

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
60V	$2\Omega$ @ $V_{GS} = 5.0\text{V}$	340mA
	$2.5\Omega$ @ $V_{GS} = 2.5\text{V}$	300mA

## Description

This MOSFET is 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

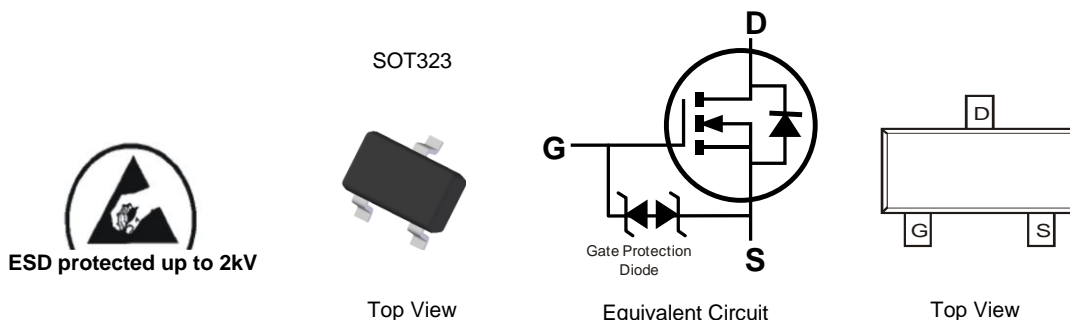
- Motor Control
- Power Management Functions
- Backlighting

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected Up To 2kV
- **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: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208③
- Weight: 0.006 grams (Approximate)

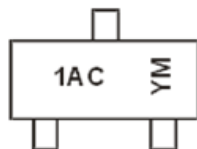


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN61D9UW-7	SOT323	3,000/Tape & Reel
DMN61D9UW-13	SOT323	10,000/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](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



1AC= Product Type Marking Code  
 YM = Date Code Marking  
 Y or Y̅ = Year (ex: C = 2015)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	B	C	D	E	F	G	H	I	J	K	L	M

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	60	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 5.0V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	340	mA
		T <sub>A</sub> = +70°C	I <sub>D</sub>	270	
	t < 5s	T <sub>A</sub> = +25°C	I <sub>D</sub>	400	mA
		T <sub>A</sub> = +70°C	I <sub>D</sub>	300	
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	0.4	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) (Note 6)			I <sub>DM</sub>	1.2	A

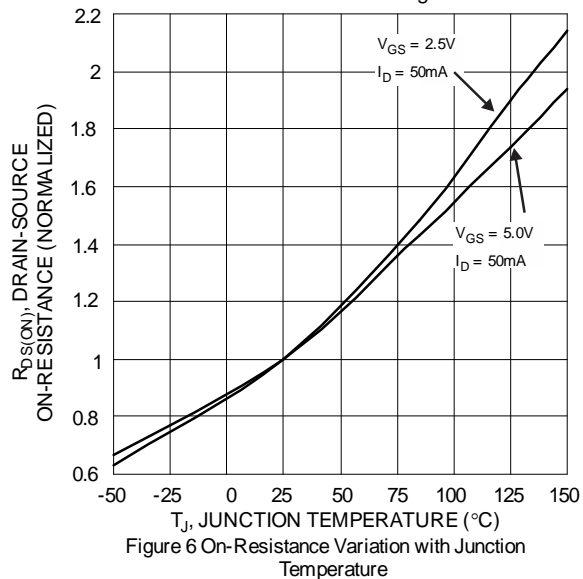
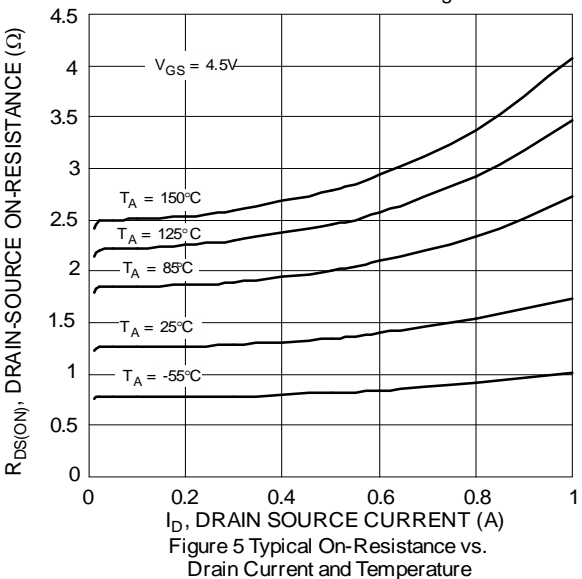
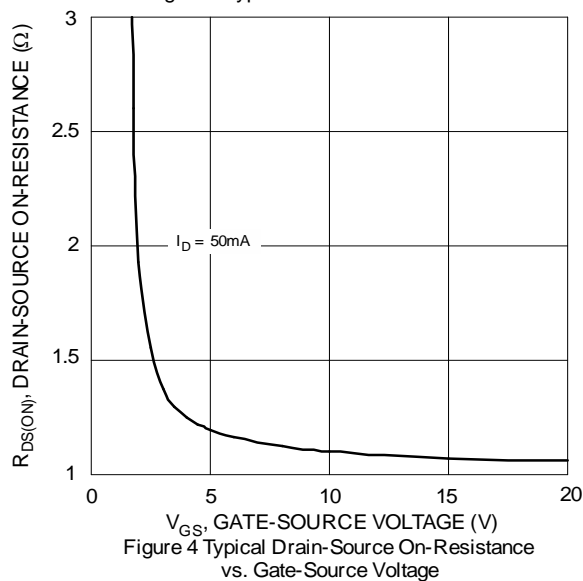
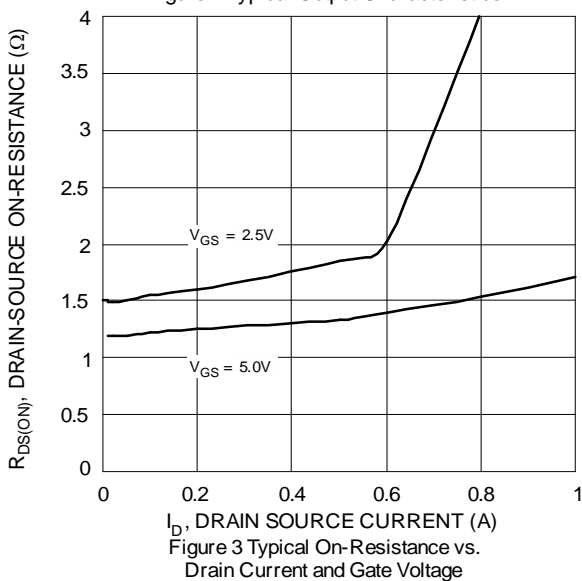
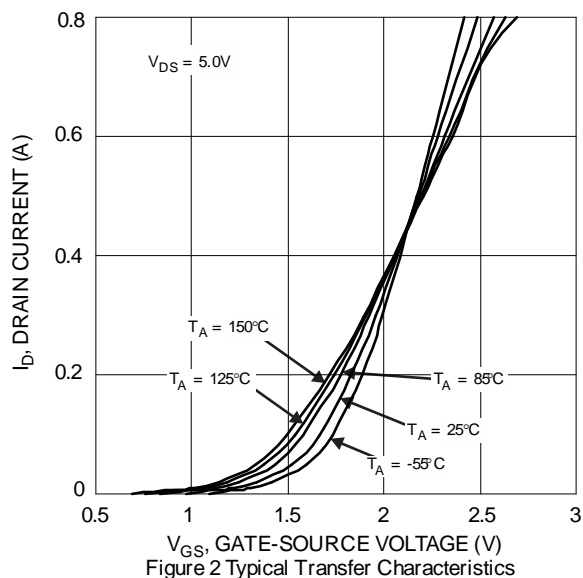
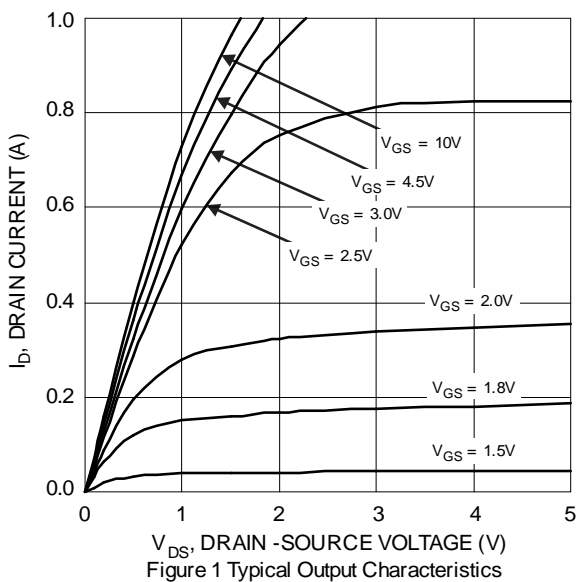
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P <sub>D</sub>	320	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R <sub>θJA</sub>	393	°C/W
	t < 5s			306	
Total Power Dissipation (Note 6)			P <sub>D</sub>	440	mW
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R <sub>θJA</sub>	289	°C/W
	t < 5s			235	
Operating and Storage Temperature Range			T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0	µA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.5	—	1.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	1.2	2.0	Ω	V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 0.05A
			1.6	2.5		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 0.05A
			2.5	3.5		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 0.05A
			—	—		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 0.05A
Forward Transconductance	Y <sub>fs</sub>	200	—	—	mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A
Diode Forward Voltage	V <sub>SD</sub>	—	0.75	1.4	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	28.5	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	3.9	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	2.5	—	pF	
Gate Resistance	R <sub>g</sub>	—	65	—	Ω	f = 1MHz, V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V
Total Gate Charge	Q <sub>g</sub>	—	0.4	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Gate-Source Charge	Q <sub>gs</sub>	—	0.1	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.1	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	2.1	—	ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 200mA
Turn-On Rise Time	t <sub>R</sub>	—	1.8	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	14.4	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	8.4	—	ns	

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
  6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.



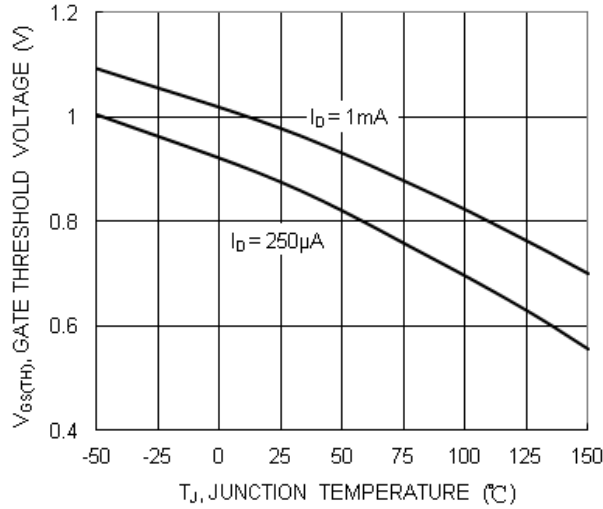


Figure 7. Gate Threshold Variation vs. Junction Temperature

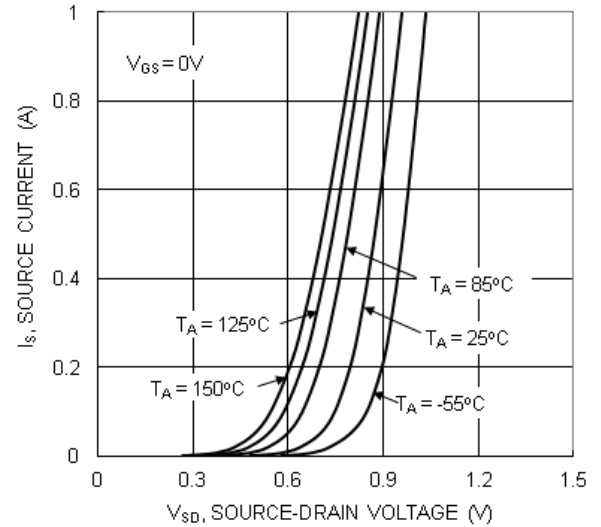


Figure 8. Diode Forward Voltage vs. Current

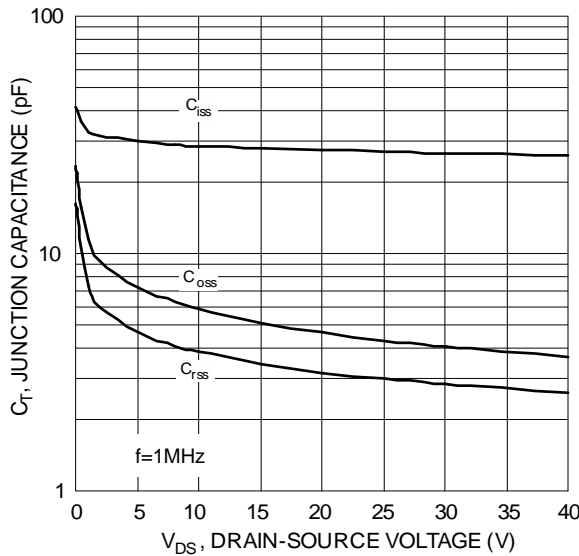


Figure 9 Typical Junction Capacitance

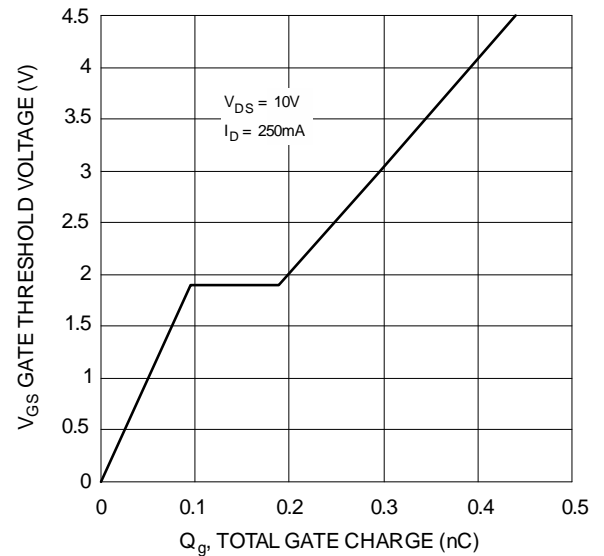


Figure 10 Gate Charge

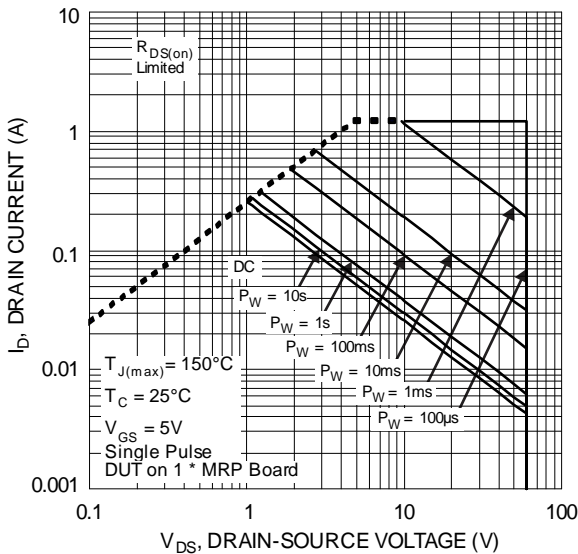
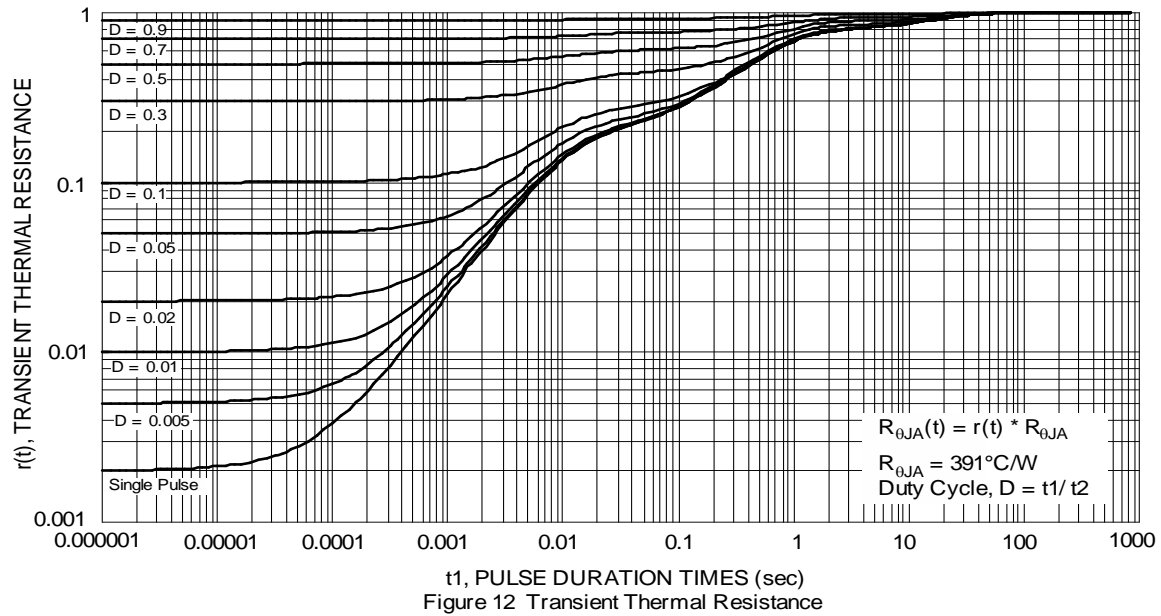
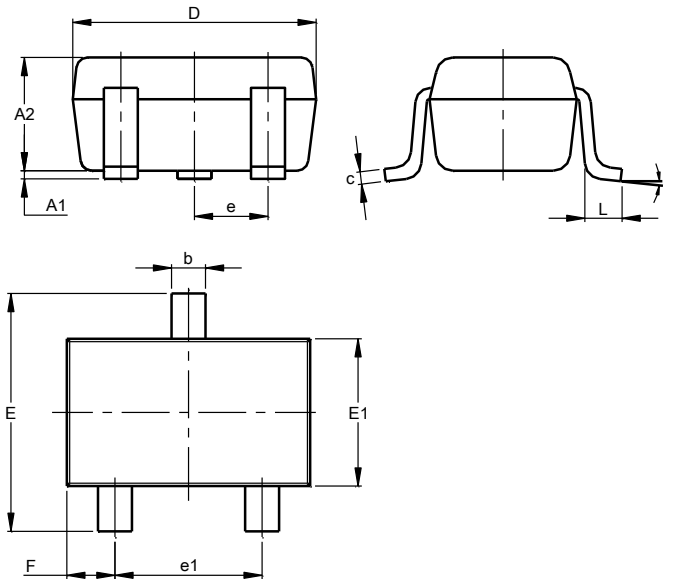


Figure 11 SOA, Safe Operation Area



## Package Outline Dimensions

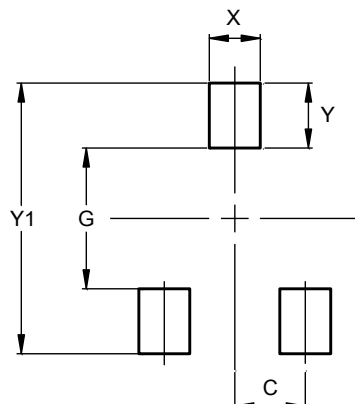
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	8°		
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	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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