

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = +25°C
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

## 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)**
- **The DMN2065UWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

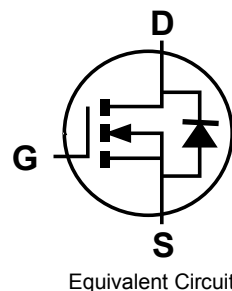
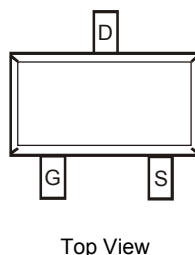
## Description and Applications

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

## 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)

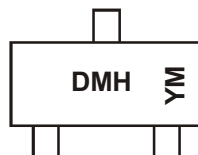


## Ordering Information (Note 4)

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) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



DMH = Product Type Marking Code  
 YM or YM = Date Code Marking  
 Y or Y = Year (ex: I = 2021)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2011	.....	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	Y	.....	I	J	K	L	M	N	O	P	R	S
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 6) $V_{GS} = 4.5\text{V}$	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 6) $V_{GS} = 1.8\text{V}$	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 5)			$I_S$	1.2	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		$P_D$	0.43	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	296	$^\circ\text{C/W}$
	$t < 10\text{s}$		252	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)		$P_D$	0.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	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 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	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 7)</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	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 8)</b>						
Input Capacitance	$C_{iss}$	—	400	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V},$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	73.8	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	65.6	—	pF	
Total Gate Charge	$Q_g$	—	5.4	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V},$ $I_D = 6\text{A}$
Gate-Source Charge	$Q_{gs}$	—	0.7	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	1.4	—	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:
- Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

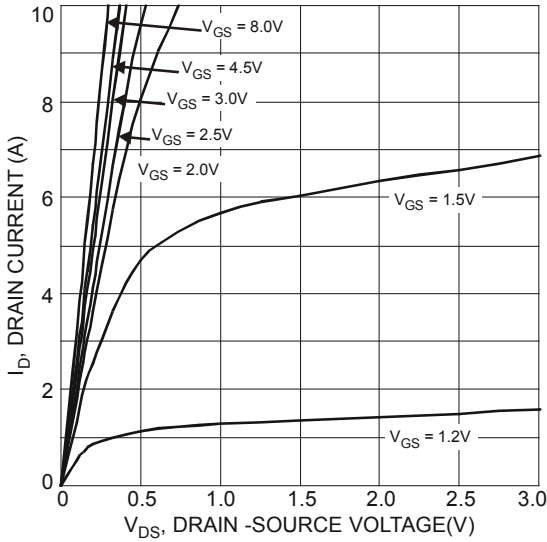


Fig. 1 Typical Output Characteristics

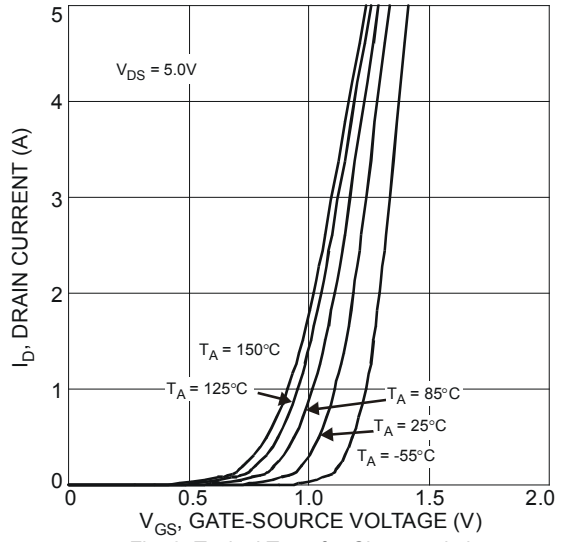


Fig. 2 Typical Transfer Characteristics

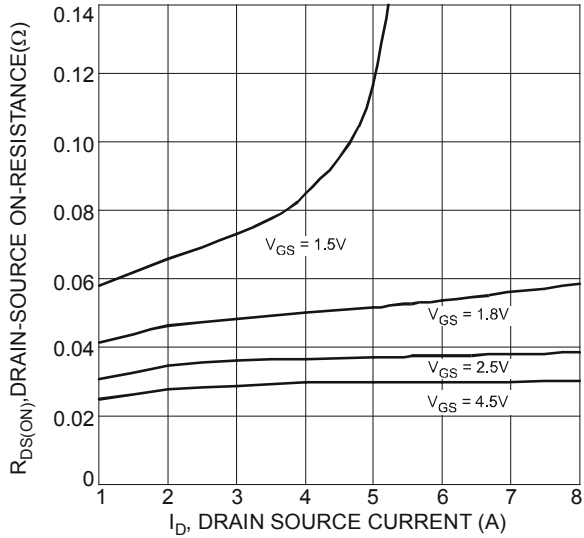


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

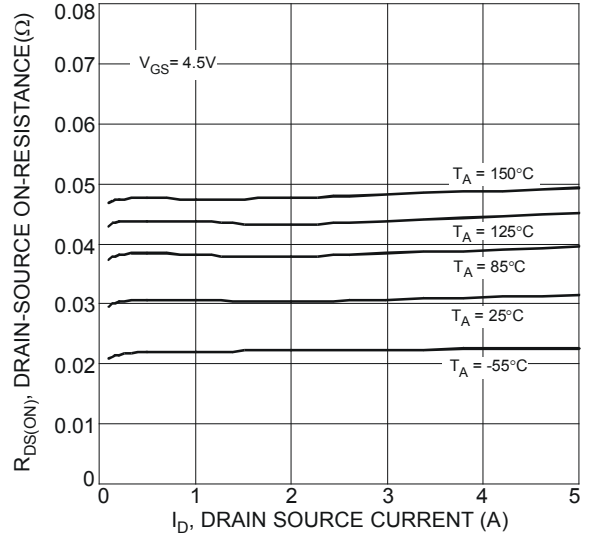


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

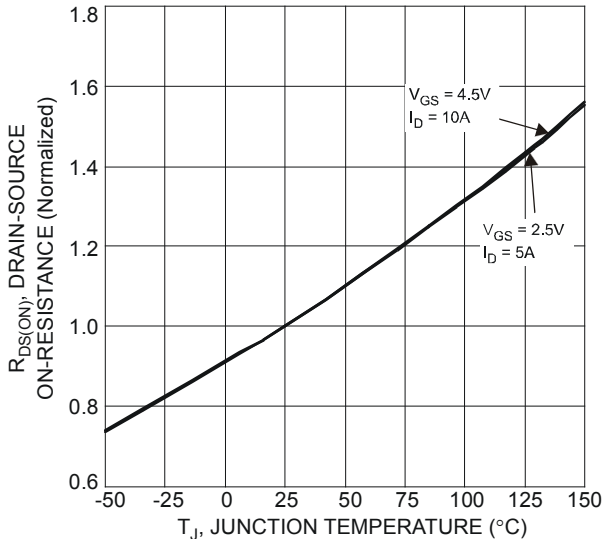


Fig. 5 On-Resistance Variation with Temperature

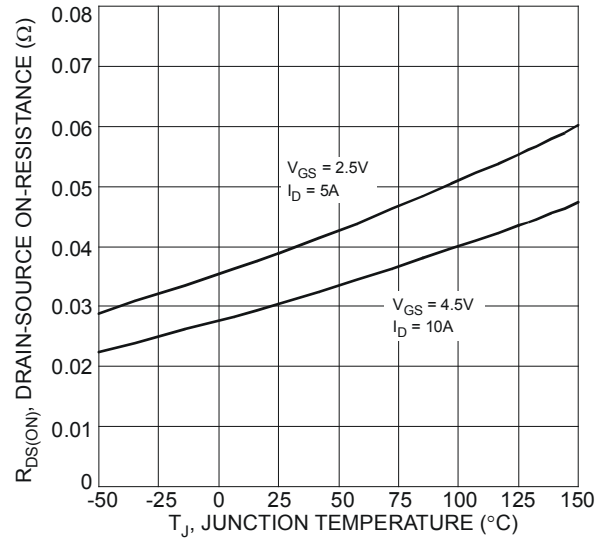


Fig. 6 On-Resistance Variation with Temperature

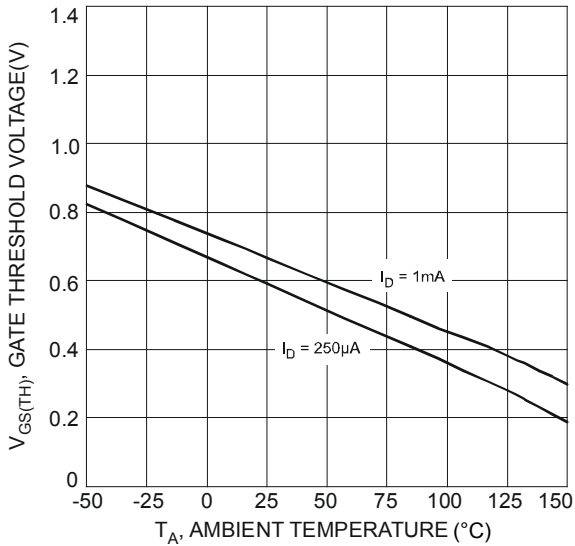


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

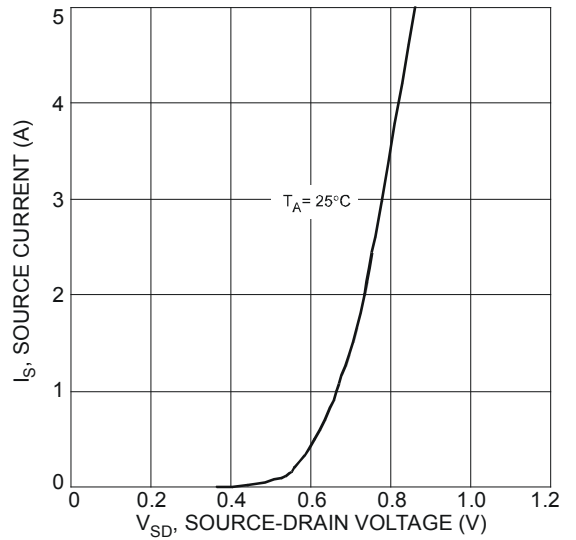


Fig. 8 Diode Forward Voltage vs. Current

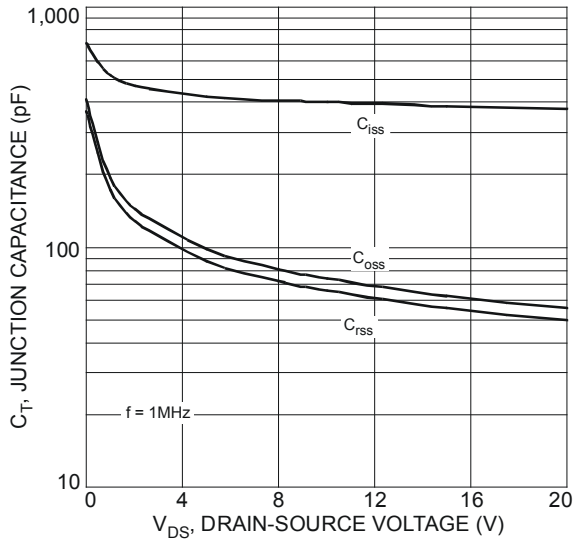


Fig. 9 Typical Junction Capacitance

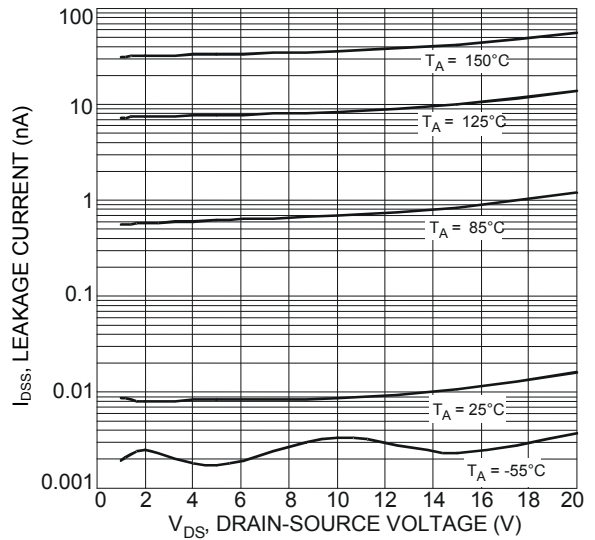


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

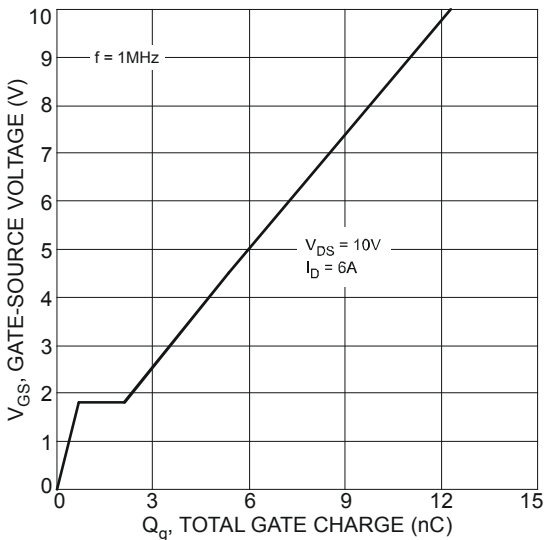


Fig. 11 Gate-Charge Characteristics

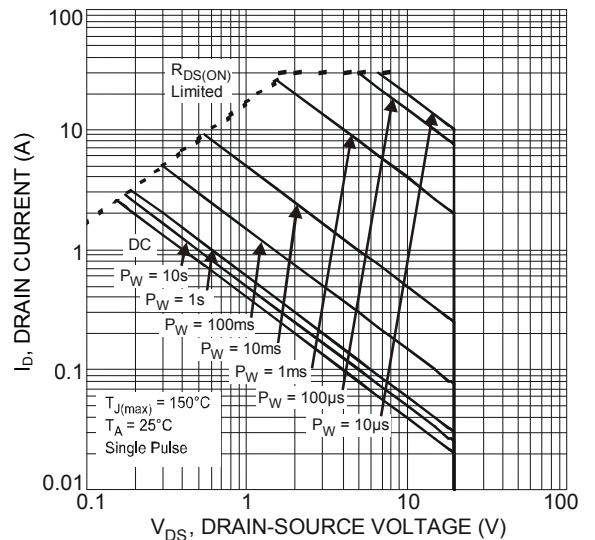


Fig. 12 SOA, Safe Operation Area

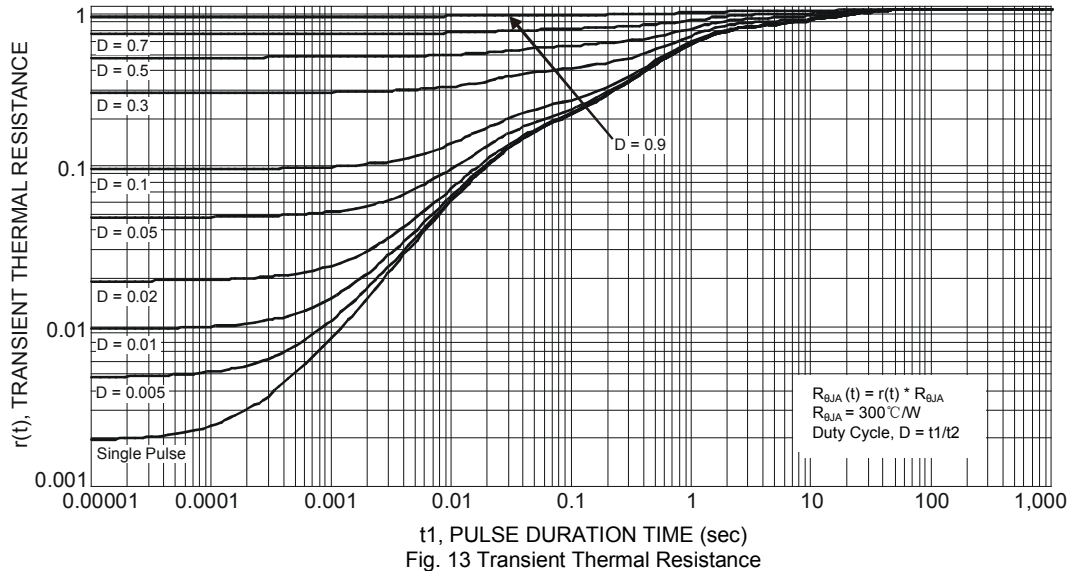
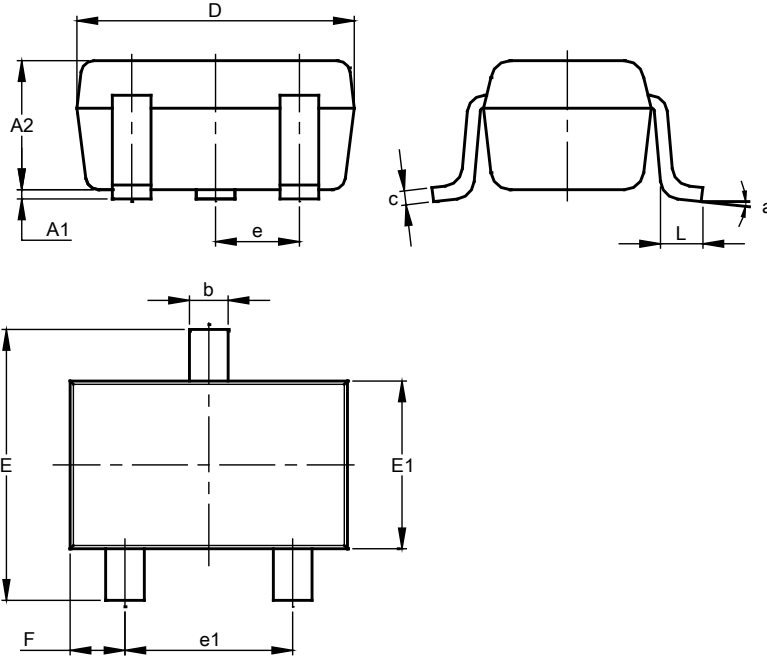


Fig. 13 Transient Thermal Resistance

## Package Outline Dimensions

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

### SOT323

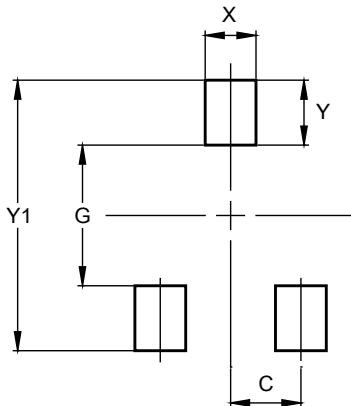


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

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

### SOT323



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

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