

**20V N-CHANNEL ENHANCEMENT MODE MOSFET**

### 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMN2065UWQ](#))**

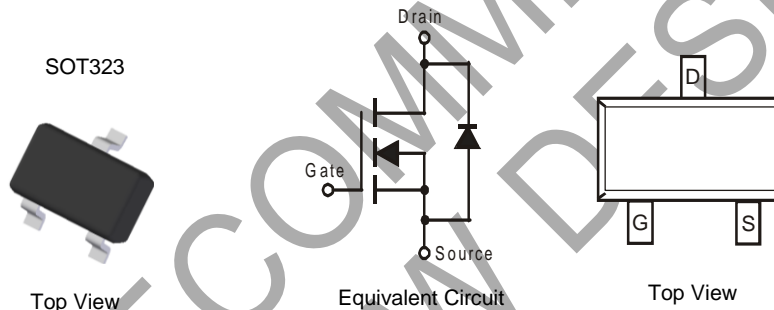
### Description and Applications

This 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 **e3**
- Weight: 0.027 grams (Approximate)

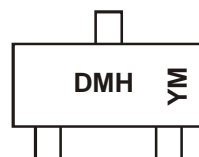


### Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2065UW-7	SOT323	3000/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 = Date Code Marking  
 Y = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

#### Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024
Code	F	G	H	I	J	K	L

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>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	2.8 2.3	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	3.1 2.6	A
Continuous Drain Current (Note 6) V <sub>GS</sub> = 1.8V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	2.2 1.7	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	2.4 1.9	A
Pulsed Drain Current (10us Pulse, Duty Cycle=1%)			I <sub>DM</sub>	30	A
Maximum Body Diode Forward Current (Note 5)			I <sub>S</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>	0.43	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R <sub>θJA</sub>	296	°C/W
	t < 10s		R <sub>θJA</sub>	252	°C/W
Total Power Dissipation (Note 6)			P <sub>D</sub>	0.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R <sub>θJA</sub>	178	°C/W
	t < 10s		R <sub>θJA</sub>	151	°C/W
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>	20	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±1	μA	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.35	-	1.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	52	56	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2A
		-	59	65		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 2A
		-	60	93		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 1A
		-	75	140		V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 0.5A
Forward Transfer Admittance	Y <sub>fs</sub>	-	7	-	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 3.8A
Diode Forward Voltage	V <sub>SD</sub>	-	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	-	400.0	-	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	73.8	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	65.6	-	pF	
Total Gate Charge	Q <sub>g</sub>	-	5.4	-	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
Gate-Source Charge	Q <sub>gs</sub>	-	0.7	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	1.4	-	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	-	3.5	-	ns	V <sub>DD</sub> = 10V, V <sub>GS</sub> = 5V, R <sub>L</sub> = 1.7Ω, R <sub>G</sub> = 6Ω
Turn-On Rise Time	t <sub>R</sub>	-	9.7	-	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	23.8	-	ns	
Turn-Off Fall Time	t <sub>F</sub>	-	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 1 inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

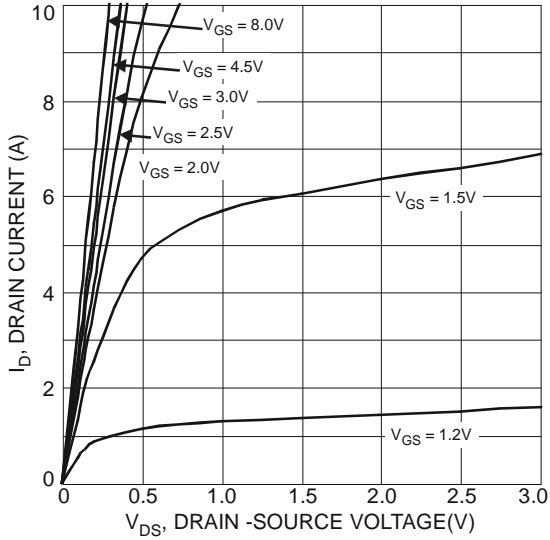


Fig. 1 Typical Output Characteristics

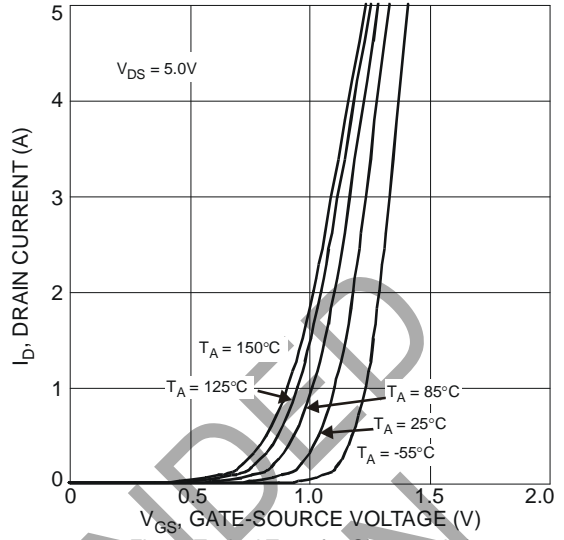


Fig. 2 Typical Transfer Characteristics

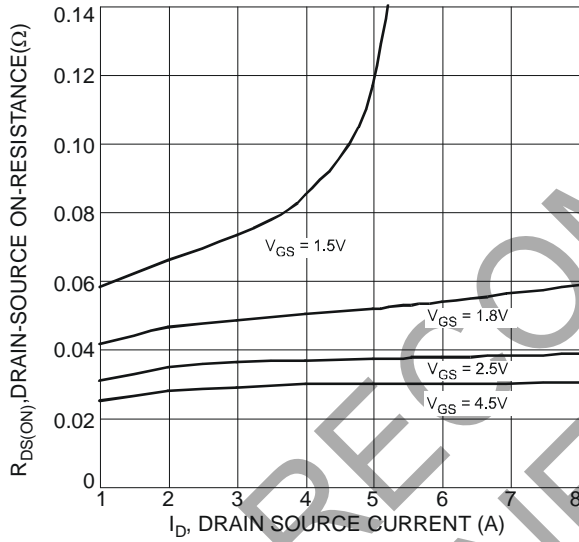


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

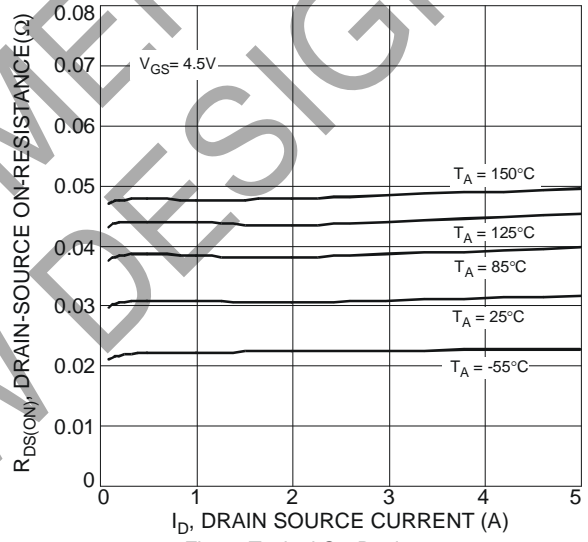


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

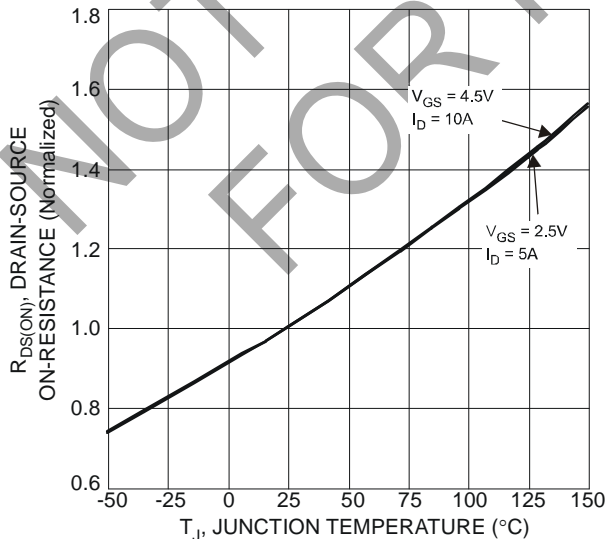


Fig. 5 On-Resistance Variation with Temperature

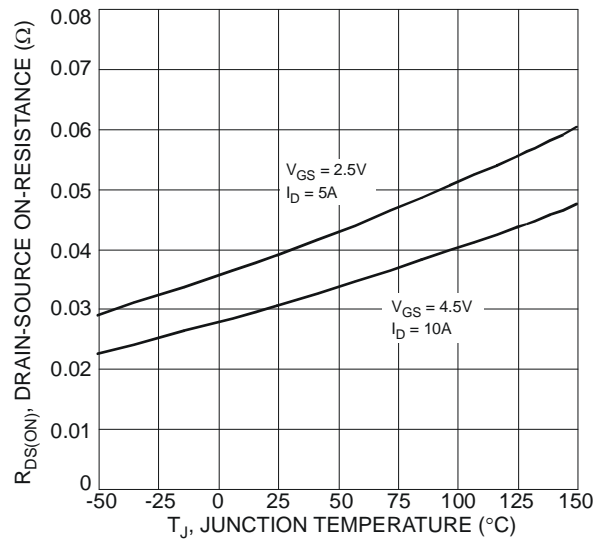


Fig. 6 On-Resistance Variation with Temperature

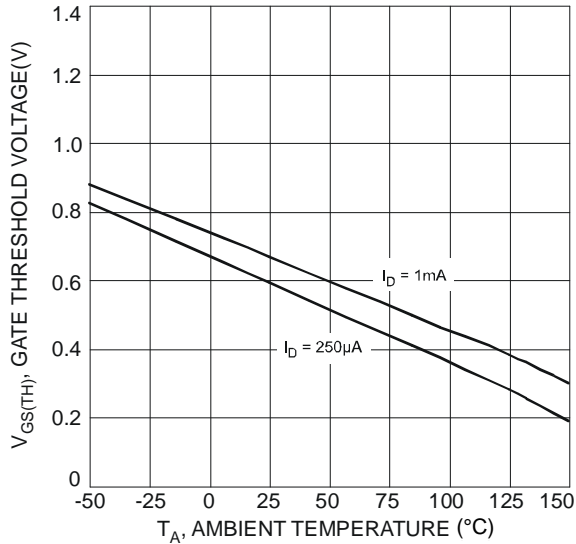


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

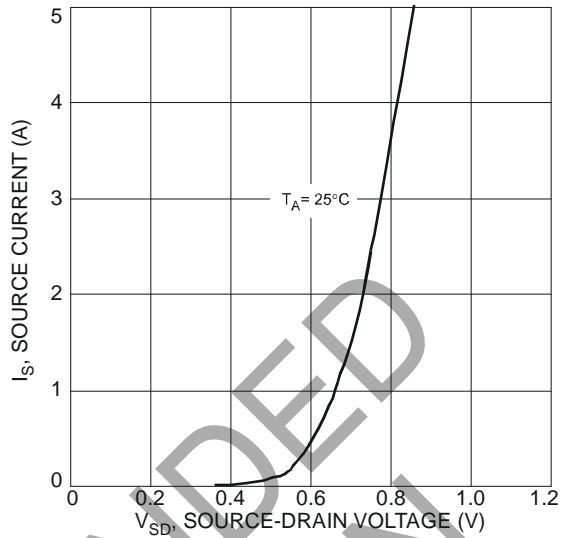


Fig. 8 Diode Forward Voltage vs. Current

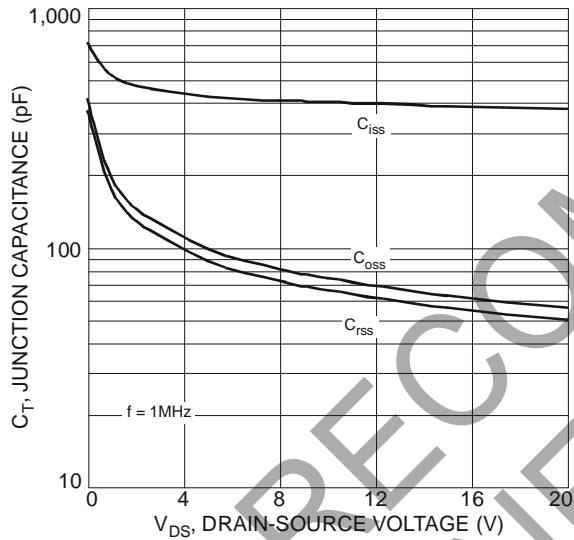


Fig. 9 Typical Junction Capacitance

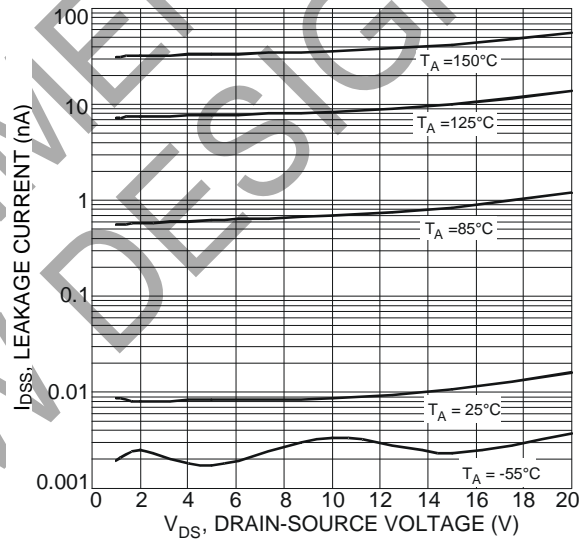


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

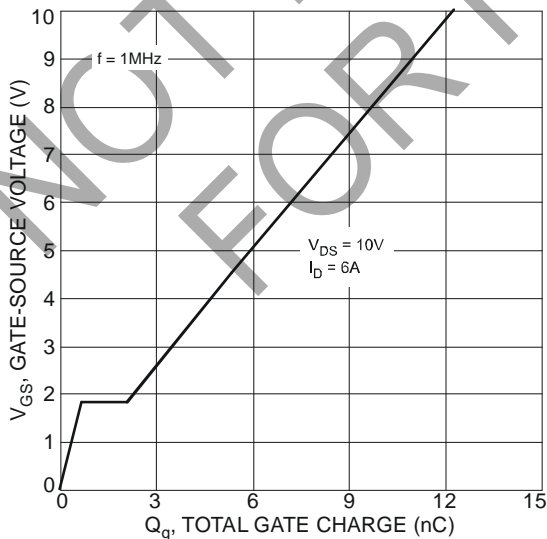


Fig. 11 Gate-Charge Characteristics

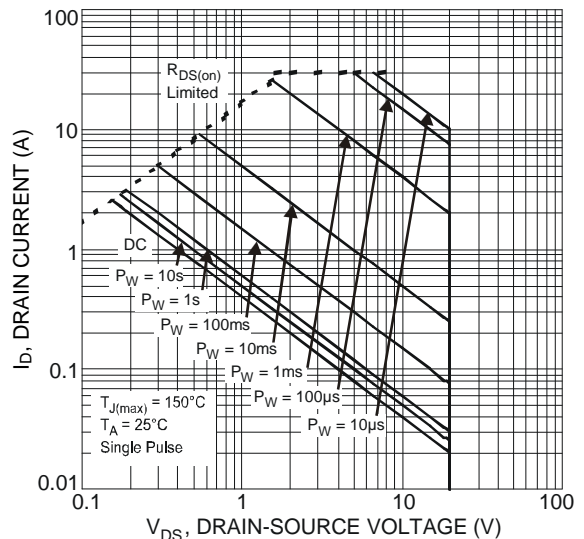


Fig. 12 SOA, Safe Operation Area

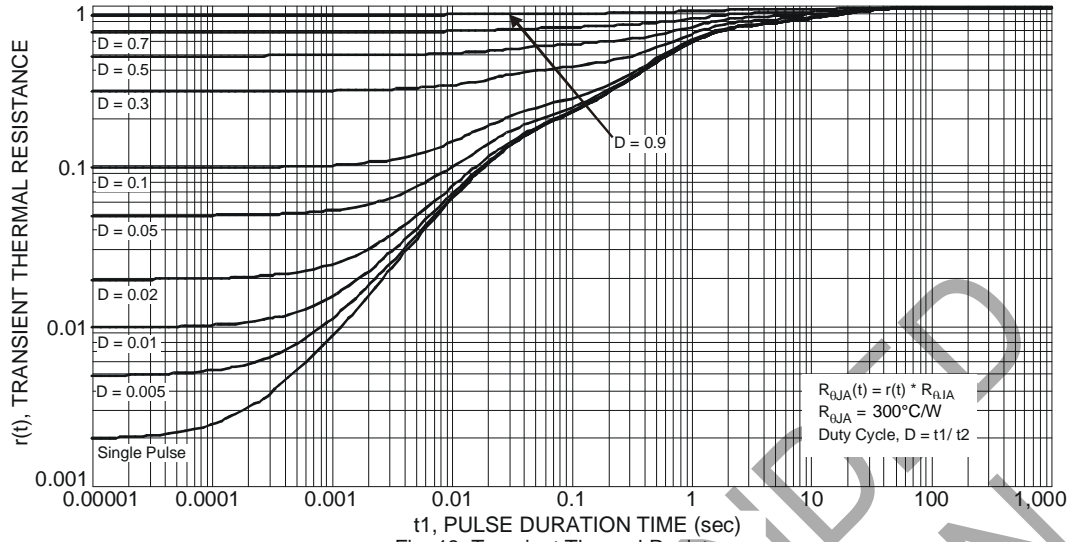


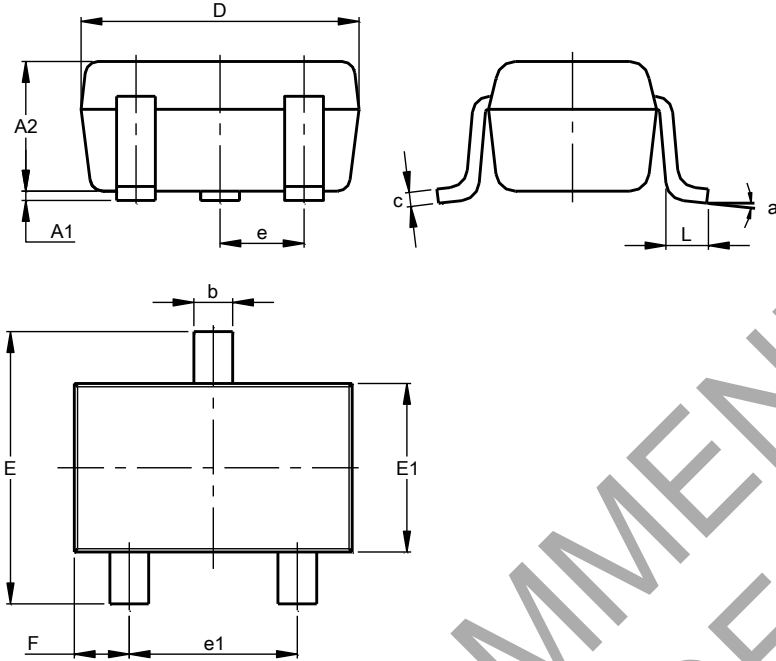
Fig. 13 Transient Thermal Resistance

NOT RECOMMENDED FOR NEW DESIGN

**Package Outline Dimensions**

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

SOT323

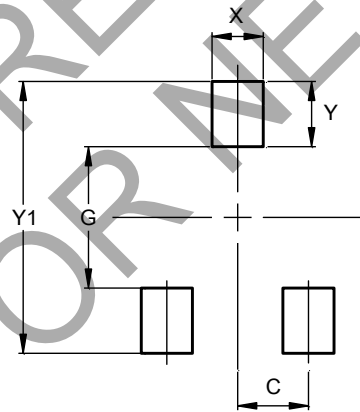


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

**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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