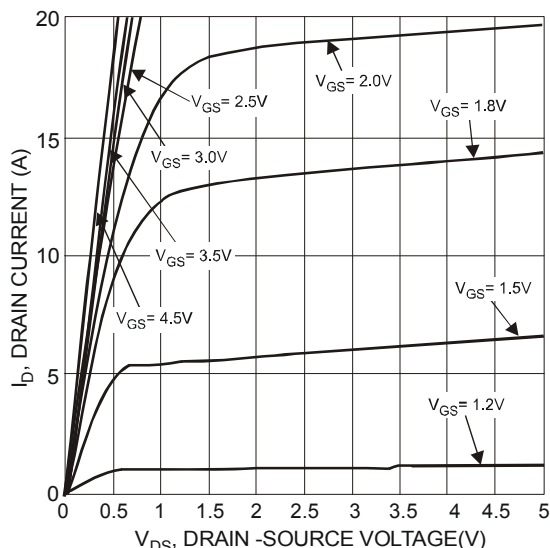


Fig. 1 Typical Output Characteristics

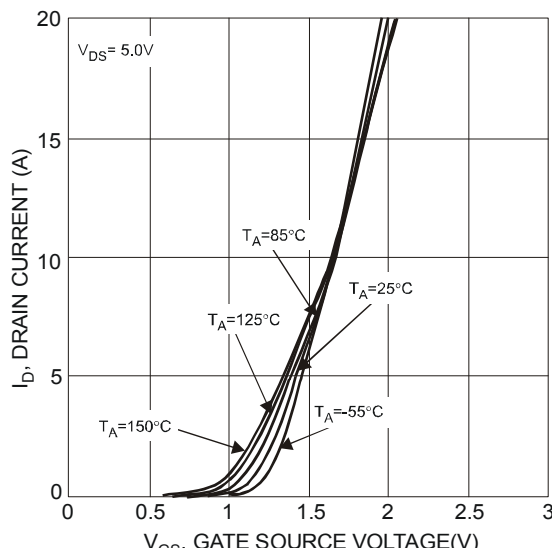


Fig. 2 Typical Transfer Characteristics

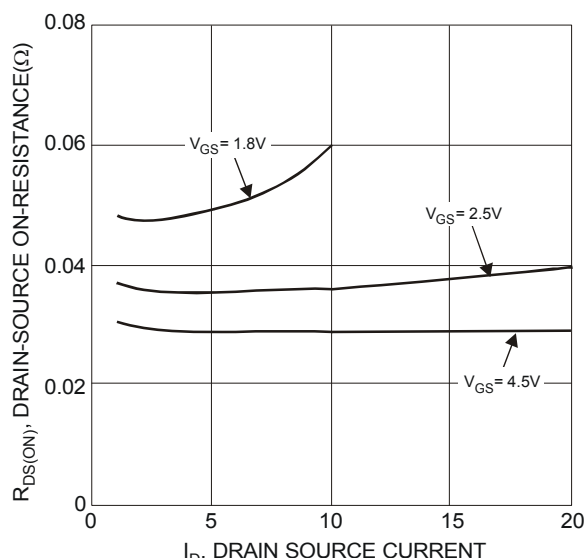


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

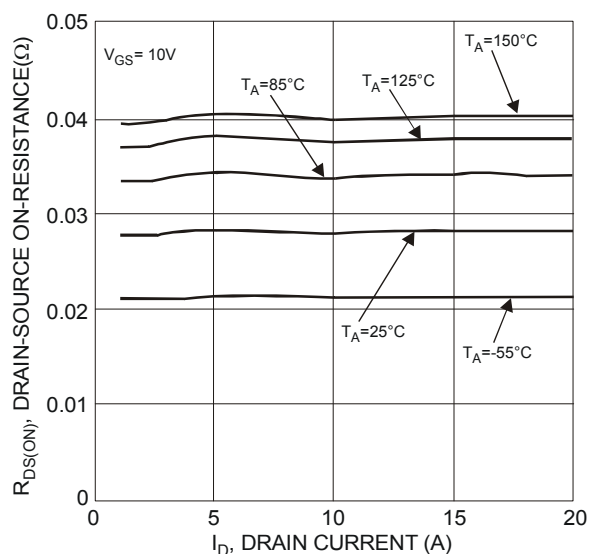


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

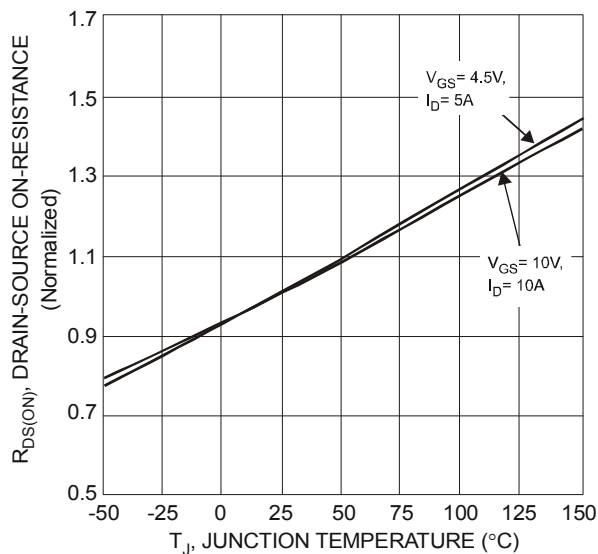


Fig. 5 On-Resistance Variation with Temperature

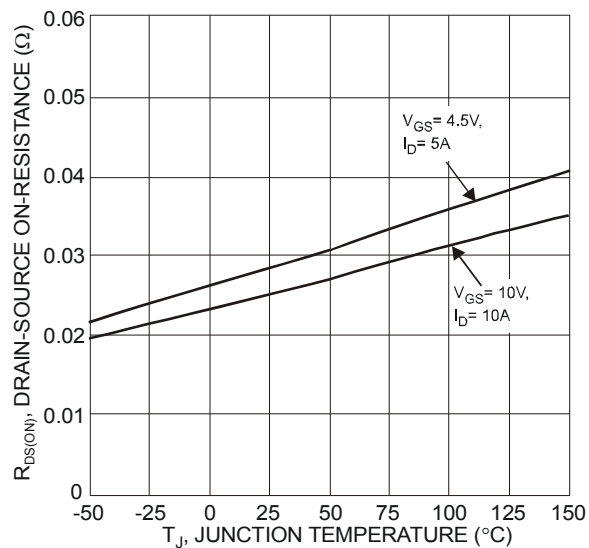


Fig. 6 On-Resistance Variation with Temperature

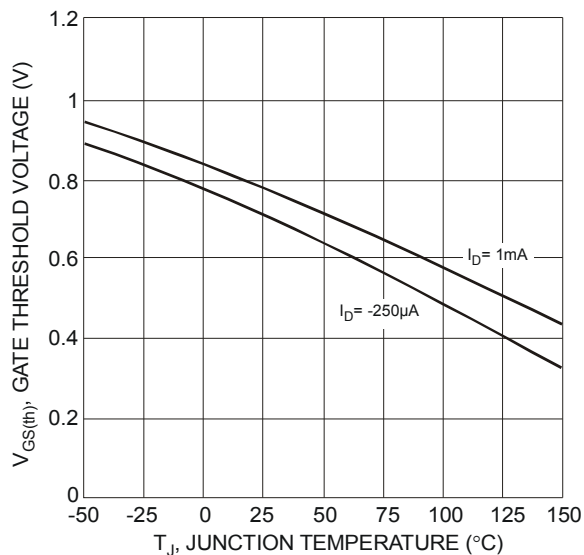


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

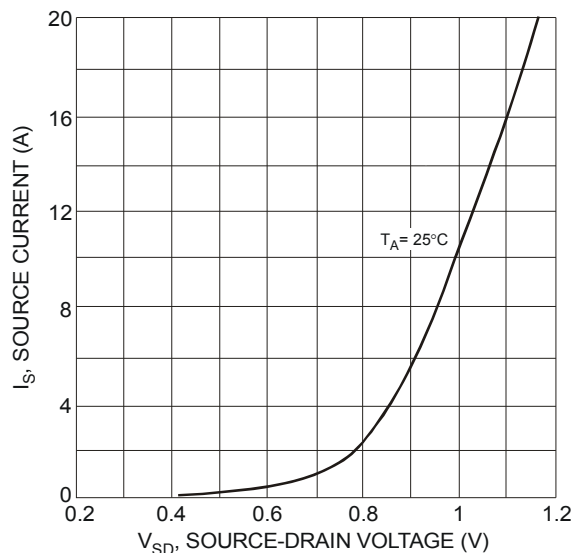


Fig. 8 Diode Forward Voltage vs. Current

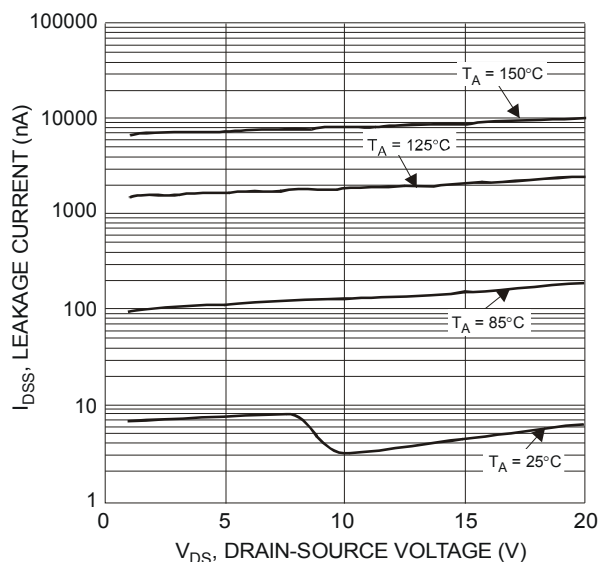


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

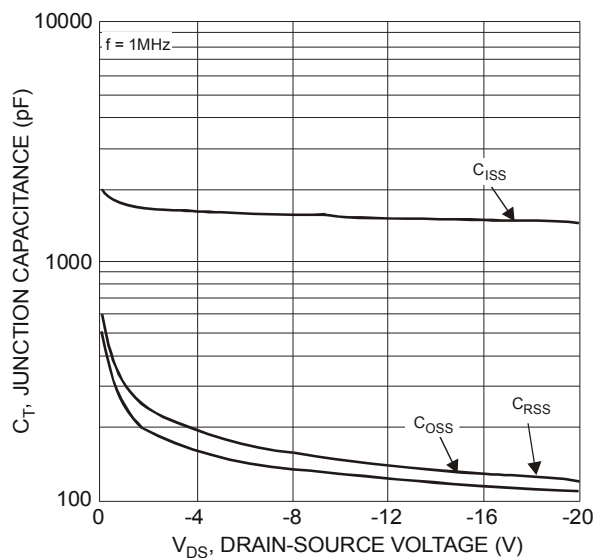


Fig. 10 Typical Junction Capacitance

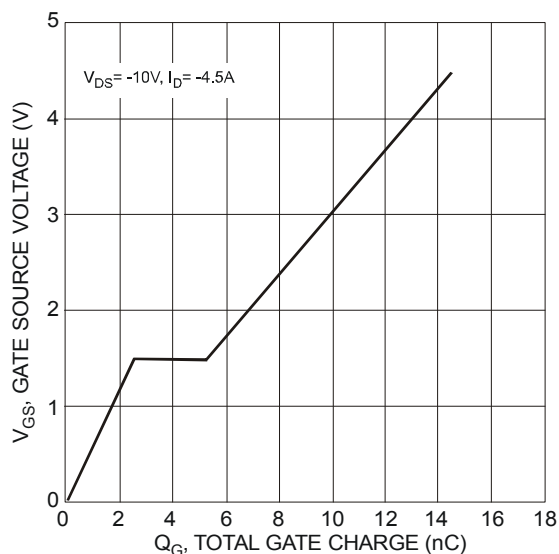


Fig. 11 Gate Charge Characteristics

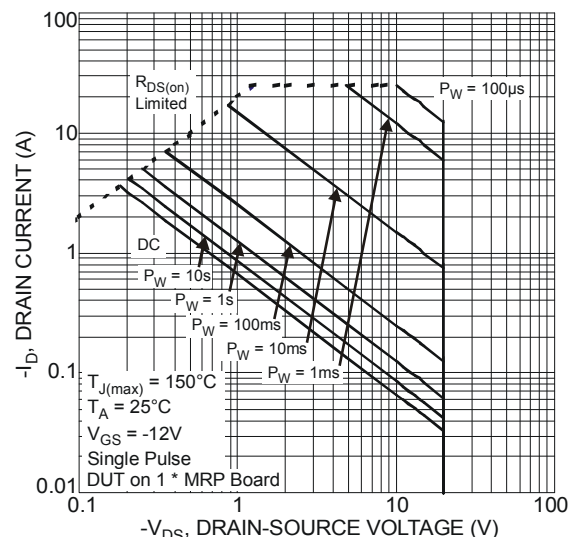
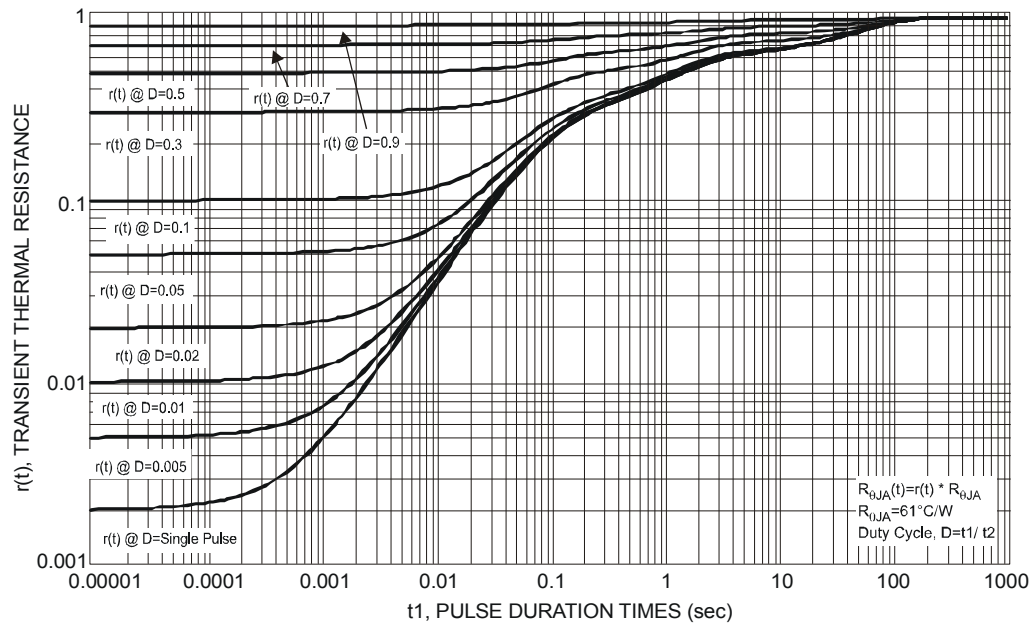
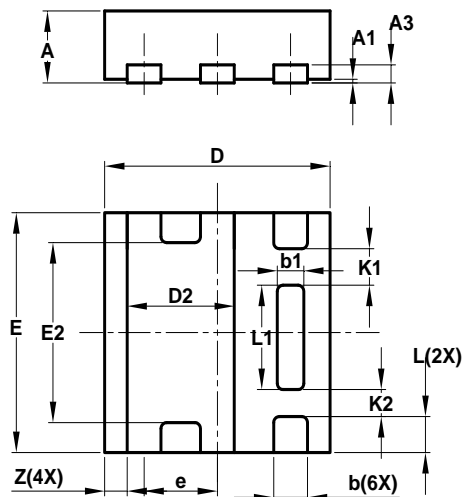


Fig. 12 SOA, Safe Operation Area

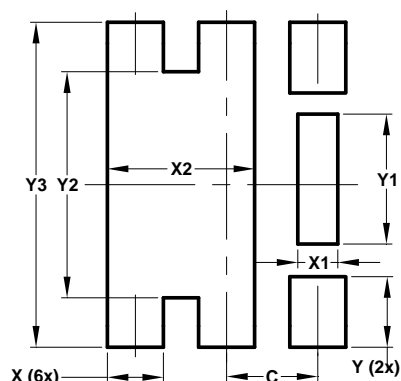


Package Outline Dimensions



U-DFN2020-6 Type E			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	—	—	0.15
b	0.25	0.35	0.30
b1	0.185	0.285	0.235
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	—	—	0.65
L	0.25	0.35	0.30
L1	0.82	0.92	0.87
K1	—	—	0.305
K2	—	—	0.225
Z	—	—	0.20
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.285
X2	1.050
Y	0.500
Y1	0.920
Y2	1.600
Y3	2.300

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