

## Product Summary

<b>BV<sub>DSS</sub></b>	<b>R<sub>Ds(on)</sub> max</b>	<b>I<sub>D</sub> max</b> <b>T<sub>A</sub> = +25°C</b>
20V	56mΩ @ V <sub>GS</sub> = 4.5V	2.8A
	65mΩ @ V <sub>GS</sub> = 2.5V	2.6A
	93mΩ @ V <sub>GS</sub> = 1.8V	2.2A
	140mΩ @ V <sub>GS</sub> = 1.5V	1.8A

## Description and Applications

This new generation MOSFET has been designed to minimize the on-state resistance (R<sub>Ds(on)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications:

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

## Features and Benefits

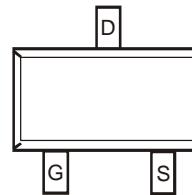
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

## Mechanical Data

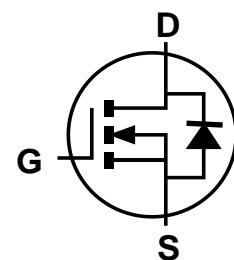
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Alloy42 Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.027 grams (Approximate)



Top View



Top View



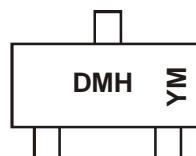
Equivalent Circuit

## Ordering Information (Notes 4 & 5)

Part Number	Compliance	Case	Packaging
DMN2065UWQ-7	Automotive	SOT323	3,000/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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



DMH = Product Type Marking Code

YM = Date Code Marking

Y = Year (ex: E = 2017)

M = Month (ex: 9 = September)

### 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 7) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	2.8 2.3	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	3.1 2.6	A
Continuous Drain Current (Note 7) $V_{GS} = 1.8\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	2.2 1.7	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	2.4 1.9	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	30	A
Maximum Body Diode Forward Current (Note 6)			$I_S$	1.2	A

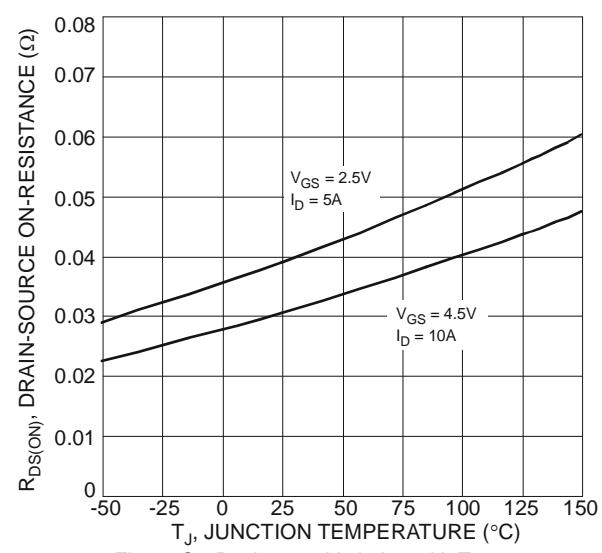
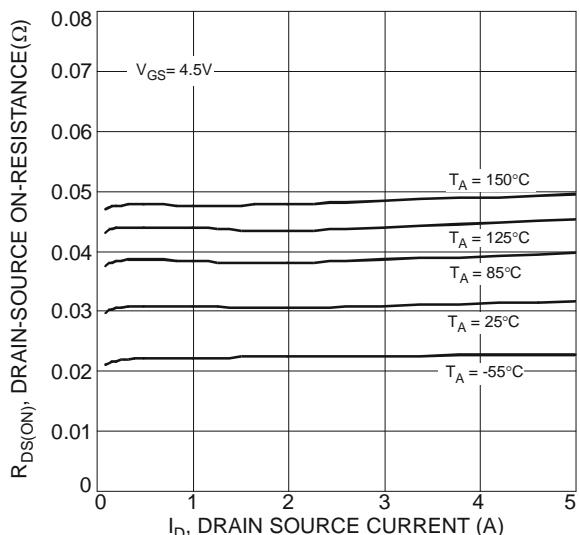
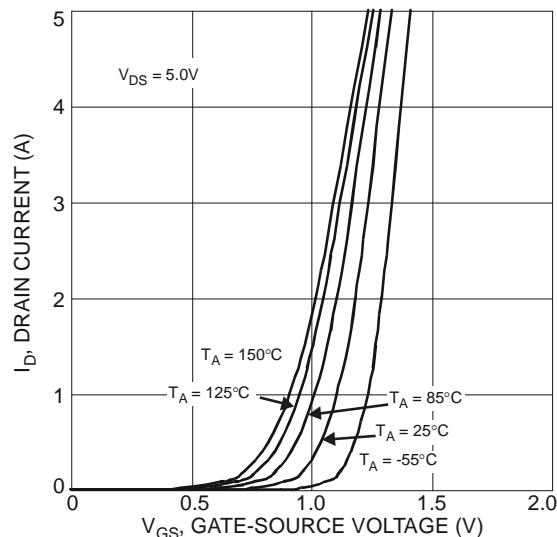
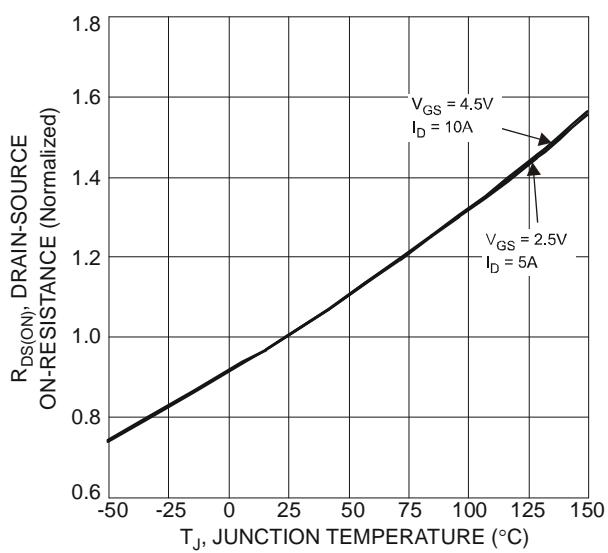
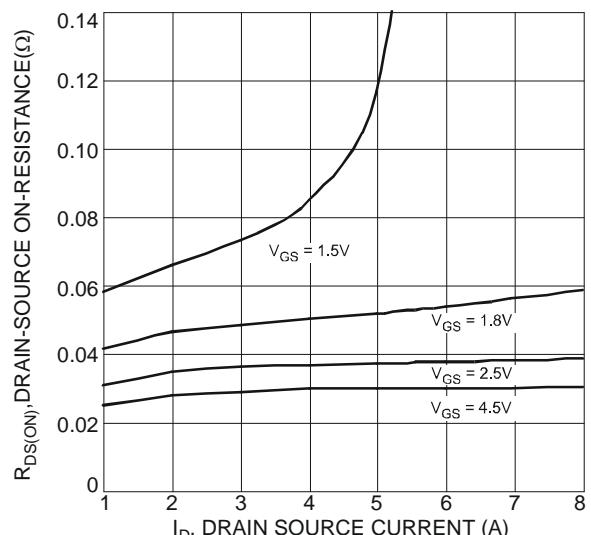
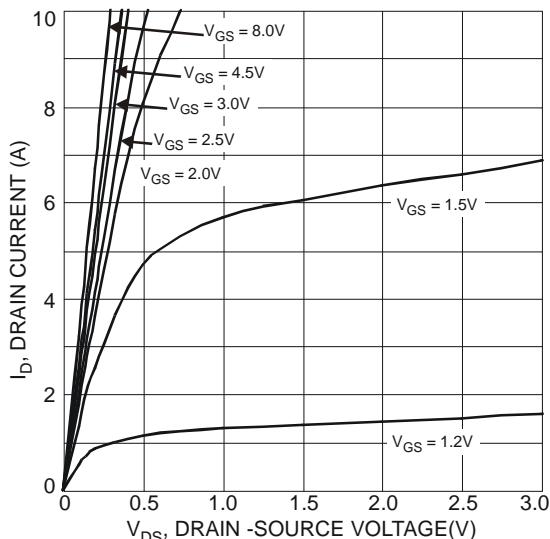
**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	$P_D$	0.43	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	296	$^\circ\text{C/W}$
	$t < 10\text{s}$	252	$^\circ\text{C/W}$
Total Power Dissipation (Note 7)	$P_D$	0.7	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	178	$^\circ\text{C/W}$
	$t < 10\text{s}$	151	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current @ $T_C = +25^\circ\text{C}$	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 1$	$\mu\text{A}$	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.35	—	1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	52	56	$\text{m}\Omega$	$V_{GS} = 4.5\text{V}, I_D = 2\text{A}$
		—	59	65		$V_{GS} = 2.5\text{V}, I_D = 2\text{A}$
		—	60	93		$V_{GS} = 1.8\text{V}, I_D = 1\text{A}$
		—	75	140		$V_{GS} = 1.5\text{V}, I_D = 0.5\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	7	—	S	$V_{DS} = 5\text{V}, I_D = 3.8\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	400	—	$\text{pF}$	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	73.8	—	$\text{pF}$	
Reverse Transfer Capacitance	$C_{rss}$	—	65.6	—	$\text{pF}$	
Total Gate Charge	$Q_g$	—	5.4	—	$\text{nC}$	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 6\text{A}$
Gate-Source Charge	$Q_{gs}$	—	0.7	—	$\text{nC}$	
Gate-Drain Charge	$Q_{qd}$	—	1.4	—	$\text{nC}$	
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	$V_{DD} = 10\text{V}, V_{GS} = 5\text{V}, R_L = 1.7\Omega, R_G = 6\Omega$
Turn-On Rise Time	$t_R$	—	9.7	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	23.8	—	ns	
Turn-Off Fall Time	$t_F$	—	7.2	—	ns	

- Notes:
6. Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.
  7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to product testing.



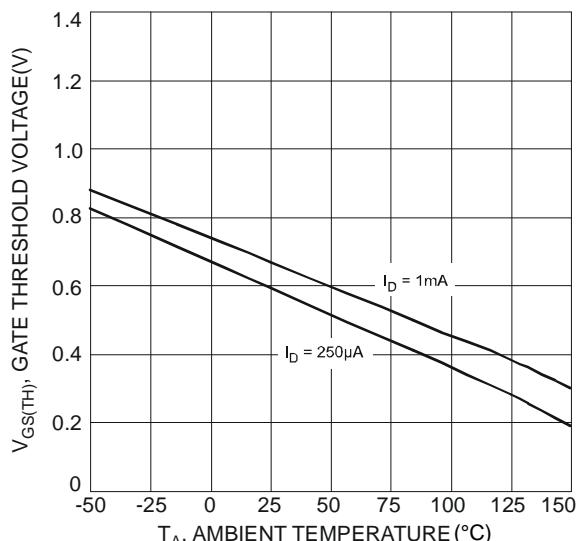


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

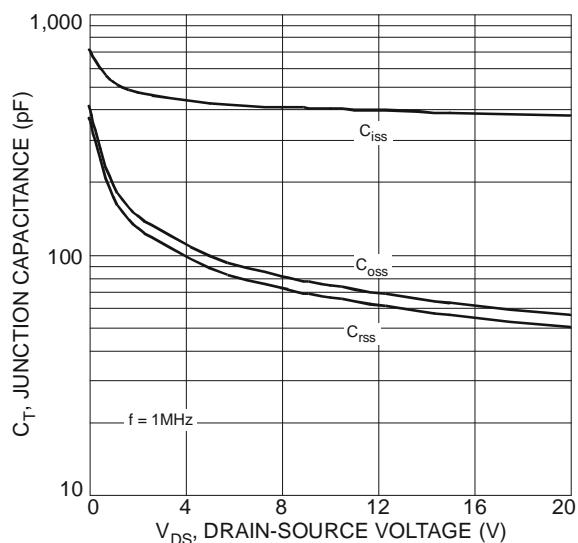


Fig. 9 Typical Junction Capacitance

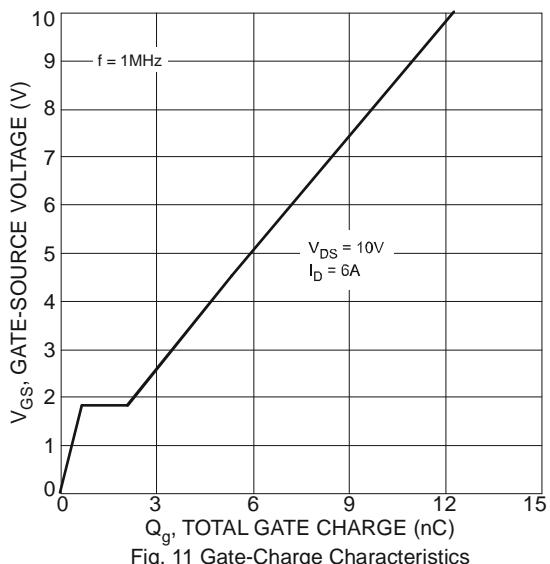


Fig. 11 Gate-Charge Characteristics

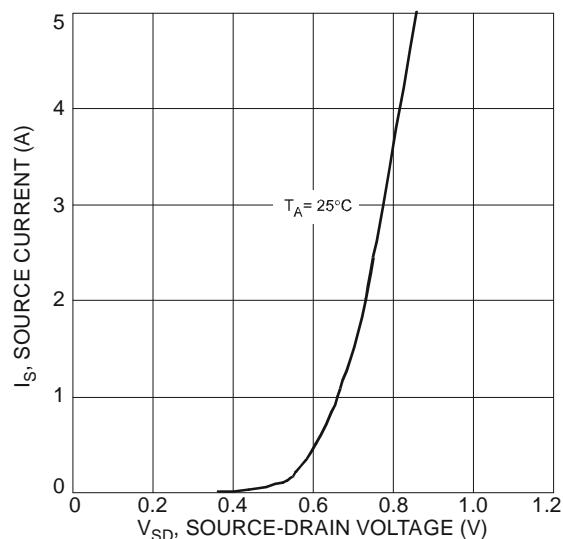


Fig. 8 Diode Forward Voltage vs. Current

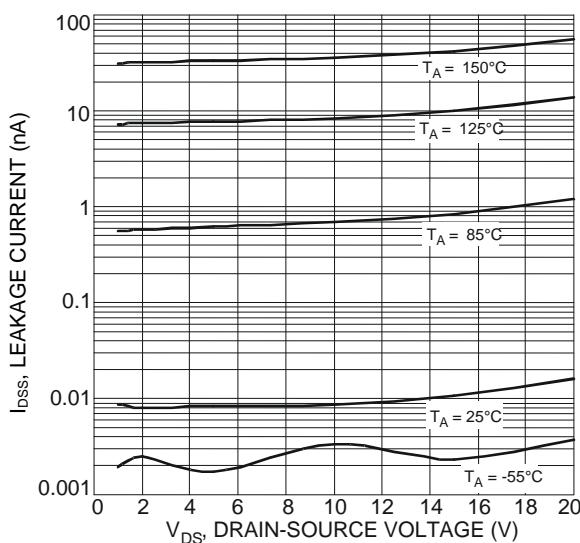


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

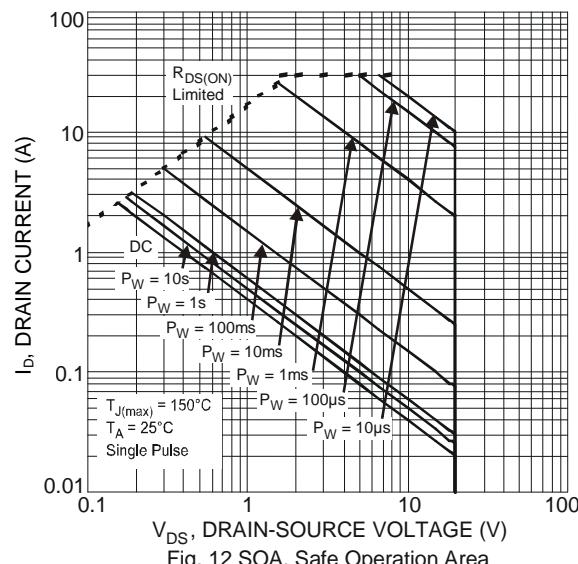


Fig. 12 SOA, Safe Operation Area

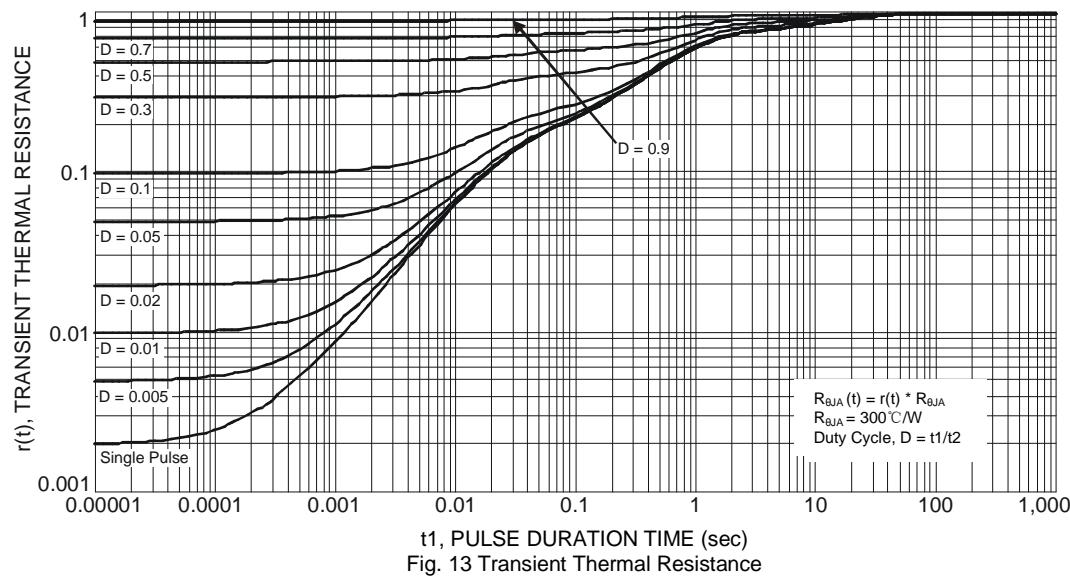
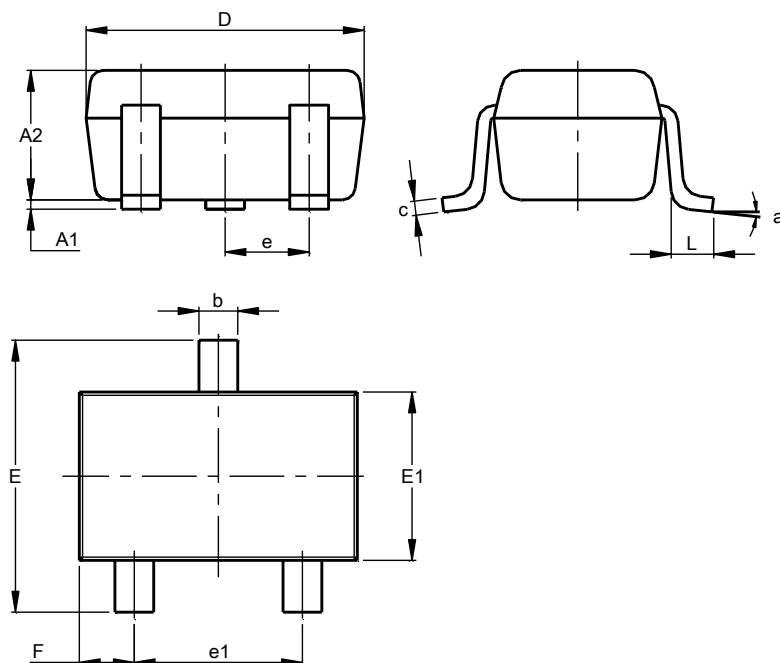


Fig. 13 Transient Thermal Resistance

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT323



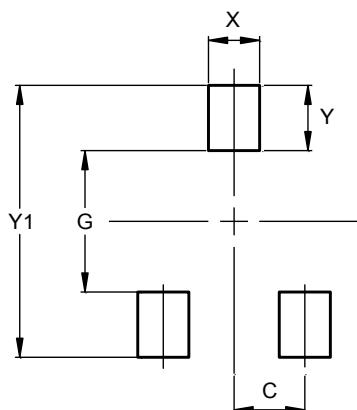
SOT323			
Dim	Min	Max	Typ
<b>A1</b>	0.00	0.10	0.05
<b>A2</b>	0.90	1.00	0.95
<b>b</b>	0.25	0.40	0.30
<b>c</b>	0.10	0.18	0.11
<b>D</b>	1.80	2.20	2.15
<b>E</b>	2.00	2.20	2.10
<b>E1</b>	1.15	1.35	1.30
<b>e</b>	0.650 BSC		
<b>e1</b>	1.20	1.40	1.30
<b>F</b>	0.375	0.475	0.425
<b>L</b>	0.25	0.40	0.30
<b>a</b>	0°	8°	--

All Dimensions in mm

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT323



Dimensions	Value (in mm)
<b>C</b>	0.650
<b>G</b>	1.300
<b>X</b>	0.470
<b>Y</b>	0.600
<b>Y1</b>	2.500

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