

# Small Signal MOSFET

## 115 mAmps, 60 Volts

### N-Channel SOT-23

#### MAXIMUM RATINGS

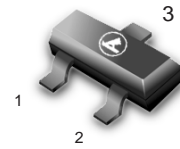
Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	60	V <sub>dc</sub>
Drain-Gate Voltage ( $R_{GS} = 1.0\text{ M}\Omega$ )	$V_{DGR}$	60	V <sub>dc</sub>
Drain Current - Continuous $T_C = 25^\circ\text{C}$ (Note 1.) $T_C = 100^\circ\text{C}$ (Note 1.) - Pulsed (Note 2.)	$I_D$ $I_{DM}$	$\pm 115$ $\pm 75$ $\pm 800$	mA <sub>dc</sub>
Gate-Source Voltage - Continuous - Non-repetitive ( $t_p \leq 50\ \mu\text{s}$ )	$V_{GS}$ $V_{GSM}$	$\pm 20$ $\pm 40$	V <sub>dc</sub> V <sub>pk</sub>

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 3.) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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 Alumina Substrate, (Note 4.) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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	$^\circ\text{C}$

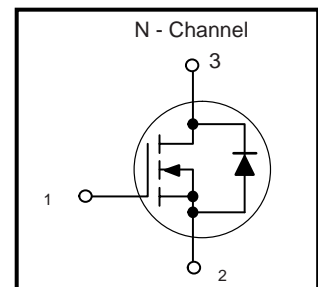
1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .
3. FR-5 = 1.0 x 0.75 x 0.062 in.
4. Alumina = 0.4 x 0.3 x 0.025 in 99.5% alumina.

## L2N7002LT1

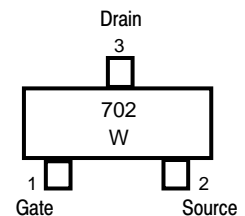


CASE 318, STYLE 21  
SOT-23 (TO-236AB)

**115 mAmps**  
**60 VOLTS**  
 $R_{DS(on)} = 7.5\ \Omega$



#### MARKING DIAGRAM & PIN ASSIGNMENT



702 = Device Code  
W = Work Week

#### ORDERING INFORMATION

Device	Package	Shipping
2N7002LT1	SOT-23	3000 Tape & Reel
2N7002LT3	SOT-23	10,000 Tape & Reel

**L2N7002LT1**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Drain–Source Breakdown Voltage ( $V_{GS} = 0, I_D = 10 \mu\text{A}$ )	$V_{(BR)DSS}$	60	–	–	Vdc
Zero Gate Voltage Drain Current ( $V_{GS} = 0, V_{DS} = 60 \text{ Vdc}$ )	$I_{DSS}$	– –	– –	1.0 500	$\mu\text{A}$
Gate–Body Leakage Current, Forward ( $V_{GS} = 20 \text{ Vdc}$ )	$I_{GSSF}$	–	–	100	nA
Gate–Body Leakage Current, Reverse ( $V_{GS} = -20 \text{ Vdc}$ )	$I_{GSSR}$	–	–	-100	nA

**ON CHARACTERISTICS** (Note 2.)

Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$ )	$V_{GS(th)}$	1.0	–	2.5	Vdc
On–State Drain Current ( $V_{DS} \geq 2.0 V_{DS(on)}, V_{GS} = 10 \text{ Vdc}$ )	$I_{D(on)}$	500	–	–	mA
Static Drain–Source On–State Voltage ( $V_{GS} = 10 \text{ Vdc}, I_D = 500 \text{ mA}$ ) ( $V_{GS} = 5.0 \text{ Vdc}, I_D = 50 \text{ mA}$ )	$V_{DS(on)}$	– –	– –	3.75 0.375	Vdc
Static Drain–Source On–State Resistance ( $V_{GS} = 10 \text{ V}, I_D = 500 \text{ mA}$ ) $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ ( $V_{GS} = 5.0 \text{ Vdc}, I_D = 50 \text{ mA}$ ) $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	$r_{DS(on)}$	– – – –	– – – –	7.5 13.5 7.5 13.5	Ohms
Forward Transconductance ( $V_{DS} \geq 2.0 V_{DS(on)}, I_D = 200 \text{ mA}$ )	$g_{FS}$	80	–	–	mmhos

**DYNAMIC CHARACTERISTICS**

Input Capacitance ( $V_{DS} = 25 \text{ Vdc}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )	$C_{iss}$	–	–	50	pF
Output Capacitance ( $V_{DS} = 25 \text{ Vdc}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )	$C_{oss}$	–	–	25	pF
Reverse Transfer Capacitance ( $V_{DS} = 25 \text{ Vdc}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )	$C_{rss}$	–	–	5.0	pF

**SWITCHING CHARACTERISTICS** (Note 2.)

Turn–On Delay Time	( $V_{DD} = 25 \text{ Vdc}, I_D \cong 500 \text{ mA}$ , $R_G = 25 \Omega, R_L = 50 \Omega, V_{gen} = 10 \text{ V}$ )	$t_{d(on)}$	–	–	20	ns
Turn–Off Delay Time		$t_{d(off)}$	–	–	40	ns

**BODY–DRAIN DIODE RATINGS**

Diode Forward On–Voltage ( $I_S = 11.5 \text{ mA}, V_{GS} = 0 \text{ V}$ )	$V_{SD}$	–	–	-1.5	Vdc
Source Current Continuous (Body Diode)	$I_S$	–	–	-115	mA
Source Current Pulsed	$I_{SM}$	–	–	-800	mA

 2. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

L2N7002LT1

TYPICAL ELECTRICAL CHARACTERISTICS

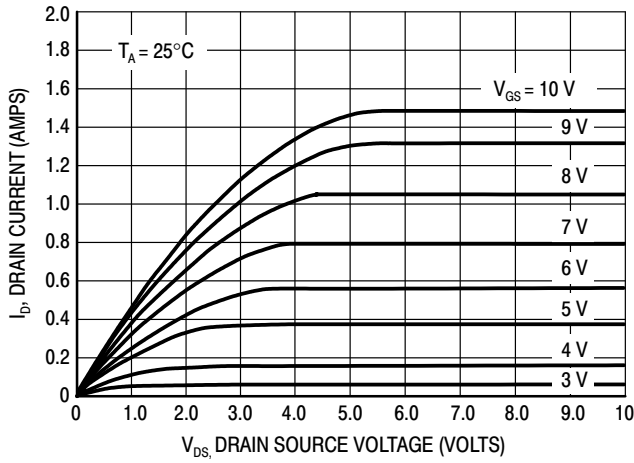


Figure 1. Ohmic Region

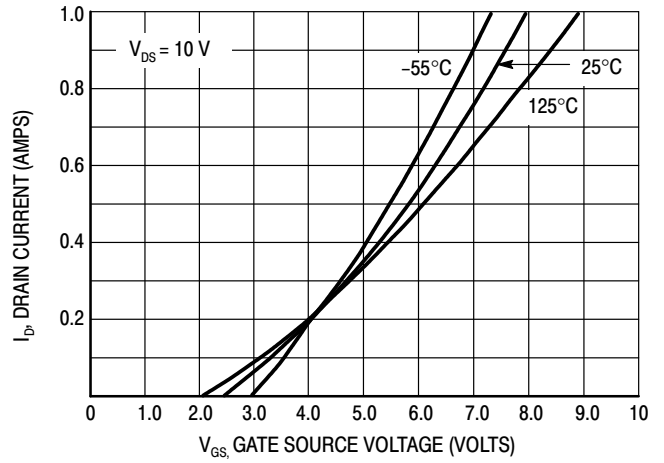


Figure 2. Transfer Characteristics

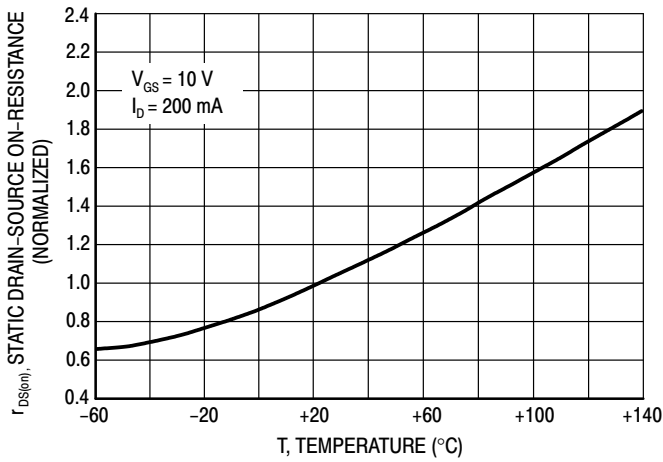


Figure 3. Temperature versus Static Drain-Source On-Resistance

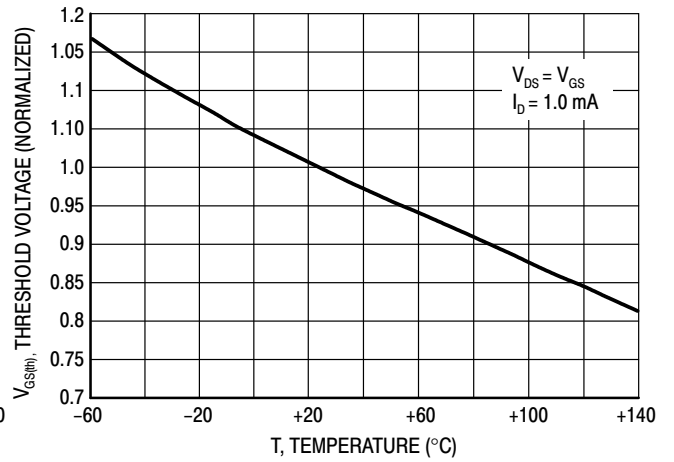


Figure 4. Temperature versus Gate Threshold Voltage