

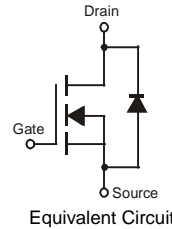
Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **"Green" Device (Notes 3 and 4)**

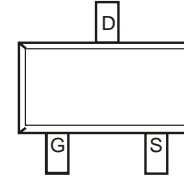


Top View

SOT523



Equivalent Circuit



Top View

Mechanical Data

- Case: SOT523
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.002 grams (approximate)

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V _{DSS}	60	V
Drain-Gate Voltage R _{GS} ≤ 1.0MΩ	V _{DGR}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Pulsed		±40	
Drain Current (Note 1)	I _D	115	mA
Continuous @ 100°C		73	
Pulsed		800	

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 1)	P _d	150	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	833	°C/W
Operating and Storage Temperature Range	T _j , T _{STG}	-55 to +150	°C

- Notes:
1. Device mounted on FR-4 PCB 1.0 x 0.75 x 0.062 inch pad layout as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 2. No purposefully added lead.
 3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 4. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 10μA
Zero Gate Voltage Drain Current @ T _C = 25°C @ T _C = 125°C	I _{DSS}	—	—	1.0 500	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Body Leakage	I _{GSS}	—	—	±10	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	2.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance @ T _J = 25°C @ T _J = 125°C	R _{DS(ON)}	—	2.0	7.5	Ω	V _{GS} = 5.0V, I _D = 0.05A
			4.4	13.5		V _{GS} = 10V, I _D = 0.5A
On-State Drain Current	I _{D(ON)}	0.5	1.0	—	A	V _{GS} = 10V, V _{DS} = 7.5V
Forward Transconductance	g _{FS}	80	—	—	mS	V _{DS} = 10V, I _D = 0.2A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{iss}	—	22	50	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	11	25	pF	
Reverse Transfer Capacitance	C _{rss}	—	2.0	5.0	pF	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(ON)}	—	7.0	20	ns	V _{DD} = 30V, I _D = 0.2A, R _L = 150Ω, V _{GEN} = 10V, R _{GEN} = 25Ω
Turn-Off Delay Time	t _{D(OFF)}	—	11	20	ns	

Notes: 5. Short duration pulse test used to minimize self-heating effect.

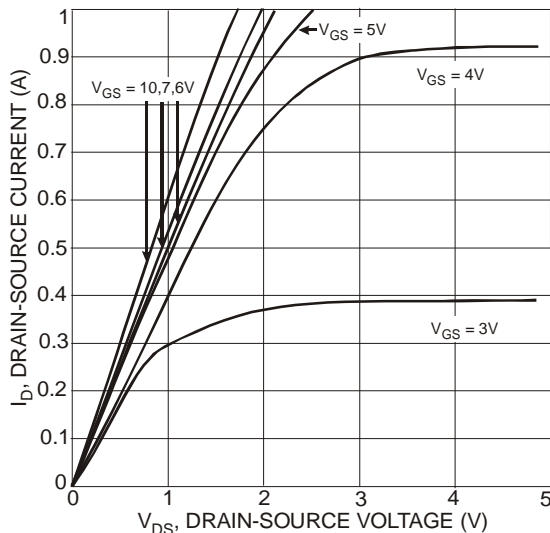


Fig. 1 On-Region Characteristics

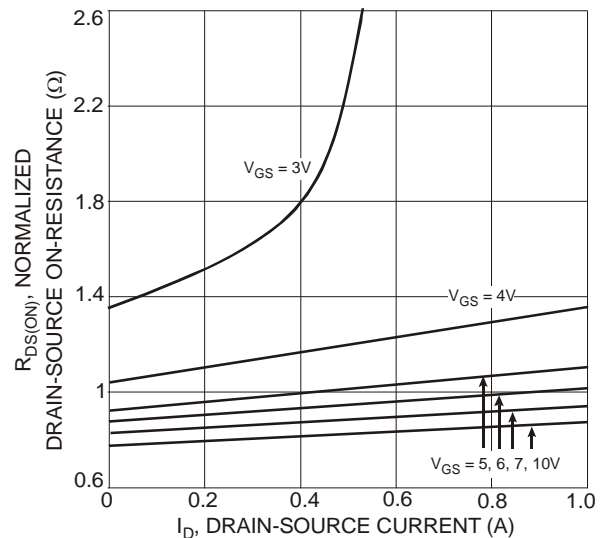


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

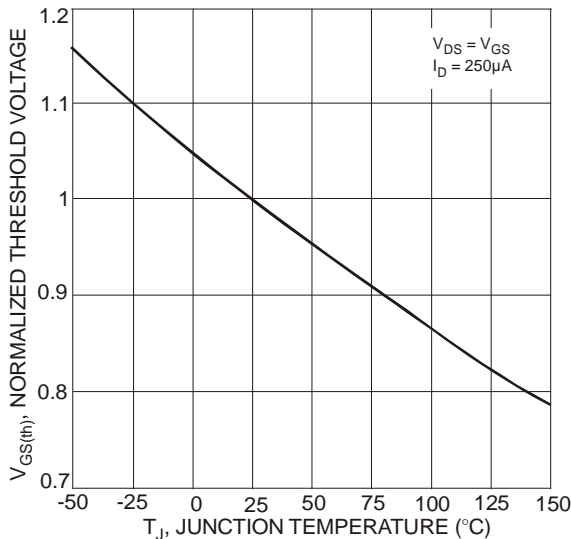


Fig. 3 Gate Threshold Variation with Temperature

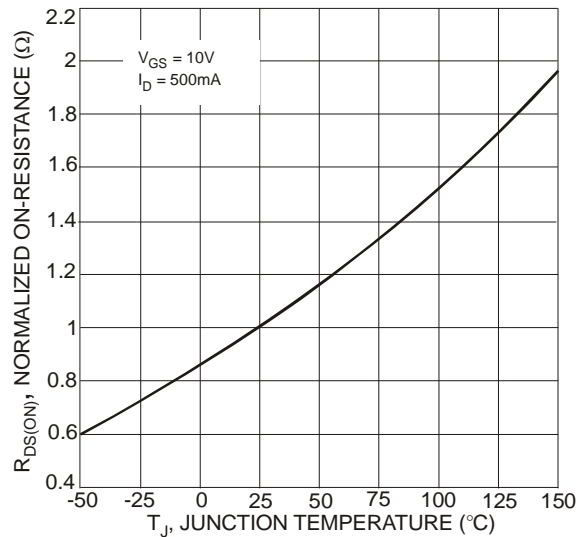


Fig. 4 On-Resistance Variation with Temperature

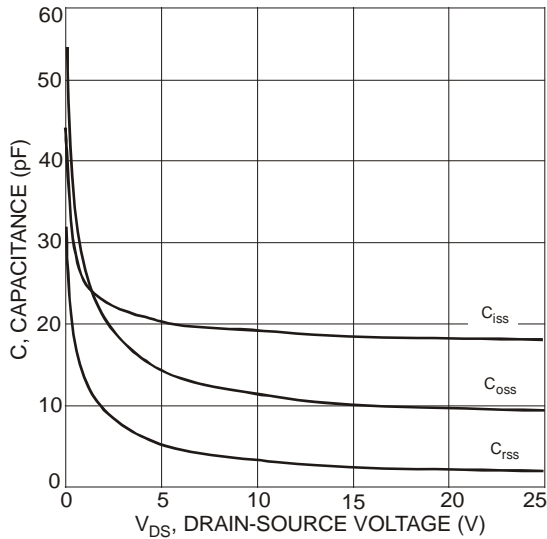


Fig. 5 Typical Capacitance

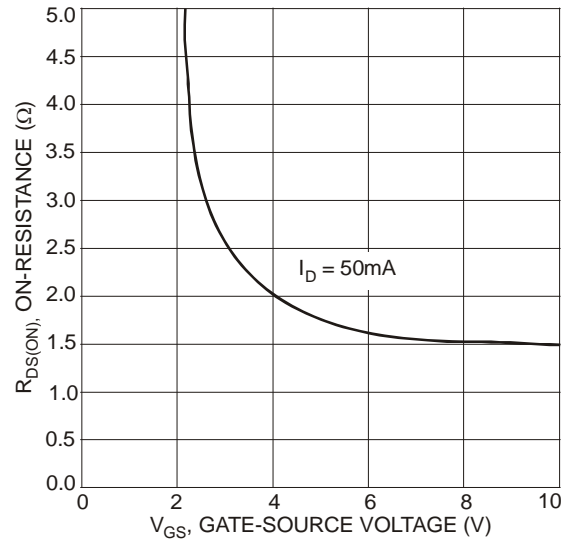


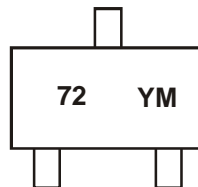
Fig. 6 On-Resistance vs. Gate-Source Voltage

Ordering Information (Note 6)

Part Number	Qualification	Case	Packaging
2N7002T-7-F	Commercial	SOT523	3000/Tape & Reel
2N7002TQ-7-F	Automotive	SOT523	3000/Tape & Reel

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



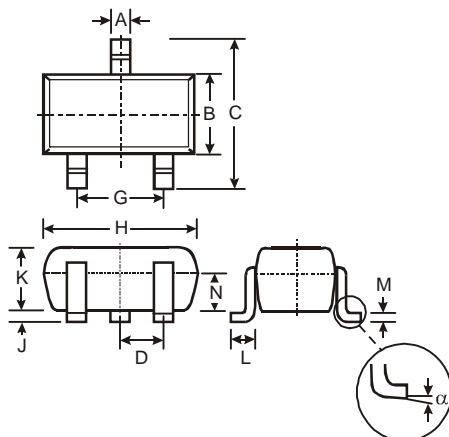
72 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: T = 2006)
 M = Month (ex: 9 = September)

Date Code Key

Year	2005	2006	2007	2008	2009	2010	2011	2012
Code	S	T	U	V	W	X	Y	Z

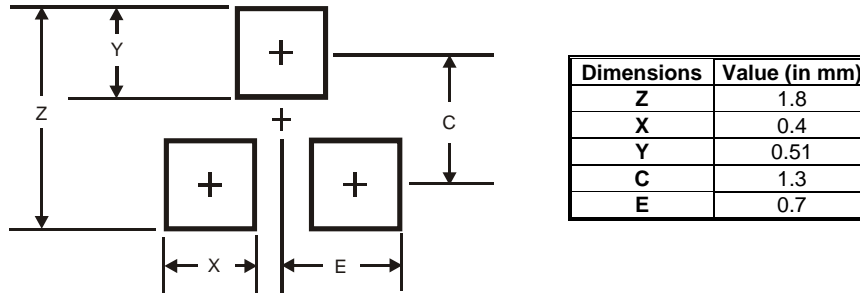
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Package Outline Dimensions



SOT523			
Dim	Min	Max	Typ
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout



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