

MOSFET – N-Channel, Small Signal, SOT-23

60 V, 115 mA

2N7002L, 2V7002L

Features

- 2V Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable (2V7002L)
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	Vdc
Drain-Gate Voltage ($R_{GS} = 1.0 \text{ M}\Omega$)	V_{DGR}	60	Vdc
Drain Current – Continuous $T_C = 25^\circ\text{C}$ (Note 1) – Pulsed (Note 2)	I_D I_{D1} I_{DM}	± 115 ± 75 ± 800	mAdc
Gate-Source Voltage – Continuous – Non-repetitive ($t_p \leq 50 \mu\text{s}$)	V_{GS} V_{GSM}	± 20 ± 40	Vdc Vpk

THERMAL CHARACTERISTICS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

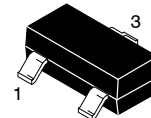
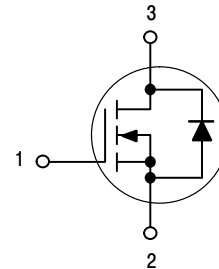


ON Semiconductor®

www.onsemi.com

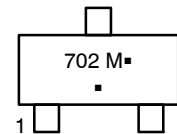
$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
60 V	$7.5 \Omega @ 10 \text{ V}, 500 \text{ mA}$	115 mA

N-Channel



SOT-23
CASE 318
STYLE 21

MARKING DIAGRAM



702 = Device Code
M = 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†
2N7002LT1G	SOT-23 (Pb-Free)	3,000 Tape & Reel
2N7002LT3G		10,000 Tape & Reel
2N7002LT7G		3,500 Tape & Reel
2V7002LT1G	SOT-23 (Pb-Free)	3,000 Tape & Reel
2V7002LT3G		10,000 Tape & Reel
2N7002LT1H*		3,000 Tape & Reel
2N7002LT7H*		3,500 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.

*Not for new design.

2N7002L, 2V7002L

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Drain–Source Breakdown Voltage (V _{GS} = 0, I _D = 10 μAdc)	V _{(BR)DSS}	60	–	–	Vdc
Zero Gate Voltage Drain Current (V _{GS} = 0, V _{DS} = 60 Vdc)	I _{DSS}	T _J = 25°C	–	–	1.0
		T _J = 125°C	–	–	500
Gate–Body Leakage Current, Forward (V _{GS} = 20 Vdc)	I _{GSSF}	–	–	100	nAdc
Gate–Body Leakage Current, Reverse (V _{GS} = –20 Vdc)	I _{GSSR}	–	–	–100	nAdc

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μAdc)	V _{GS(th)}	1.0	–	2.5	Vdc
On–State Drain Current (V _{DS} ≥ 2.0 V _{DS(on)} , V _{GS} = 10 Vdc)	I _{D(on)}	500	–	–	mA
Static Drain–Source On–State Voltage (V _{GS} = 10 Vdc, I _D = 500 mAdc) (V _{GS} = 5.0 Vdc, I _D = 50 mAdc)	V _{DS(on)}	–	–	3.75	Vdc
		–	–	0.375	
Static Drain–Source On–State Resistance (V _{GS} = 10 V, I _D = 500 mAdc) (V _{GS} = 5.0 Vdc, I _D = 50 mAdc)	r _{DS(on)}	T _C = 25°C	–	–	7.5
		T _C = 125°C	–	–	13.5
		T _C = 25°C	–	–	7.5
		T _C = 125°C	–	–	13.5
Forward Transconductance (V _{DS} ≥ 2.0 V _{DS(on)} , I _D = 200 mAdc)	g _{FS}	80	–	–	mS

DYNAMIC CHARACTERISTICS

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 = 1.0 MHz)	C _{oss}	–	–	25	pF
Reverse Transfer Capacitance (V _{DS} = 25 Vdc, V _{GS} = 0, f = 1.0 MHz)	C _{rss}	–	–	5.0	pF

SWITCHING CHARACTERISTICS (Note 5)

Turn–On Delay Time	(V _{DD} = 25 Vdc, I _D ≅ 500 mAdc, R _G = 25 Ω, R _L = 50 Ω, V _{gen} = 10 V)	t _{d(on)}	–	–	20	ns
Turn–Off Delay Time		t _{d(off)}	–	–	40	ns

BODY–DRAIN DIODE RATINGS

Diode Forward On–Voltage (I _S = 115 mAdc, V _{GS} = 0 V)	V _{SD}	–	–	–1.5	Vdc
Source Current Continuous (Body Diode)	I _S	–	–	–115	mAdc
Source Current Pulsed	I _{SM}	–	–	–800	mAdc

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.