

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
20V	56mΩ @ V _{GS} = 4.5V	2.9A
	65mΩ @ V _{GS} = 2.5V	2.7A
	93mΩ @ V _{GS} = 1.8V	2.2A
	140mΩ @ V _{GS} = 1.5V	1.8A

Description and Applications

This MOSFET has been 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.

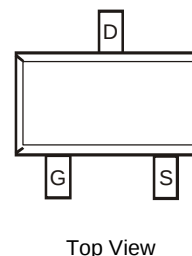
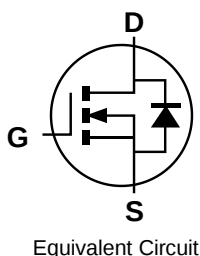
- General Purpose Interfacing Switch
- Power Management Functions
- DC-DC Converters
- Analog Switch

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)**

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 Copper Leadframe.
Solderable per MIL-STD-202, Method 208 **e3**
- Weight: 0.027 grams (Approximate)

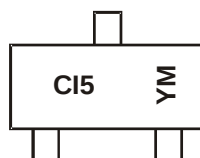


Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2053UW-7	SOT323	3,000/Tape & Reel
DMN2053UW-13	SOT323	10,000/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



CI5 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: G = 2019)
 M = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025
Code	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_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	2.9	A
		T _A = +70°C		2.3	
Pulsed Drain Current (10μs Pulse, Duty Cycle=1%)			I _{DM}	20	A
Maximum Body Diode Forward Current (Note 5)			I _S	1.0	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P _D	0.47	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	268	°C/W
Total Power Dissipation (Note 6)		P _D	0.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	178	°C/W
Operating and Storage Temperature Range		T _J I _{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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DSS}	—	—	1	μA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±1	μA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.35	—	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	39	56	mΩ	V _{GS} = 4.5V, I _D = 2A
		—	45	65		V _{GS} = 2.5V, I _D = 2A
		—	51	93		V _{GS} = 1.8V, I _D = 1A
		—	75	140		V _{GS} = 1.5V, I _D = 0.5A
		—	—	—		V _{GS} = 1.5V, I _D = 0.5A
Diode Forward Voltage	V _{SD}	—	0.7	1.0	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	369	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	54	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	32	—	pF	
Gate Resistance	R _g	—	4.1	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	3.6	—	nC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 6A
Gate-Source Charge	Q _{gs}	—	0.4	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.0	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	2.6	—	ns	V _{DD} = 10V, V _{GS} = 5V, R _G = 6Ω, I _D = 6A
Turn-On Rise Time	t _R	—	3.0	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	12.5	—	ns	
Turn-Off Fall Time	t _F	—	3.6	—	ns	I _F = 1.0A, di/dt = 100A/μs
Reverse Recovery Time	t _{RR}	—	6.0	—	ns	
Reverse Recovery Charge	Q _{RR}	—	0.9	—	nC	I _F = 1.0A, di/dt = 100A/μs

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

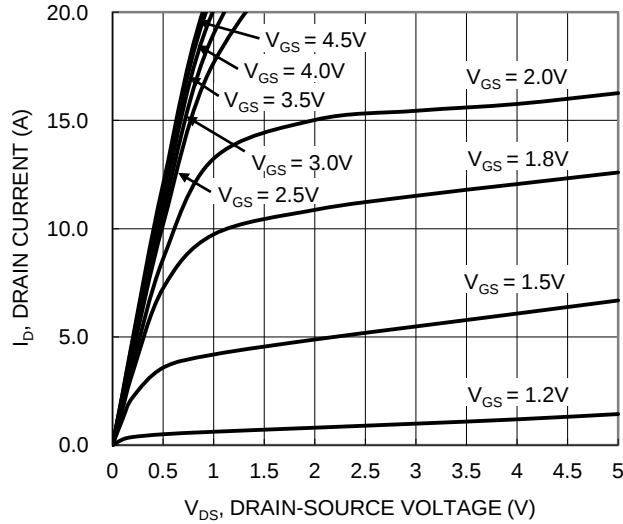


Figure 1. Typical Output Characteristic

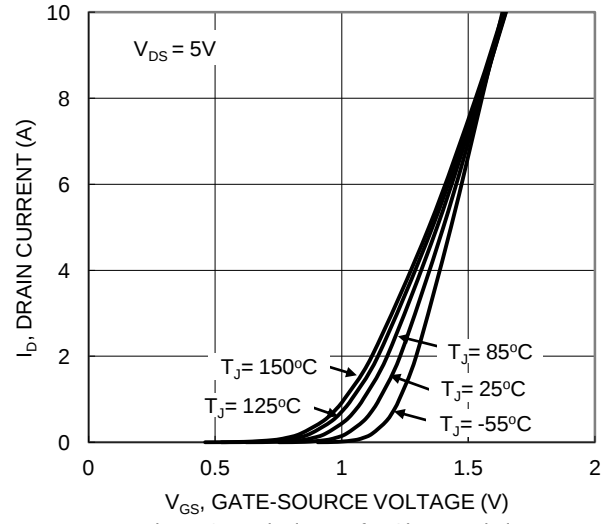


Figure 2. Typical Transfer Characteristic

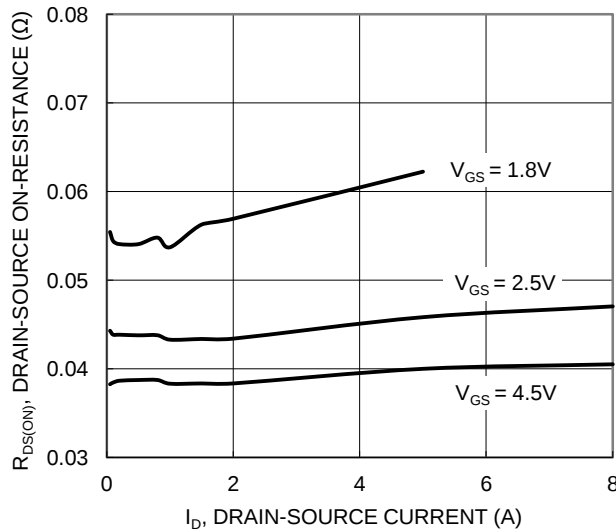


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

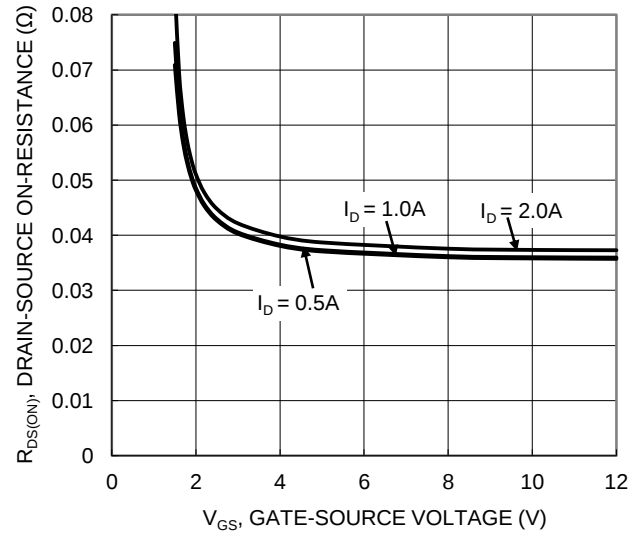


Figure 4. Typical Transfer Characteristic

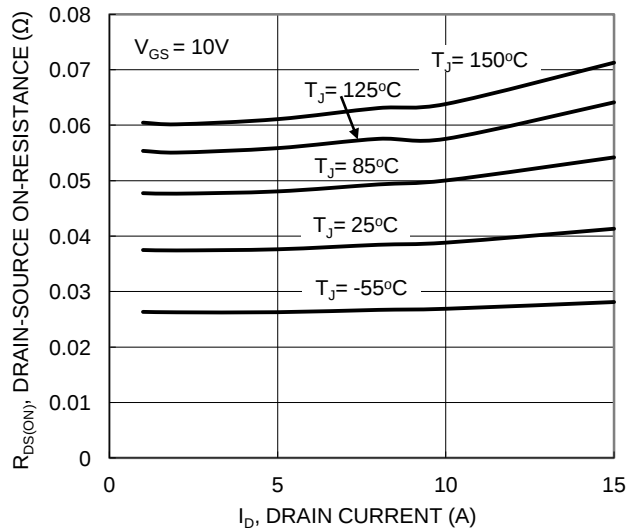


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

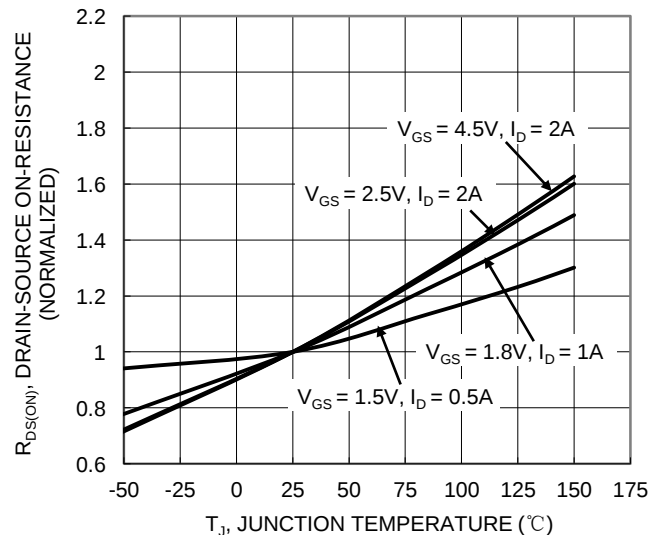
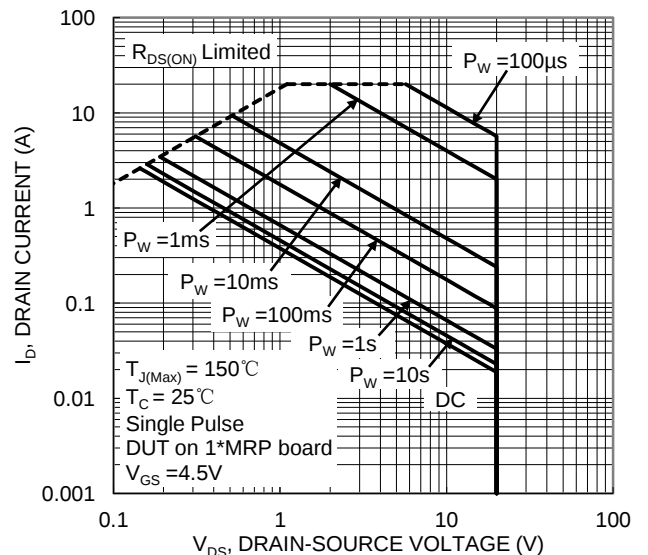
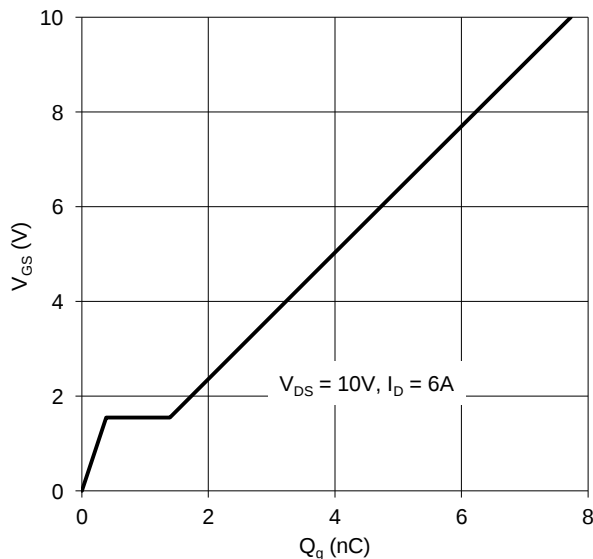
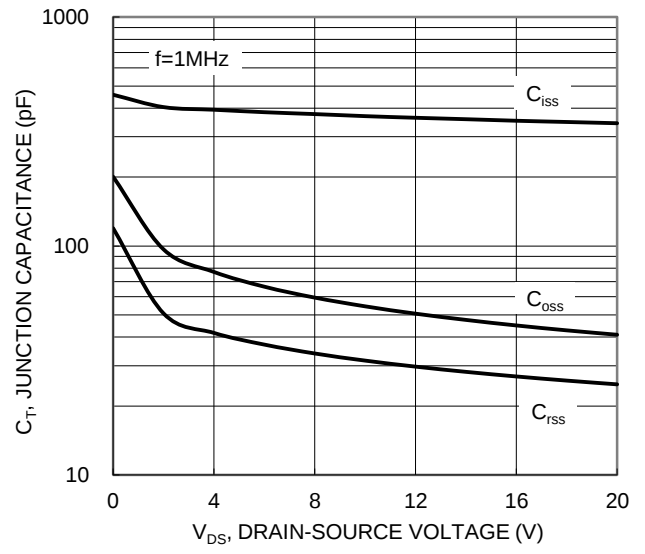
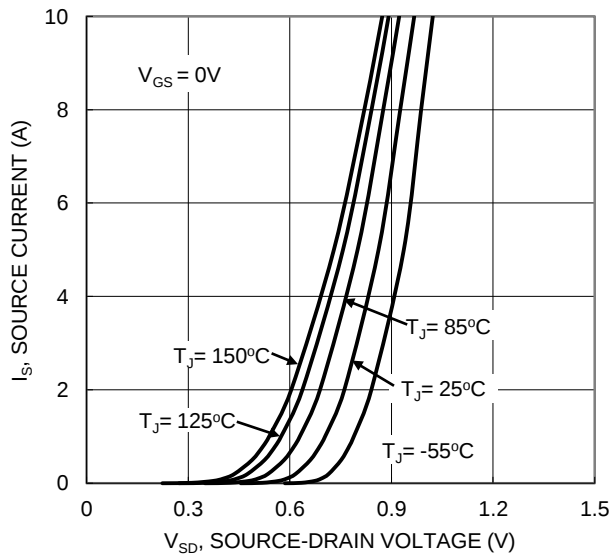
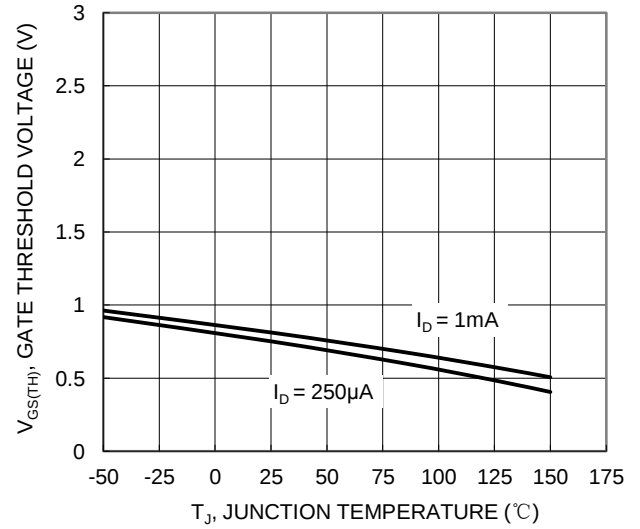
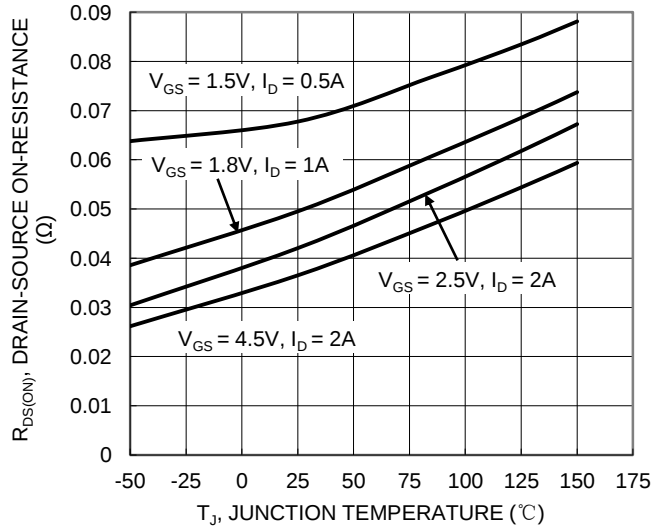


Figure 6. On-Resistance Variation with Temperature



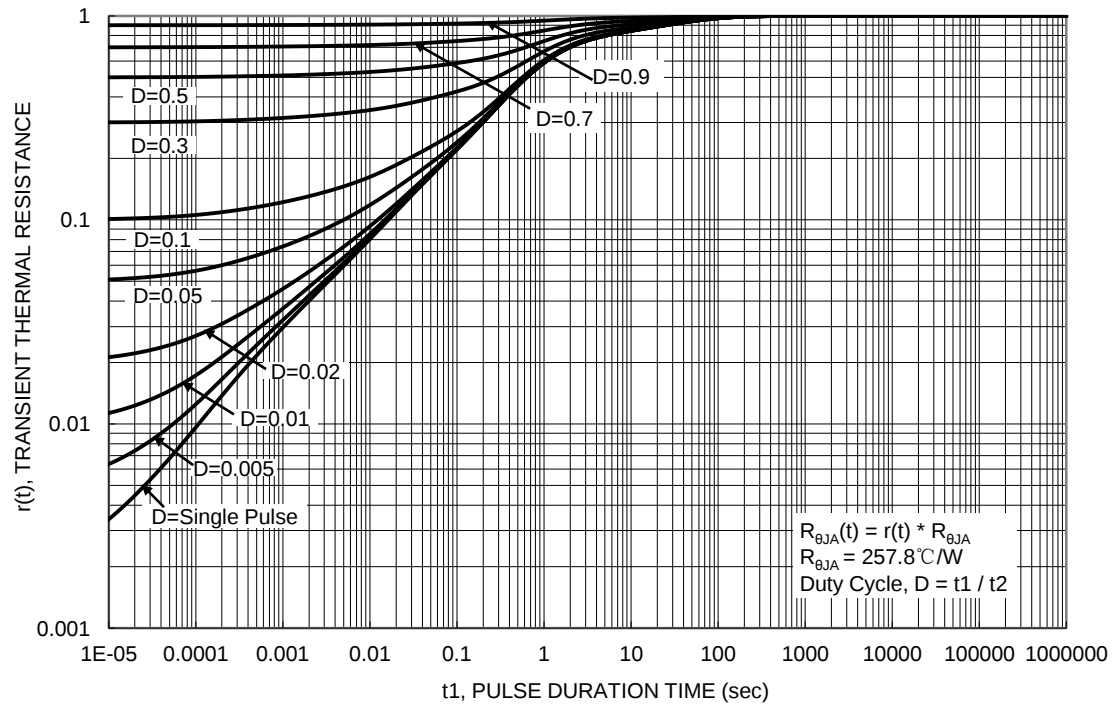
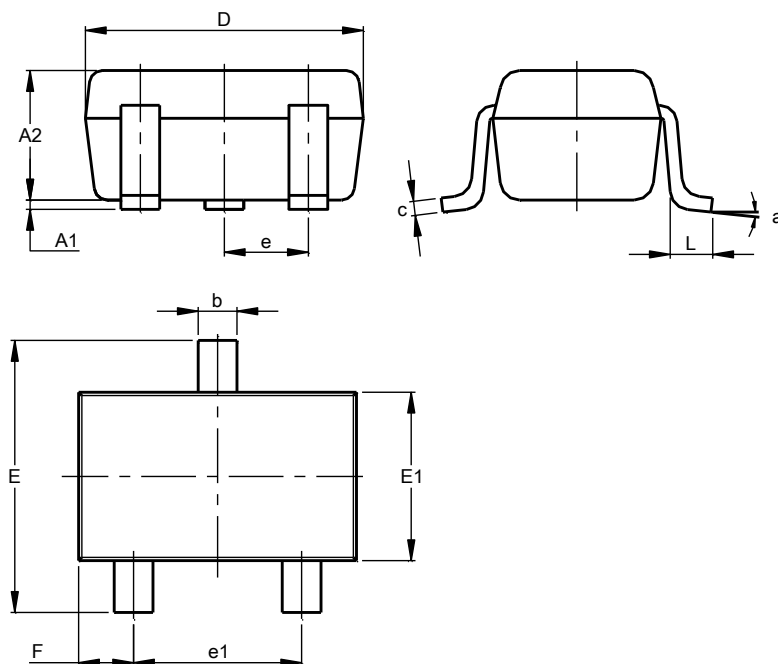


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SOT323

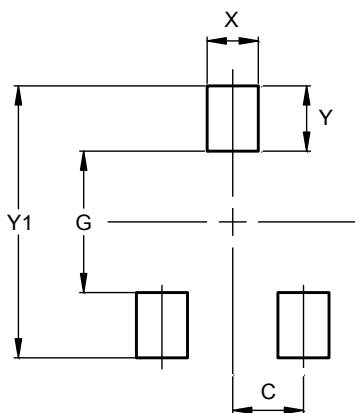


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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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