

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
20V	200mΩ @ V _{GS} = 4.5V	1.2A
	280mΩ @ V _{GS} = 2.5V	1.1A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>

Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- DC-DC Converters
- Load Switch
- Power Management Functions

Mechanical Data

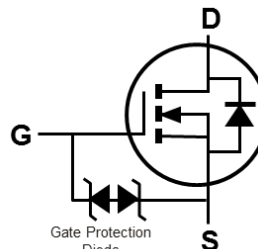
- Case: SOT523
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Alloy 42 Lead-Frame. Solderable per MIL-STD-202, Method 208 (e3)
- Terminal Connections: See Diagram
- Weight: 0.002 grams (Approximate)



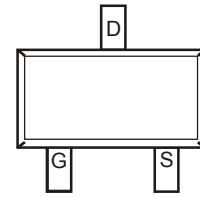
SOT523



Top View



Equivalent Circuit



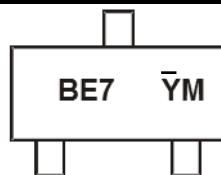
Top View

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2310UTQ-7	SOT523	3000/Tape & Reel
DMN2310UTQ-13	SOT523	10000/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



BE7 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: H = 2020)
M = Month (ex: 9 = September)

Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	H	I	J	K	L	M	N	O	P	R	S	T

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}	±8	V
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +75°C	I _D	1.2 1.0	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	0.6	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	4.2	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P _D	0.29	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	435	°C/W
Total Power Dissipation (Note 6)		P _D	0.49	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	253	°C/W
Operating and Storage Temperature Range		T _J T _{STG}	-55 to 150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	μA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	10	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.45	—	0.95	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	174	200	m Ω	$V_{GS} = 4.5\text{V}, I_D = 300\text{mA}$
		—	211	280		$V_{GS} = 2.5\text{V}, I_D = 250\text{mA}$
		—	263	380		$V_{GS} = 1.8\text{V}, I_D = 100\text{mA}$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	38	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	10	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	6	—	pF	
Gate Resistance	R_g	—	1.42	—	k Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge	Q_g	—	0.7	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 1\text{A}$
Gate-Source Charge	Q_{gs}	—	0.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.1	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	8	—	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	—	138	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	154	—	ns	
Turn-Off Fall Time	t_F	—	180	—	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.

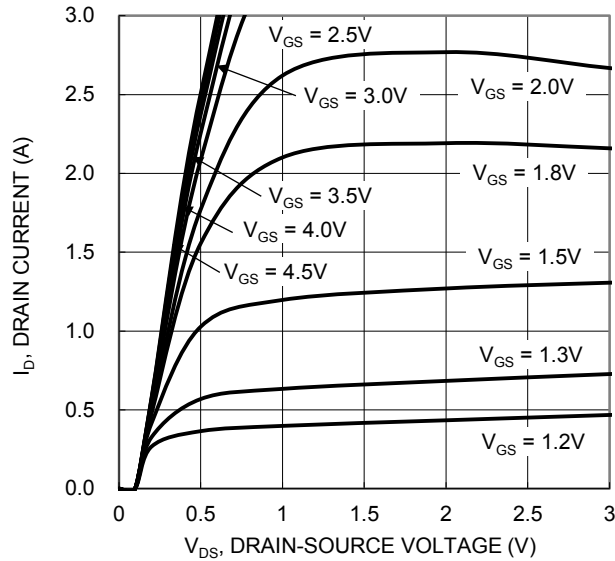


Figure 1. Typical Output Characteristic

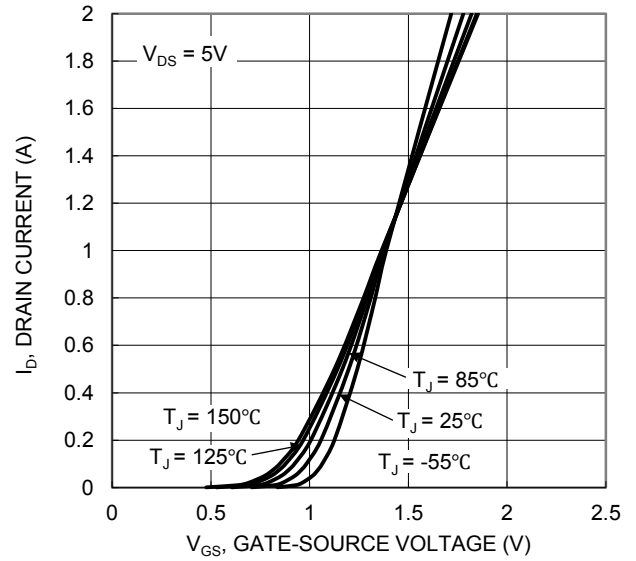


Figure 2. Typical Transfer Characteristic

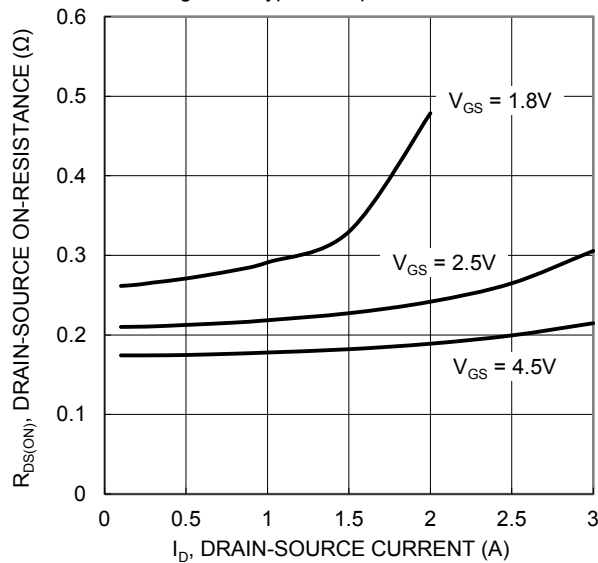


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

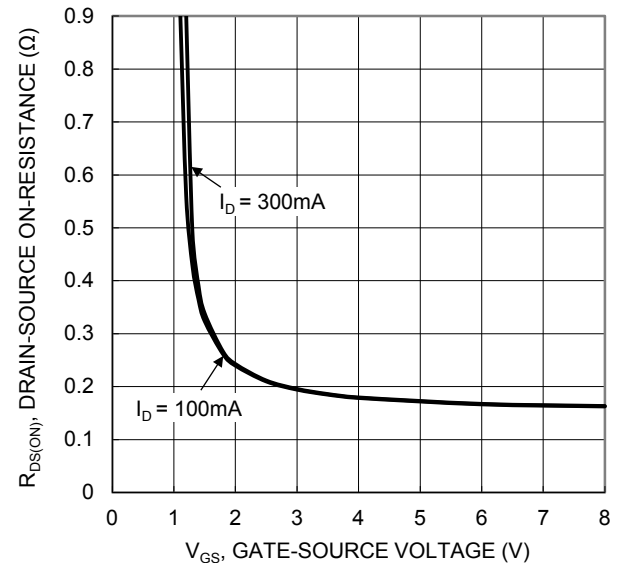


Figure 4. Typical Transfer Characteristic

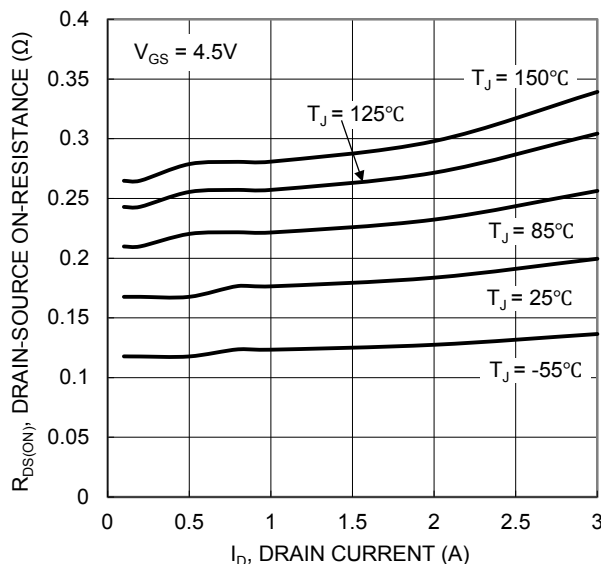


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

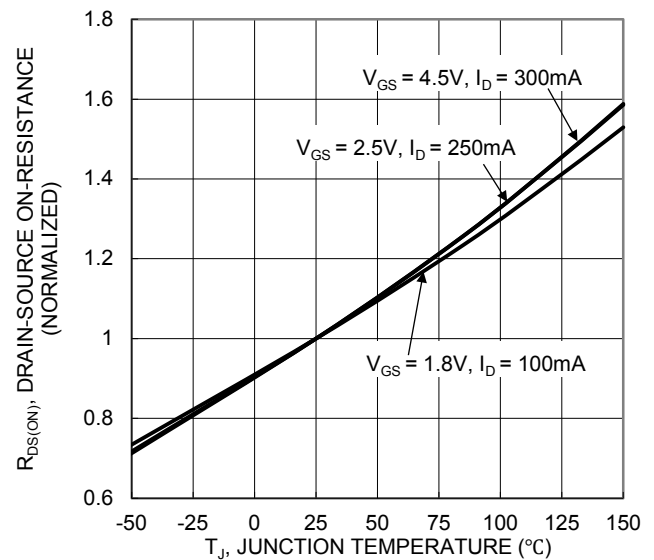
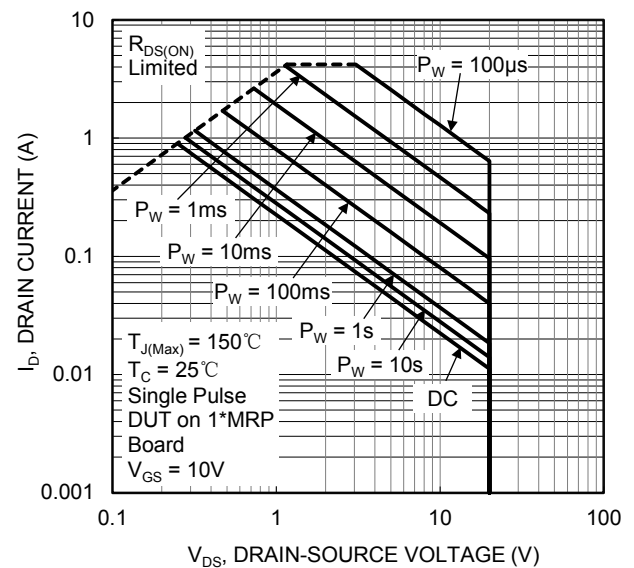
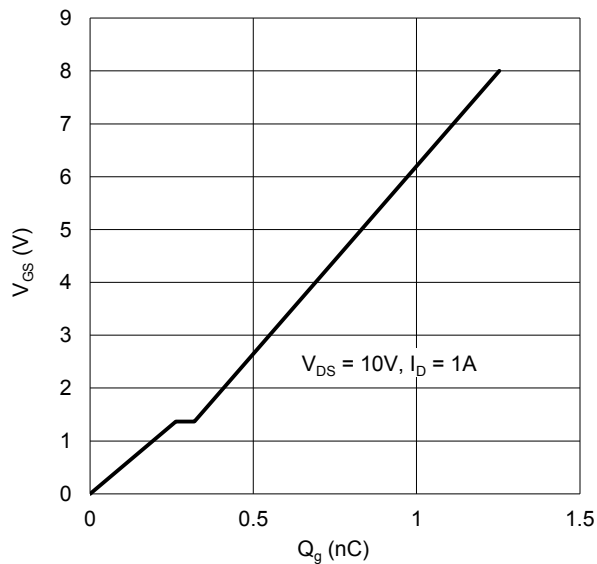
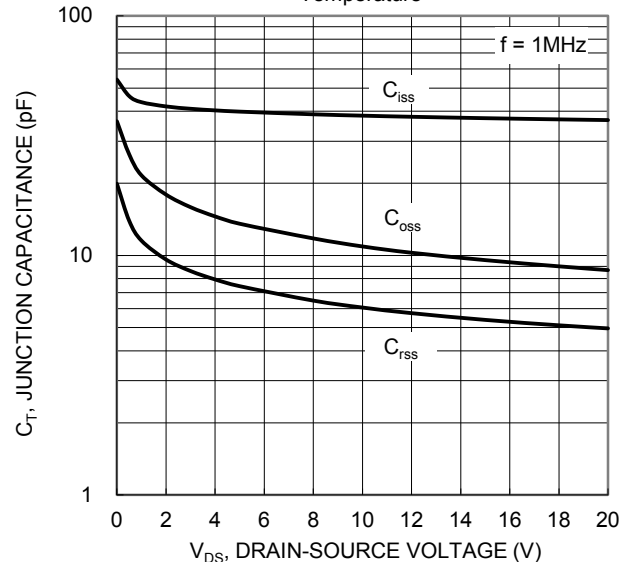
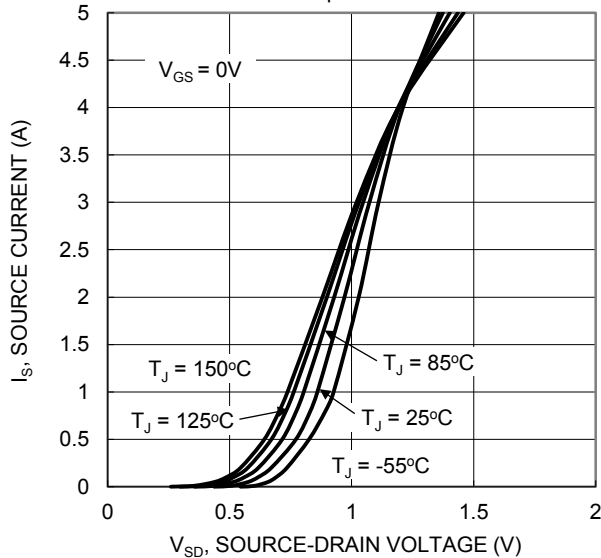
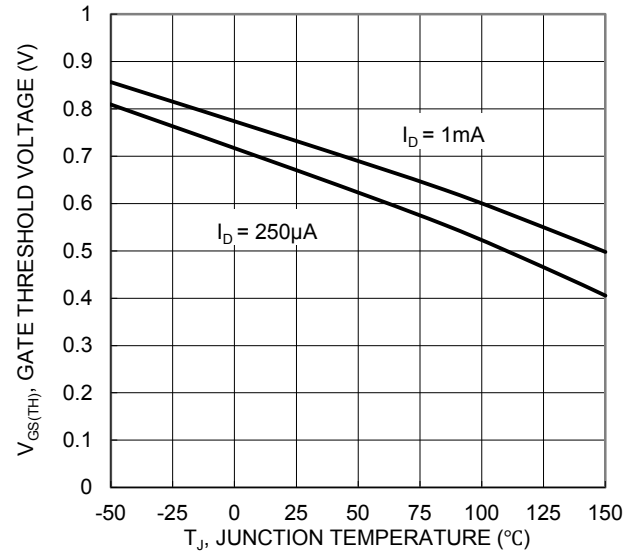
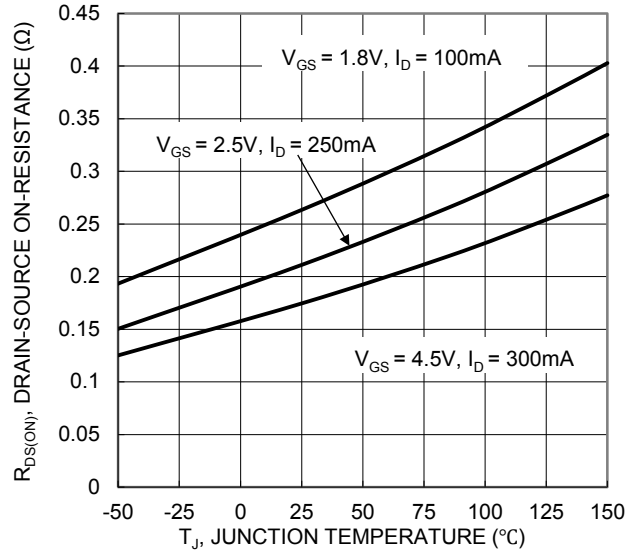


Figure 6. On-Resistance Variation with Junction Temperature



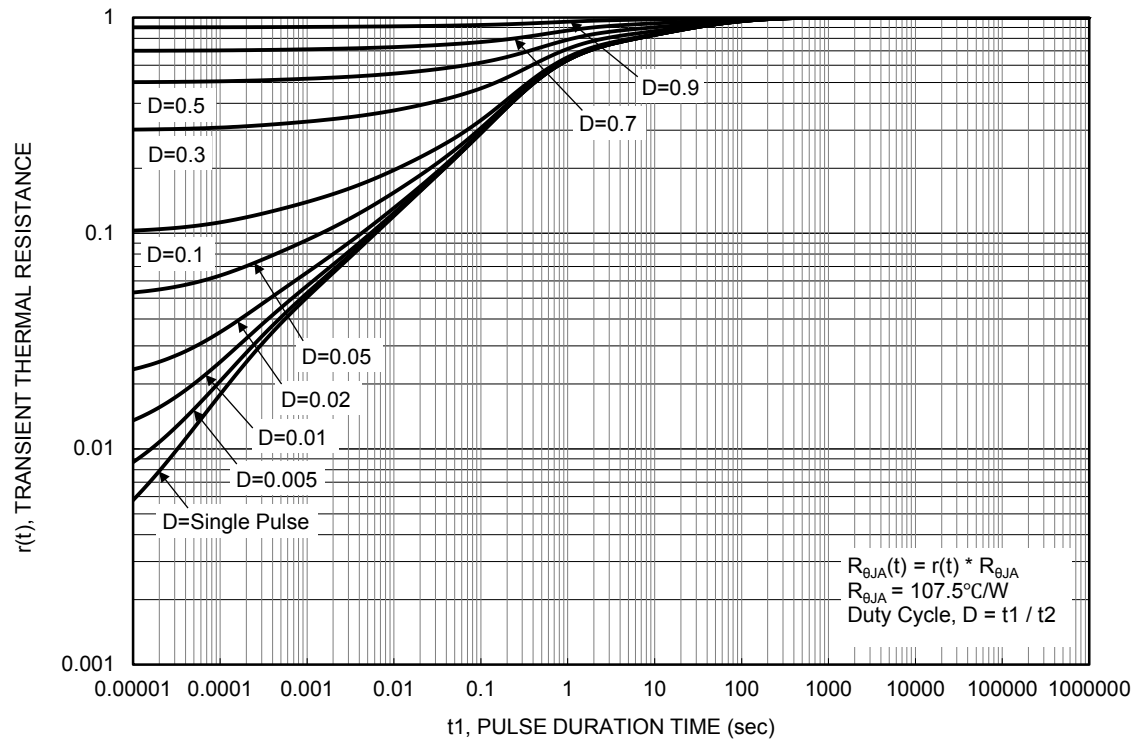
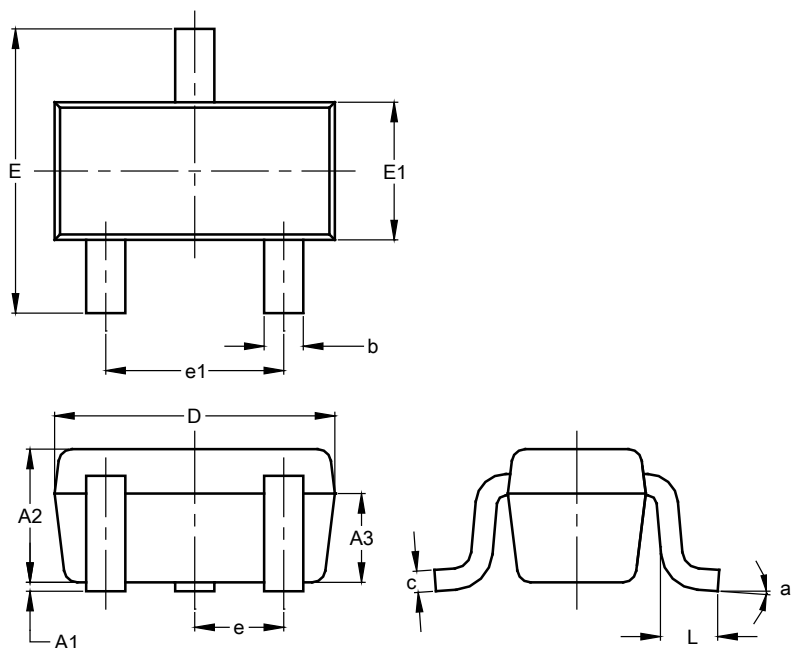


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

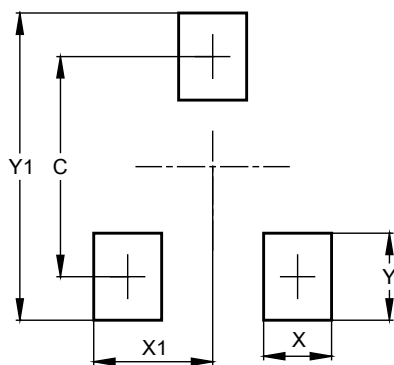
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT523			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
C	1.29
X	0.40
X1	0.70
Y	0.51
Y1	1.80

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