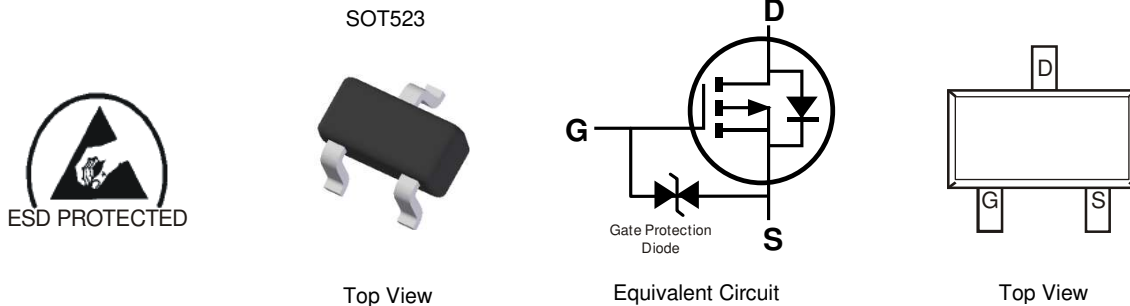


Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Gate**
- **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**

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 leadframe. Solderable per MIL-STD-202, Method 208 ^(e3)
- Terminal Connections: See Diagram
- Weight: 0.002 grams (Approximate)

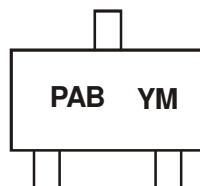


Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2004TK-7	SOT523	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



PAB = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: F = 2018)
 M = Month (ex: 9 = September)

Date Code Key

Year Code	2006 T	2007 U	...	2014 B	2015 C	2016 D	2017 E	2018 F	2019 G	2020 H	2021 I	2022 J
Month Code	Jan 1	Feb 2	Mar 3	Apr 4	May 5	Jun 6	Jul 7	Aug 8	Sep 9	Oct O	Nov N	Dec 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}	±8	V
Drain Current (Note 5)	Steady State	T _A = +25°C	I _D	-430	mA
		T _A = +85°C		-310	
Pulsed Drain Current (Note 6)			I _{DM}	-750	mA

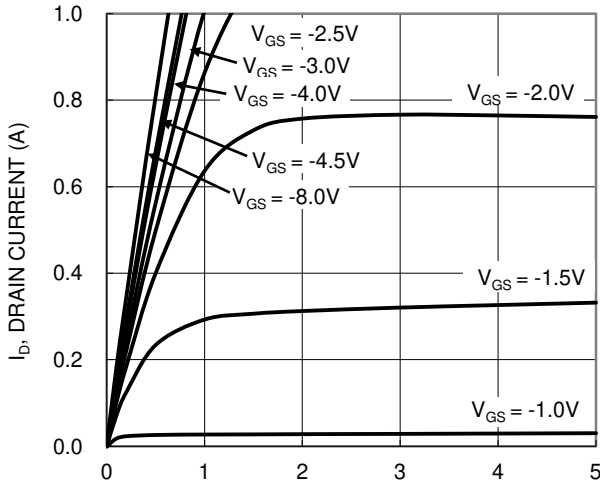
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P _D	230	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	558	°C/W
Total Power Dissipation (Note 6)		P _D	320	mW
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	393	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

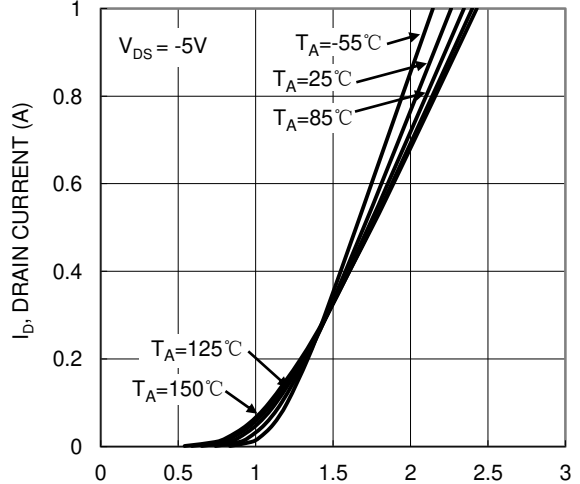
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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 = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±1.0	μA	V _{GS} = ±4.5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.5	—	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	0.7	1.1	Ω	V _{GS} = -4.5V, I _D = -430mA
		—	1.0	1.6		V _{GS} = -2.5V, I _D = -300mA
		—	1.3	2.4		V _{GS} = -1.8V, I _D = -150mA
Diode Forward Voltage	V _{SD}	—	-0.8	-1.4	V	V _{GS} = 0V, I _S = -115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	47	—	pF	V _{DS} = -16V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	6.8	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	4.9	—	pF	
Gate Resistance	R _g	—	240	—	Ω	V _{DS} = 0V, V _{GS} = 0V
Total Gate Charge V _{GS} = -4.5V	Q _g	—	0.55	—	nC	V _{DS} = -10V, I _D = -250mA
Total Gate Charge V _{GS} = -8V	Q _g	—	0.97	—	nC	
Gate-Source Charge	Q _{gs}	—	0.05	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.1	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.9	—	ns	V _{DD} = -3V, V _{GS} = -2.5V, R _G = 25Ω, I _D = -100mA
Turn-On Rise Time	t _R	—	3.3	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	25.5	—	ns	
Turn-Off Fall Time	t _F	—	19.3	—	ns	
Reverse Recovery Time	t _{RR}	—	7.3	—	ns	I _F = -1A, di/dt = -100A/μs
Reverse Recovery Charge	Q _{RR}	—	1.9	—	nC	I _F = -1A, di/dt = -100A/μs

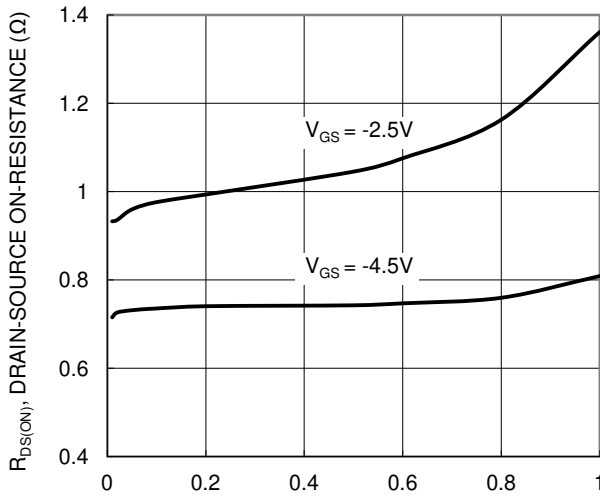
- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
 6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.



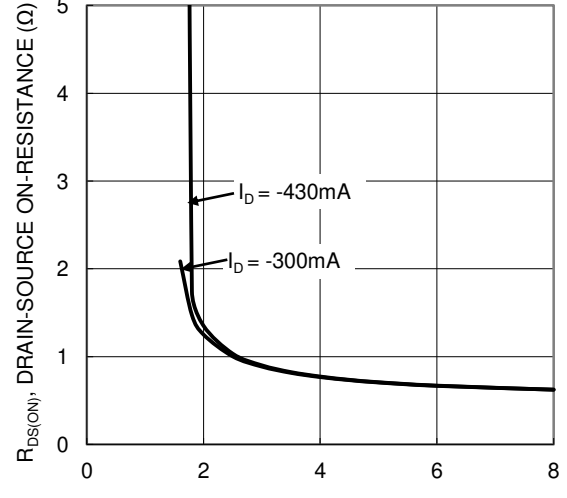
V_{DS} , DRAIN-SOURCE VOLTAGE (V)
Figure 1. Typical Output Characteristic



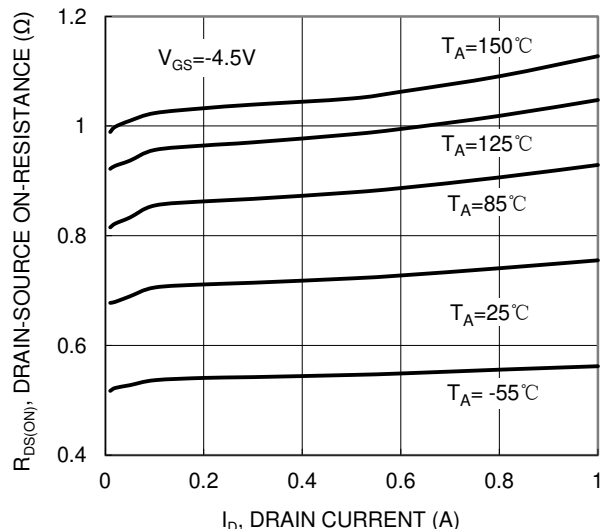
V_{GS} , GATE-SOURCE VOLTAGE (V)
Figure 2. Typical Transfer Characteristic



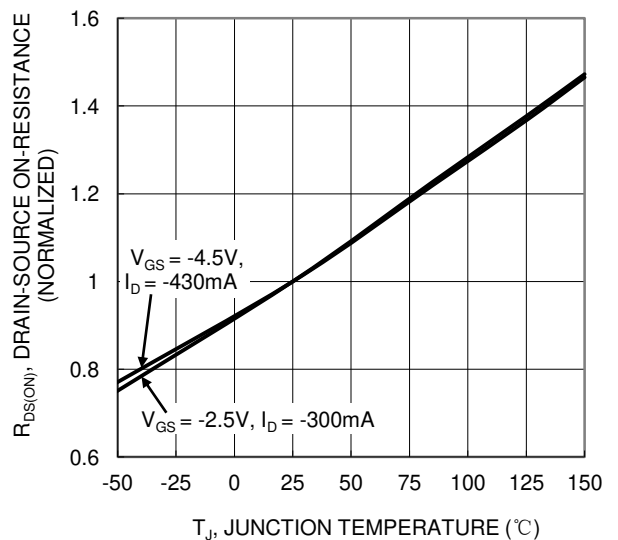
I_D , DRAIN-SOURCE CURRENT (A)
Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage



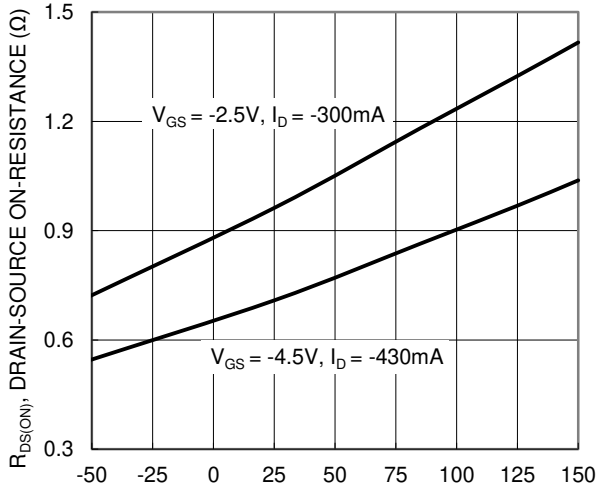
V_{GS} , GATE-SOURCE VOLTAGE (V)
Figure 4. Typical Transfer Characteristic



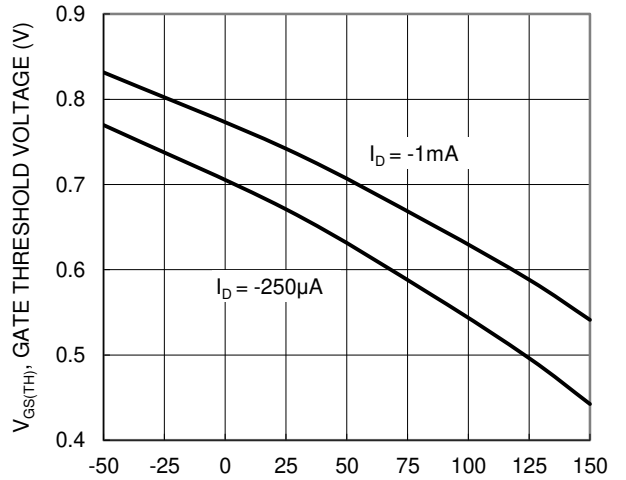
I_D , DRAIN CURRENT (A)
Figure 5. Typical On-Resistance vs. Drain Current and Temperature



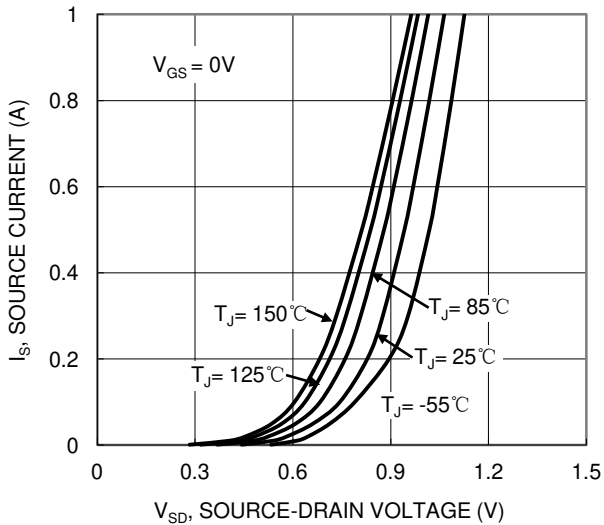
T_J , JUNCTION TEMPERATURE ($^{\circ}C$)
Figure 6. On-Resistance Variation with Temperature



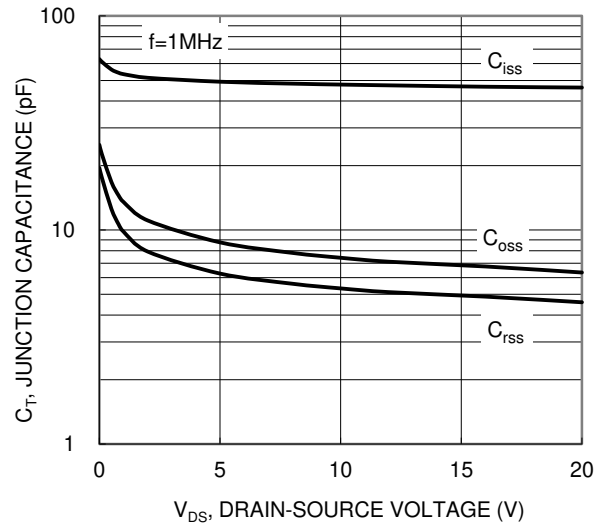
T_J , JUNCTION TEMPERATURE ($^{\circ}\text{C}$)
Figure 7. On-Resistance Variation with Temperature



T_J , JUNCTION TEMPERATURE ($^{\circ}\text{C}$)
Figure 8. Gate Threshold Variation vs. Junction Temperature



V_{SD} , SOURCE-DRAIN VOLTAGE (V)
Figure 9. Diode Forward Voltage vs. Current



V_{DS} , DRAIN-SOURCE VOLTAGE (V)
Figure 10. Typical Junction Capacitance

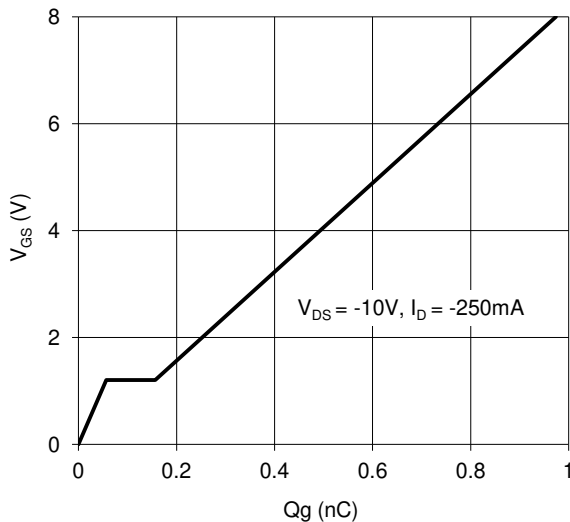
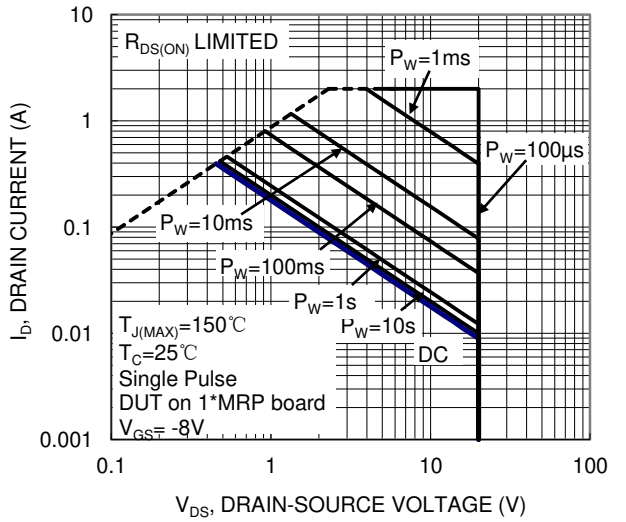


Figure 11. Gate Charge



V_{DS} , DRAIN-SOURCE VOLTAGE (V)
Figure 12. SOA, Safe Operation Area

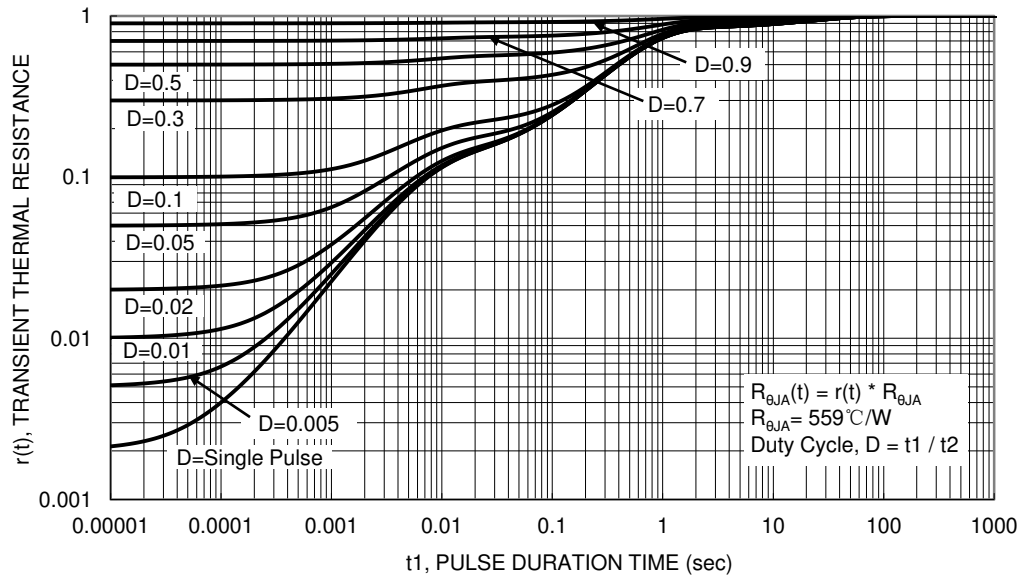
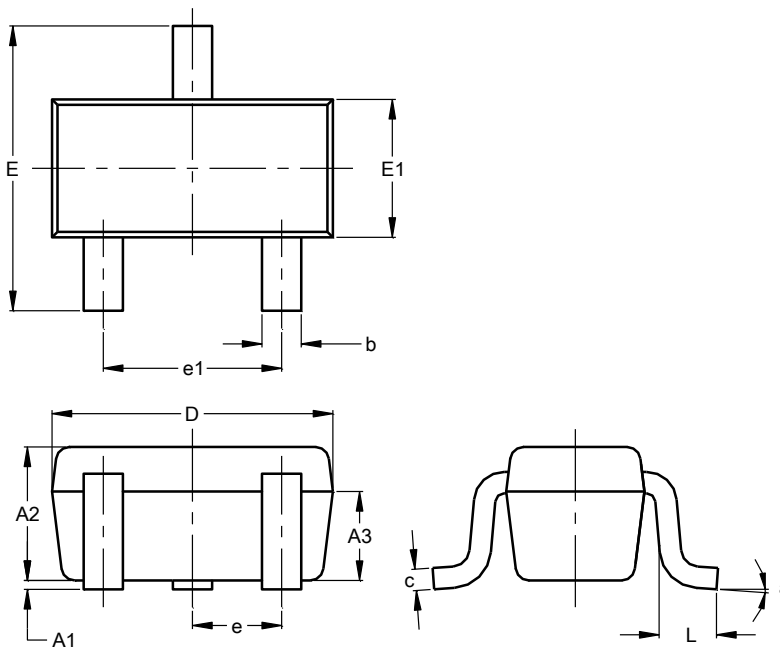


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SOT523



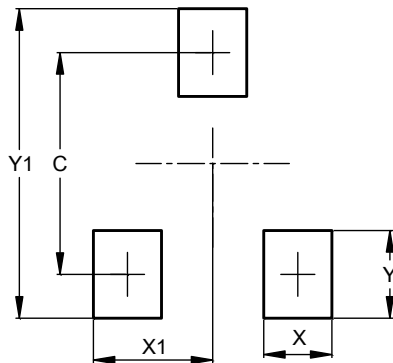
SOT523			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°

All Dimensions in mm

Suggested Pad Layout

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

SOT523



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

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