Small Signal MOSFET

60 V, 115 mA, N-Channel SOT-23

Features

- AEC Qualified
- PPAP Capable
- Pb-Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	Vdc
Drain-Gate Voltage ($R_{GS} = 1.0 \text{ M}\Omega$)	V _{DGR}	60	Vdc
Drain Current - Continuous $T_C = 25^{\circ}C$ (Note 1) $T_C = 100^{\circ}C$ (Note 1) - Pulsed (Note 2)	I _D I _D I _{DM}	±115 ±75 ±800	mAdc
Gate-Source Voltage - Continuous - Non-repetitive (t _p ≤ 50 μs)	V _{GS} V _{GSM}	±20 ±40	Vdc Vpk

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 3) T _A = 25°C Derate above 25°C	P _D	225 1.8	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate,(Note 4) T _A = 25°C	P _D	300	mW mW/°C
Derate above 25°C		2.4	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T _J , T _{stg}	-55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the

- Recommended Operating Conditions may affect device reliability.

 1. The Power Dissipation of the package may result in a lower continuous drain
- 2. Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2.0%.
- 3. $FR-5 = 1.0 \times 0.75 \times 0.062$ in.
- 4. Alumina = 0.4 x 0.3 x 0.025 in 99.5% alumina.



ON Semiconductor®

http://onsemi.com

V _{(BR)DSS}	R _{DS(on)} MAX	I _D MAX
60 V	7.5 Ω @ 10 V, 500 mA	115 mA

N-Channel



SOT-23 CASE 318 STYLE 21





= Device Code 702 М = Date Code* = Pb-Free Package

(Note: Microdot may be in either location) *Date Code orientation and/or position may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping [†]		
2N7002LT1	SOT-23	3000 Tape & Reel		
2N7002LT3	001 20	10,000 Tape & Reel		
2N7002LT1G	SOT-23	3000 Tape & Reel		
2N7002LT3G	(Pb-free)	10,000 Tape & Reel		

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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2N7002L

ELECTRICAL CHARACTERISTICS ($T_A = 25^{\circ}C$ unless otherwise noted)

C	Symbol	Min	Тур	Max	Unit	
OFF CHARACTERISTICS		•		u.	•	
Drain-Source Breakdown Volt ($V_{GS} = 0$, $I_D = 10 \mu Adc$)	V _{(BR)DSS}	60	-	-	Vdc	
Zero Gate Voltage Drain Curre (V _{GS} = 0, V _{DS} = 60 Vdc)	ent $T_J = 25^{\circ}C$ $T_J = 125^{\circ}C$	I _{DSS}	-		1.0 500	μAdc
Gate-Body Leakage Current, (V _{GS} = 20 Vdc)	Forward	I _{GSSF}	-	-	100	nAdc
Gate-Body Leakage Current, (V _{GS} = -20 Vdc)	I _{GSSR}	-	-	-100	nAdc	
ON CHARACTERISTICS (Not	te 5)			1	•	•
Gate Threshold Voltage $(V_{DS} = V_{GS}, I_D = 250 \mu Add$:)	V _{GS(th)}	1.0	-	2.5	Vdc
On-State Drain Current $(V_{DS} \ge 2.0 \ V_{DS(on)}, \ V_{GS} =$	I _{D(on)}	500	-	-	mA	
Static Drain-Source On-State ($V_{GS} = 10 \text{ Vdc}$, $I_D = 500 \text{ m}$) ($V_{GS} = 5.0 \text{ Vdc}$, $I_D = 50 \text{ m}$)	V _{DS(on)}	-	- -	3.75 0.375	Vdc	
Static Drain-Source On-State ($V_{GS} = 10 \text{ V}, I_D = 500 \text{ mAc}$) ($V_{GS} = 5.0 \text{ Vdc}, I_D = 50 \text{ m/s}$)	r _{DS(on)}	- - -	- - -	7.5 13.5 7.5	Ohms	
Forward Transconductance $(V_{DS} \ge 2.0 V_{DS(on)}, I_D = 20)$	g _{FS}	80	-	13.5	mmhos	
DYNAMIC CHARACTERISTIC	cs			1	-1	_ L
Input Capacitance (V _{DS} = 25 Vdc, V _{GS} = 0, f = 1.0 MHz)		C _{iss}	-	-	50	pF
Output Capacitance (V _{DS} = 25 Vdc, V _{GS} = 0, f	C _{oss}	-	-	25	pF	
Reverse Transfer Capacitance (V _{DS} = 25 Vdc, V _{GS} = 0, f	C _{rss}	-	-	5.0	pF	
SWITCHING CHARACTERIS	TICS (Note 5)			1	•	•
Turn-On Delay Time	$(V_{DD} = 25 \text{ Vdc}, I_D \cong 500 \text{ mAdc},$	t _{d(on)}	-	-	20	ns
Turn-Off Delay Time	$R_G = 25 \Omega, R_L = 50 \Omega, V_{gen} = 10 V)$	t _{d(off)}	-	-	40	ns
BODY-DRAIN DIODE RATIN	GS	•		•	•	•
Diode Forward On-Voltage (I _S = 11.5 mAdc, V _{GS} = 0 \	V _{SD}	-	-	-1.5	Vdc	
Source Current Continuous (Body Diode)	I _S	-	-	-115	mAdc	
Source Current Pulsed		I _{SM}	-	-	-800	mAdc
			•	•	•	

^{5.} Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2.0%.

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TYPICAL ELECTRICAL CHARACTERISTICS

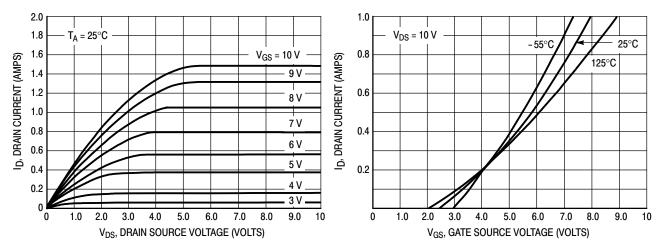


Figure 1. Ohmic Region

Figure 2. Transfer Characteristics

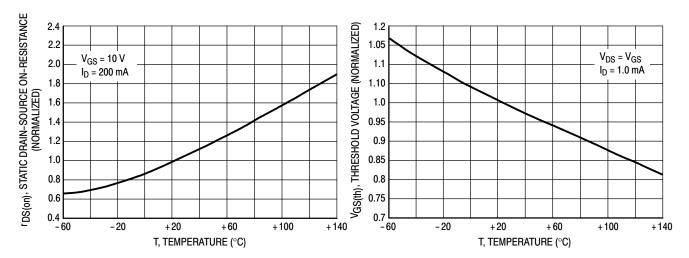


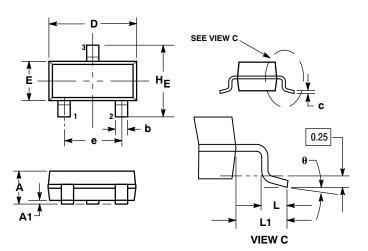
Figure 3. Temperature versus Static Drain-Source On-Resistance

Figure 4. Temperature versus Gate Threshold Voltage

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PACKAGE DIMENSIONS

SOT-23 (TO-236) CASE 318-08 **ISSUE AN**



NOTES:

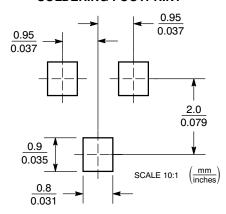
- DIMENSIONING AND TOLERANCING PER ANSI
- Y14.5M, 1982
- CONTROLLING DIMENSION: INCH
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
- 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

	MILLIMETERS				INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX	
Α	0.89	1.00	1.11	0.035	0.040	0.044	
A1	0.01	0.06	0.10	0.001	0.002	0.004	
b	0.37	0.44	0.50	0.015	0.018	0.020	
С	0.09	0.13	0.18	0.003	0.005	0.007	
D	2.80	2.90	3.04	0.110	0.114	0.120	
E	1.20	1.30	1.40	0.047	0.051	0.055	
е	1.78	1.90	2.04	0.070	0.075	0.081	
L	0.10	0.20	0.30	0.004	0.008	0.012	
L1	0.35	0.54	0.69	0.014	0.021	0.029	
HE	2.10	2.40	2.64	0.083	0.094	0.104	

STYLE 21:

- PIN 1. GATE
 - SOURCE

SOLDERING FOOTPRINT



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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