100V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)\ max}$	I_D T_C = +25°C
100V	80mΩ @ V_{GS} = 10V	18A
	100mΩ @ V_{GS} = 4.5V	16A

Description

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Applications

- Power Management Functions
- DC-DC Converters

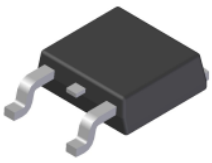
Features

- Low $R_{DS(ON)}$ – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

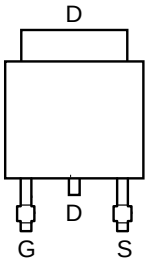
Mechanical Data

- Case: TO252
- 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)

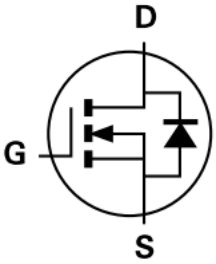
TO252



Top View



Top View



Internal Schematic

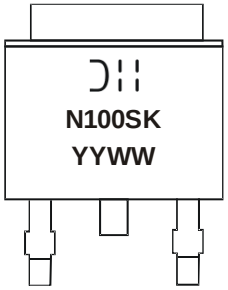
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN10H100SK3-13	TO252	2,500/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. 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.
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

TO252



=Manufacturer's Marking
N100SK= Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 14 = 2014)
WW = Week Code (01 to 53)

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

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	T_C = +25°C T_C = +70°C	I_D	18 14	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)		I_{DM}	16	A
Avalanche Current, L = 1mH (Note 7)		I_{AS}	8	A
Avalanche Energy, L = 1mH (Note 7)		E_{AS}	32.6	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	37	W
	T_C = +70°C		24	
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	46	°C/W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	3.3	
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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 80V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	2.0	3.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	65	80	mΩ	V_{GS} = 10V, I_D = 3.3A
		—	70	100		V_{GS} = 4.5V, I_D = 2A
Diode Forward Voltage	V_{SD}	—	0.77	—	V	V_{GS} = 0V, I_S = 3.2A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	1172	—	pF	V_{DS} = 50V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	40.8	—		
Reverse Transfer Capacitance	C_{rss}	—	31.3	—		
Gate Resistance	R_G	—	1.6	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	25.2	—	nC	V_{DS} = 50V, I_D = 3.3A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	12.2	—		
Gate-Source Charge	Q_{gs}	—	5.3	—		
Gate-Drain Charge	Q_{gd}	—	5.9	—		
Turn-On Delay Time	$t_{D(ON)}$	—	5.4	—	ns	V_{DD} = 50V, R_G = 6.0Ω, I_D = 3.3A
Turn-On Rise Time	t_R	—	5.9	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	20	—		
Turn-Off Fall Time	t_F	—	7.3	—		
Body Diode Reverse Recovery Time	t_{RR}	—	19.7	—	ns	I_F = 3.3A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	15.9	—	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
6. Device mounted on infinite heatsink.
7. Guaranteed by design. Not subject to product testing.
8. Short duration pulse test used to minimize self-heating effect.

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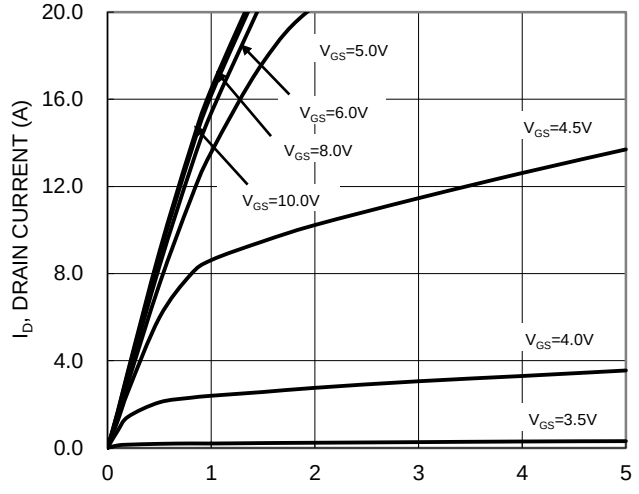


Figure 1. Typical Output Characteristic

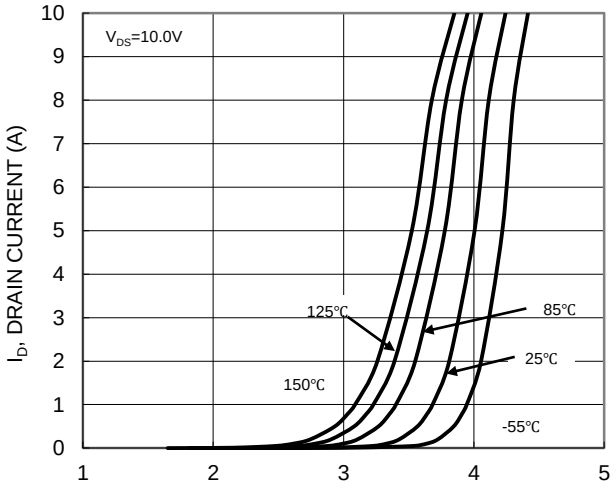


Figure 2. Typical Transfer Characteristic

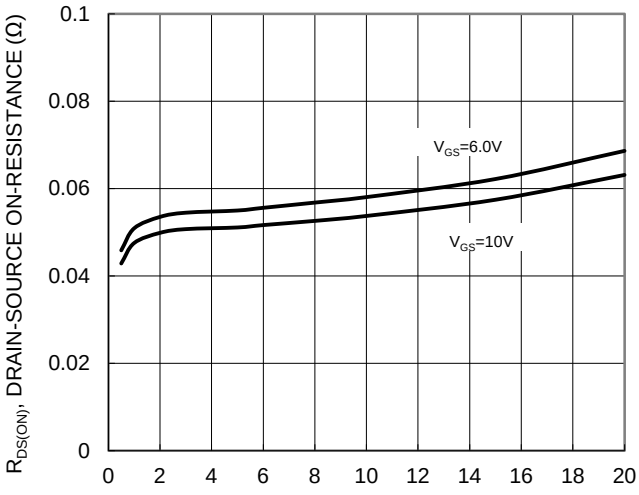


Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

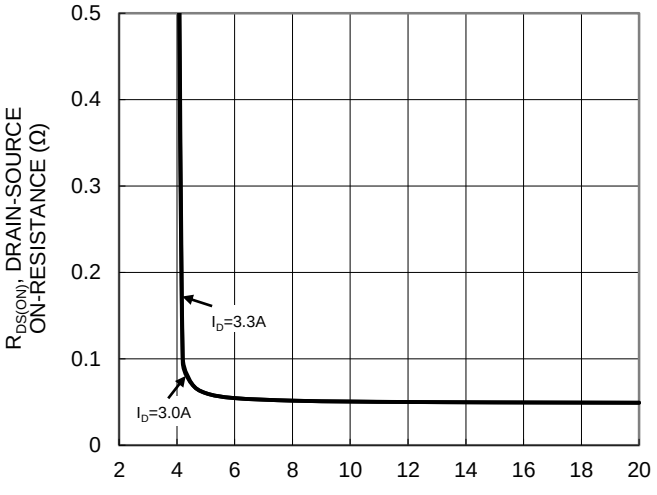


Figure 4. Typical Transfer Characteristic

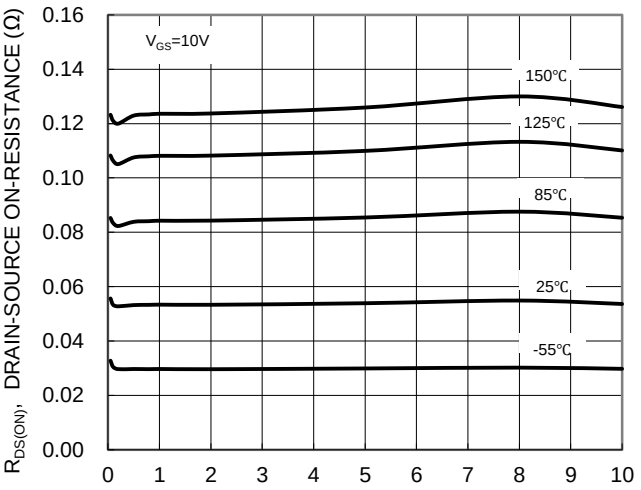


Figure 5. Typical On-Resistance vs Drain Current and Temperature

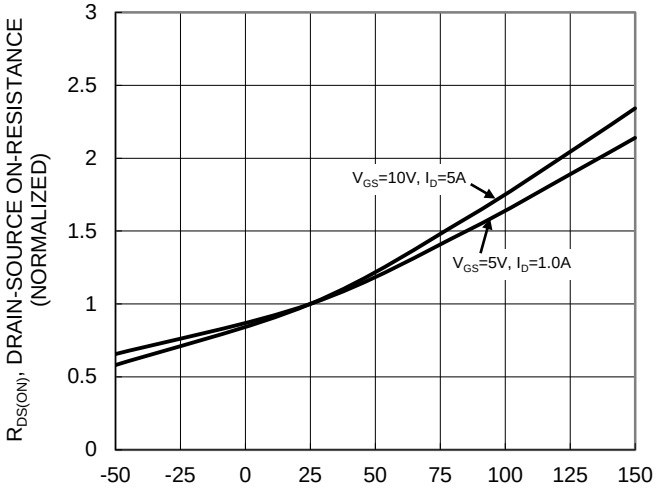


Figure 6. On-Resistance Variation with Temperature

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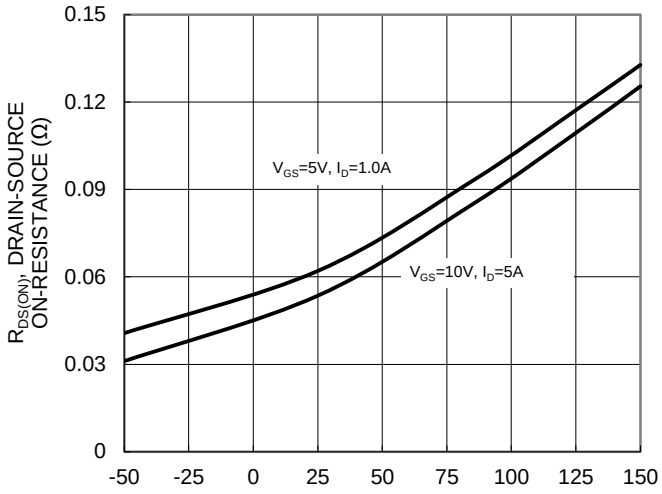


Figure 7. On-Resistance Variation with Temperature

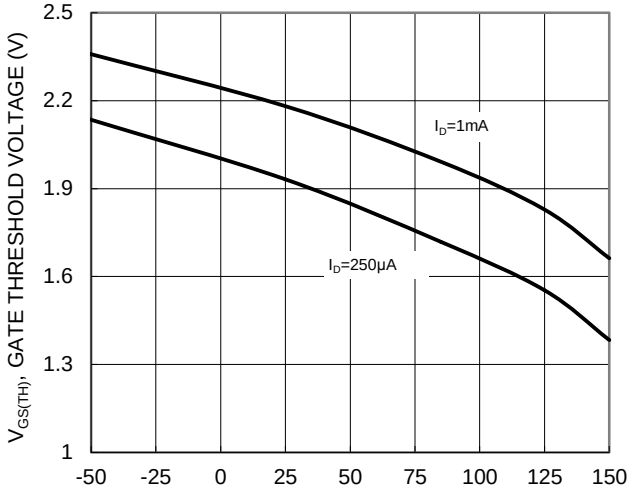


Figure 8. Gate Threshold Variation vs Temperature

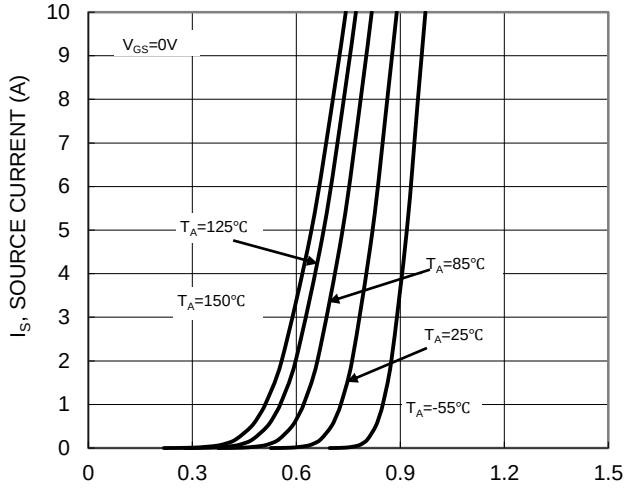


Figure 9. Diode Forward Voltage vs Current

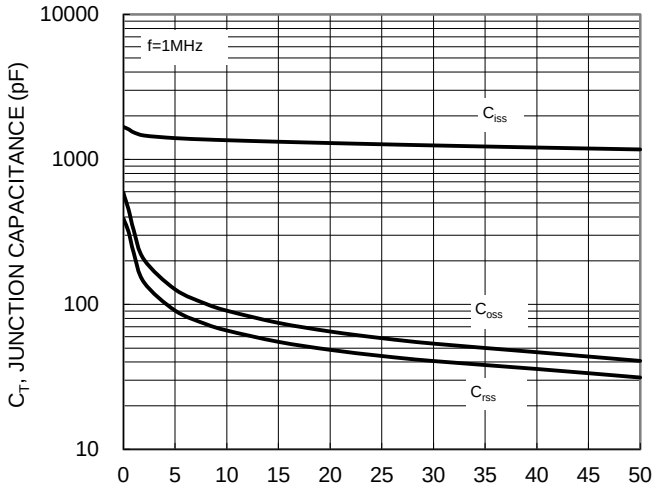


Figure 10. Typical Junction Capacitance

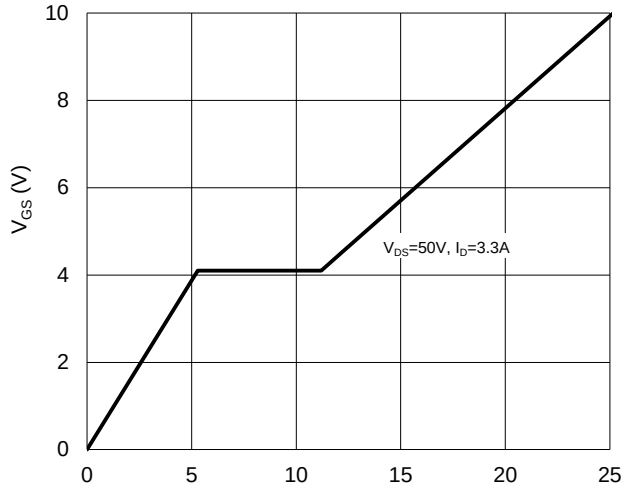


Figure 11. Gate Charge

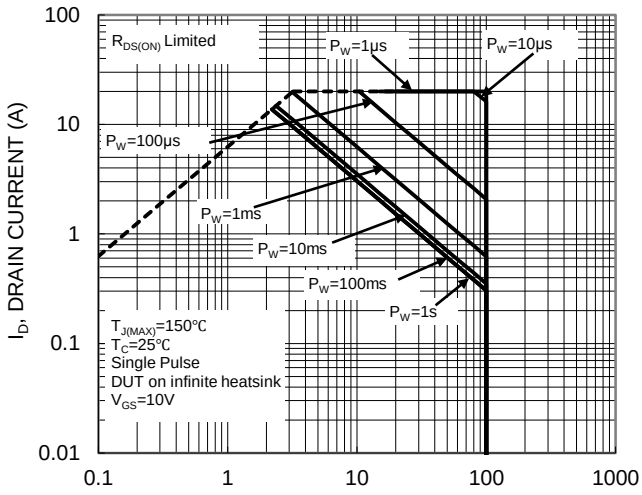


Figure 12. SOA, Safe Operation Area

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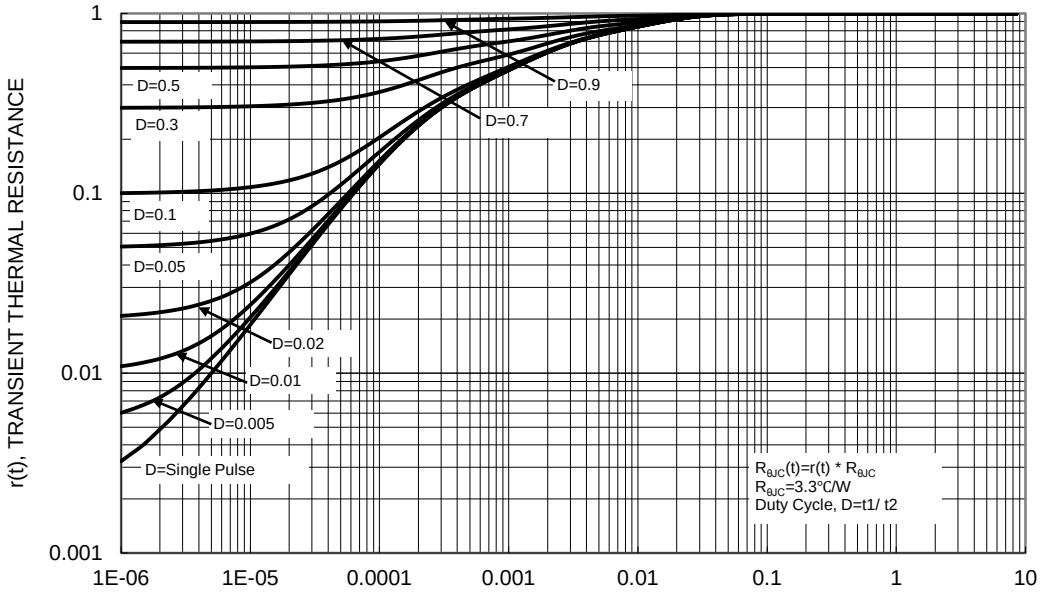
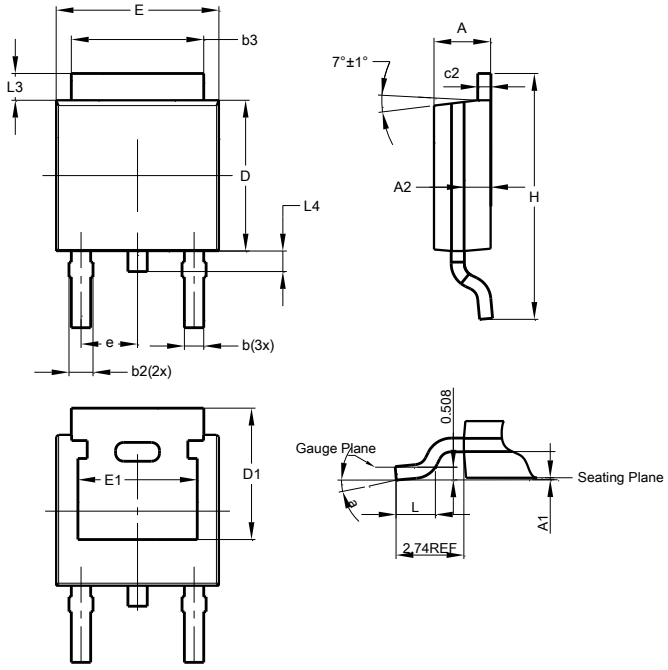


Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

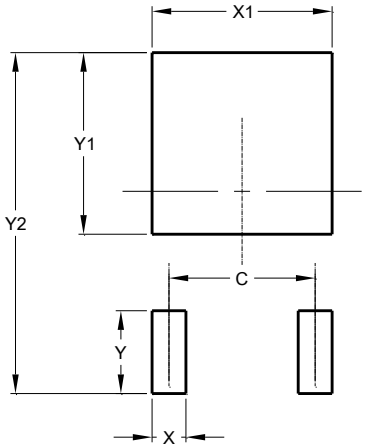
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



TO252 (DPAK)			
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)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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