

Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	I_D $T_C = +25^\circ\text{C}$
700V	1.25Ω @ $V_{GS} = 10\text{V}$	3.9A

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

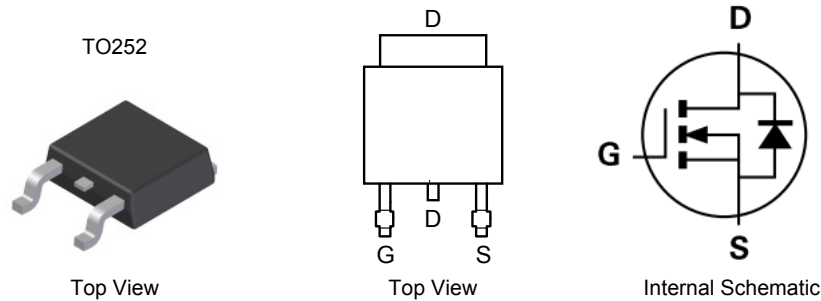
- Switching

Features

- 100% Unclamped Inductive Switch (UIS) test in production
- Low Gate Input Resistance
- Low Input Capacitance
- 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: TO252 (DPAK)
- 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
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 E3
- Weight: 0.33 grams (approximate)

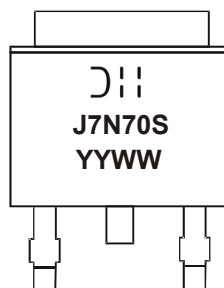


Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMJ7N70SK3-13	Standard	TO252	2,500/Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 - See 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.
 - 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/products/packages.html>.

Marking Information



J7N70S = Manufacturer's Marking
 J7N70S = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 13 = 2013)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V _{DSS}	700	V
Gate-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current (Note 5) V _{GS} = 10V	I _D	T _C = +25°C	3.9
		T _C = +100°C	2.5
Maximum Body Diode Forward Current (Note 5)	I _S	3.0	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	15.6	A
Avalanche Current (Note 6)	I _{AR}	1.5	A
Avalanche Energy (Note 6)	E _{AR}	76	mJ
Peak Diode Recovery dv/dt	dv/dt	11.8	V/ns

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P _D	T _C = +25°C	28
		T _C = +100°C	11
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	38	°C/W
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	2.1	
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}	700	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 700V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	100	nA	V _{GS} = ±30V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	2	2.9	4	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(on)}	—	1	1.25	Ω	V _{GS} = 10V, I _D = 2.5A
Diode Forward Voltage	V _{SD}	—	0.9	1.3	V	V _{GS} = 0V, I _S = 5A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	351	—	pF	V _{DS} = 50V, f = 1MHz, V _{GS} = 0V
Output Capacitance	C _{oss}	—	66	—		
Reverse Transfer Capacitance	C _{rss}	—	1.1	—		
Gate Resistance	R _G	—	3.5	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	13.9	—	nC	V _{DD} = 560V, I _D = 5A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	1.9	—		
Gate-Drain Charge	Q _{gd}	—	8.5	—		
Turn-On Delay Time	t _{D(on)}	—	8.5	—	ns	V _{DD} = 350V, V _{GS} = 10V, R _G = 4.7Ω, I _D = 2.5A
Turn-On Rise Time	t _r	—	11.6	—		
Turn-Off Delay Time	t _{D(off)}	—	24.5	—		
Turn-Off Fall Time	t _f	—	10	—		
Body Diode Reverse Recovery Time	t _{rr}	—	212	—	ns	I _S = 5A, dI/dt = 100A/µs
Body Diode Reverse Recovery Time (T _J = +150°C)	t _{rr}	—	251	—	ns	
Body Diode Reverse Recovery Charge	Q _{rr}	—	1.8	—	µC	
Body Diode Reverse Recovery Charge (T _J = +150°C)	Q _{rr}	—	2.3	—	µC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
 - UIS in production with V_{DD} = 50V, V_{GS} = 10V, L = 60mH, T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect
 - Guaranteed by design. Not subject to production testing

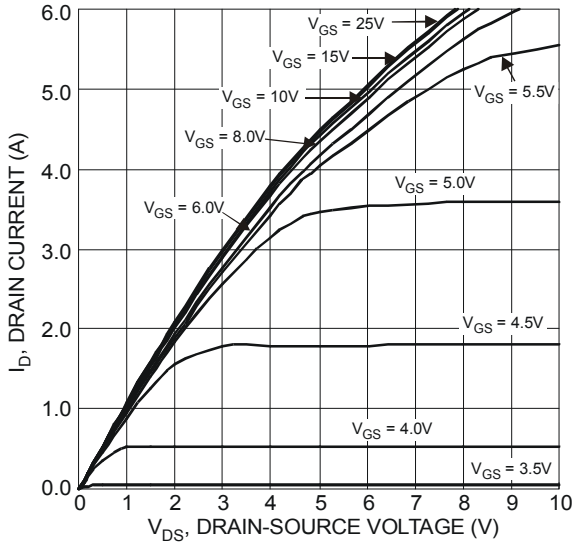


Figure 1 Typical Output Characteristics

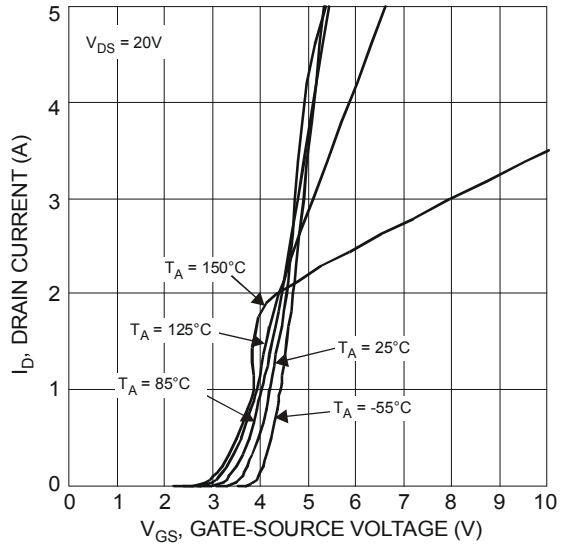


Figure 2 Typical Transfer Characteristics

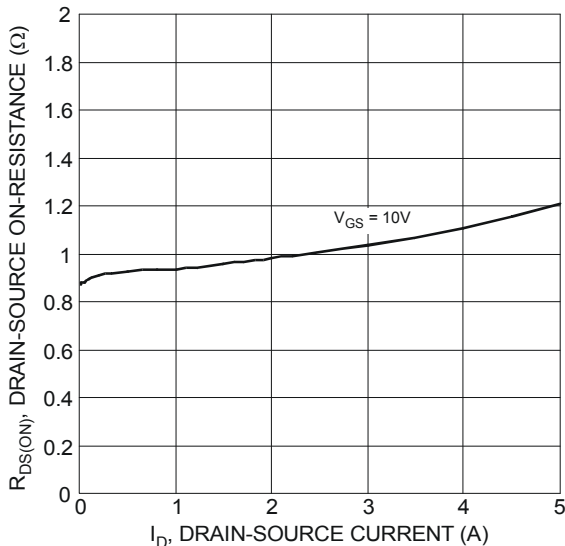


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

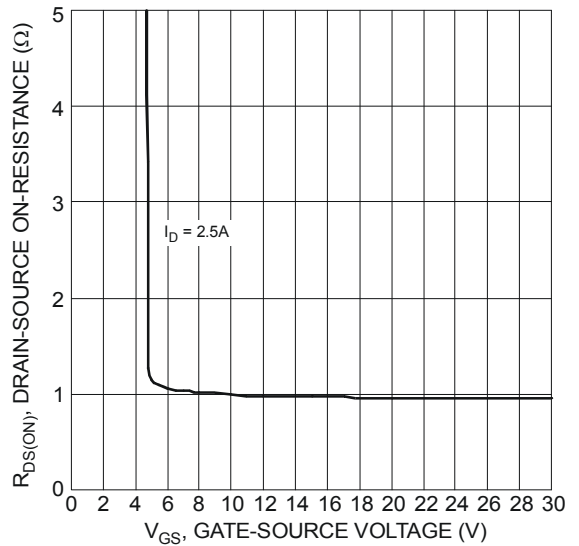


Figure 4 Typical Transfer Characteristics

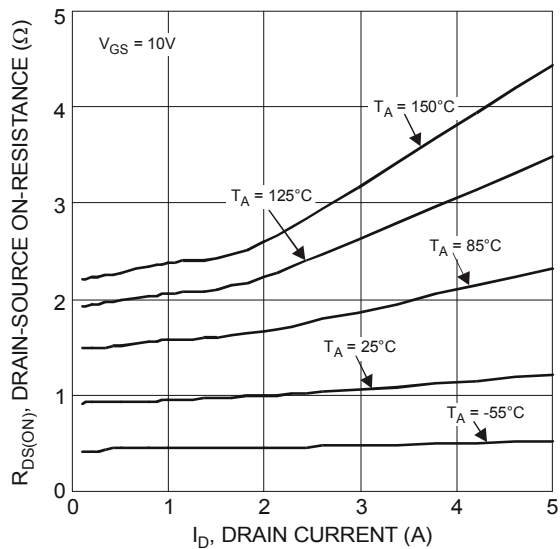


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

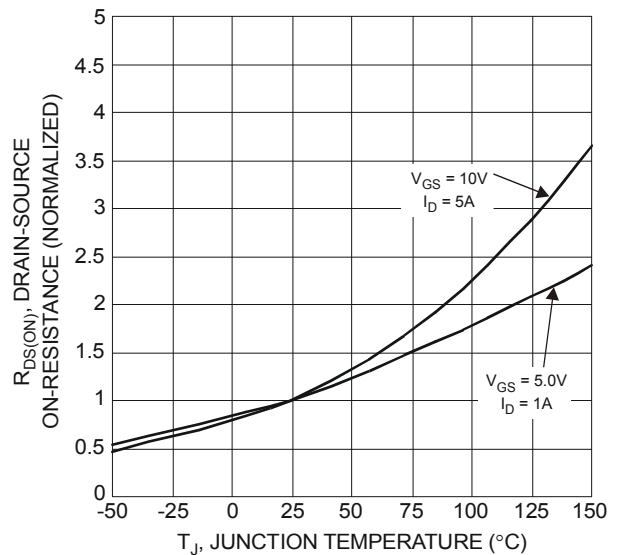


Figure 6 On-Resistance Variation with Temperature

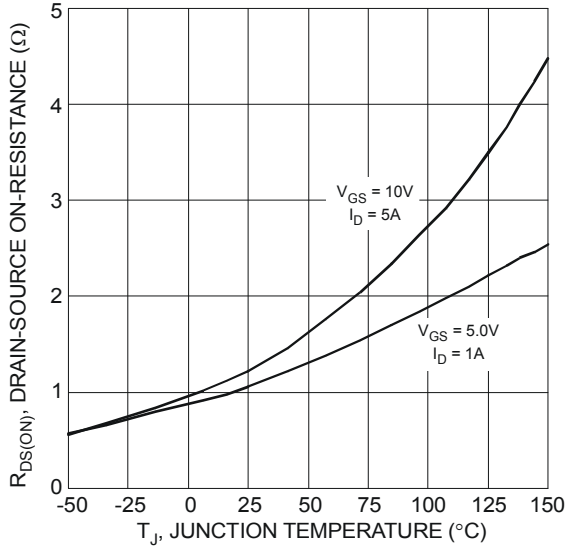


Figure 7 On-Resistance Variation with Temperature

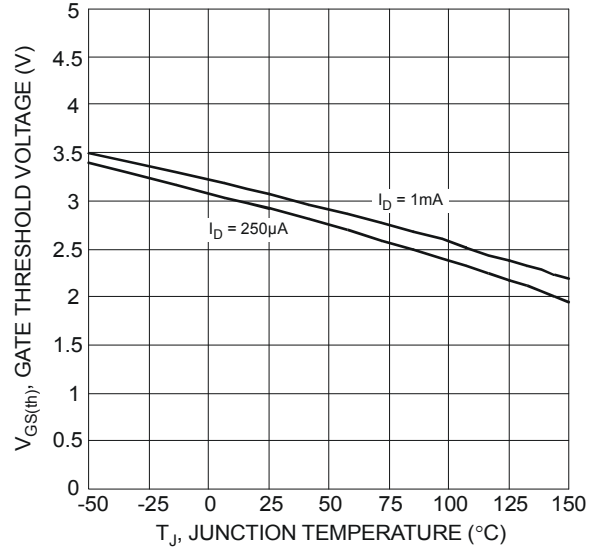


Figure 8 Gate Threshold Variation vs. Ambient Temperature

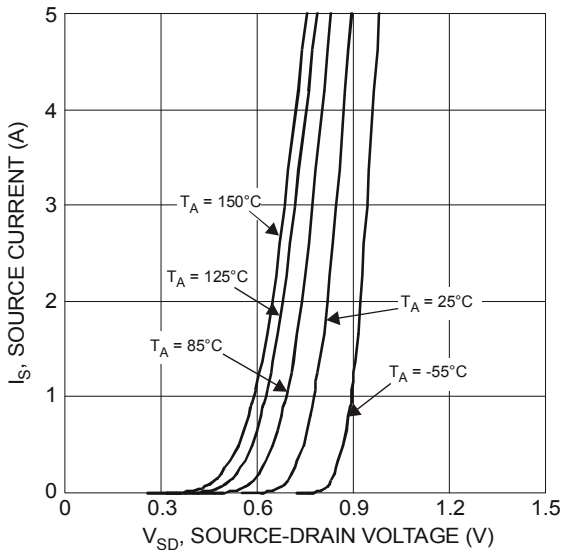


Figure 9 Diode Forward Voltage vs. Current

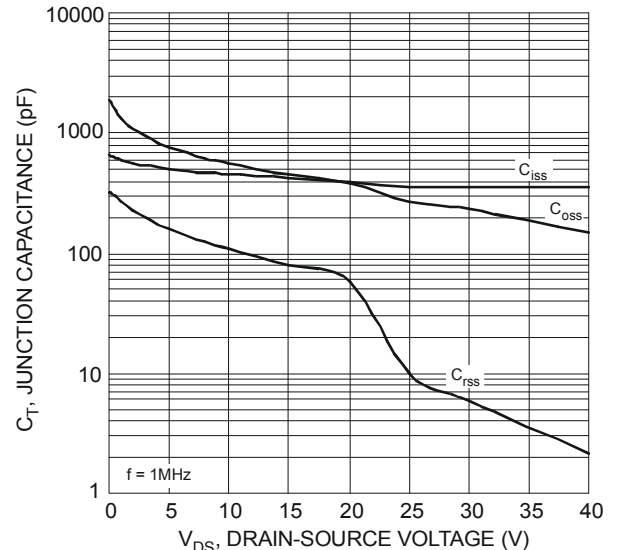


Figure 10 Typical Junction Capacitance

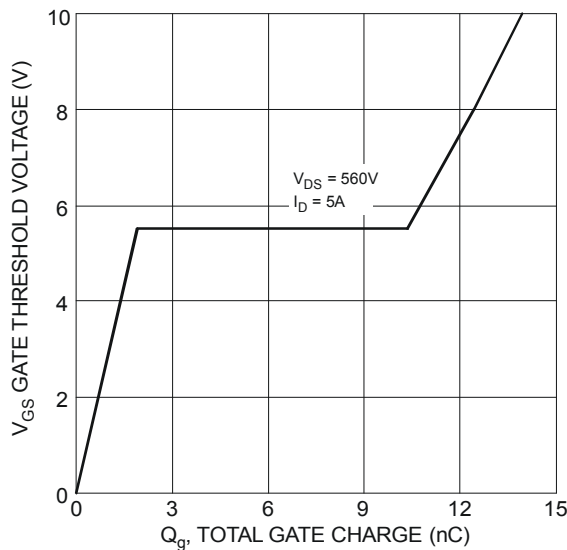


Figure 11 Gate Charge

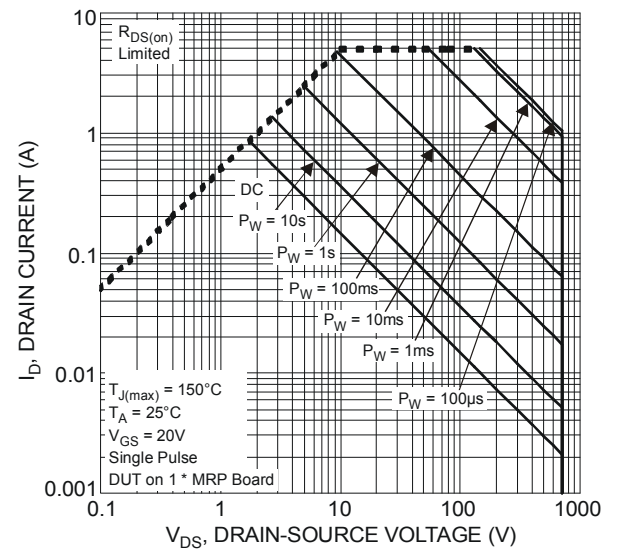


Figure 12 SOA, Safe Operation Area

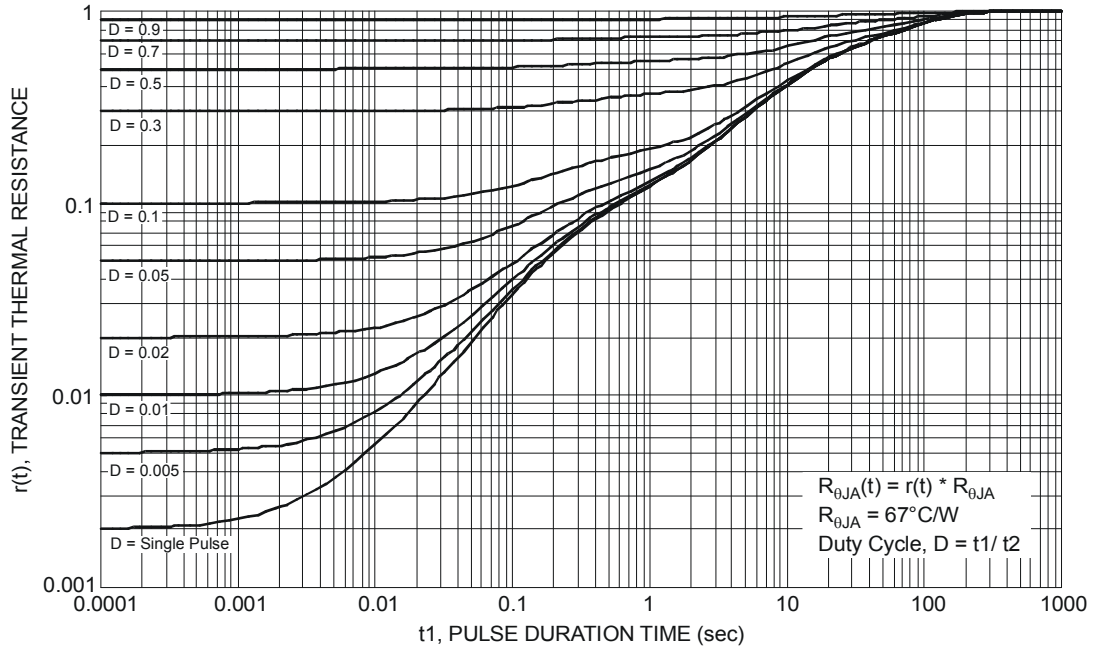
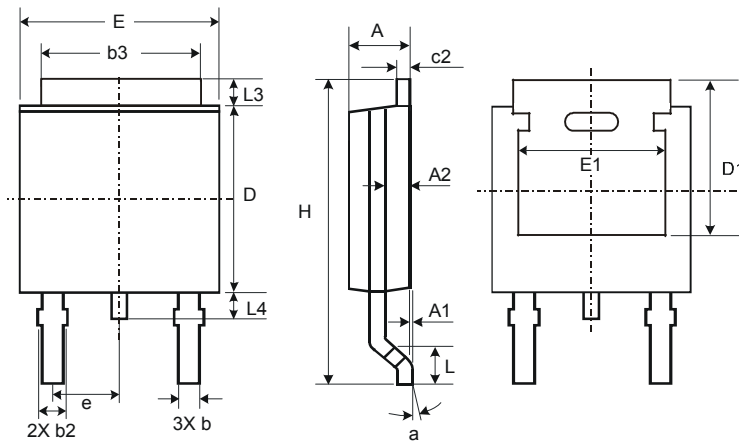


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

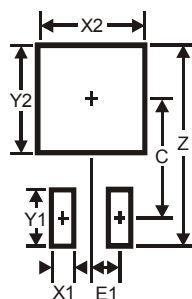
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



TO252			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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