

# Small Signal MOSFET

## 115 mAmps, 60 Volts

### N-Channel SOT-23

- Pb-Free Package is Available.

#### MAXIMUM RATINGS

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

#### 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 $+150$	$^\circ\text{C}$

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

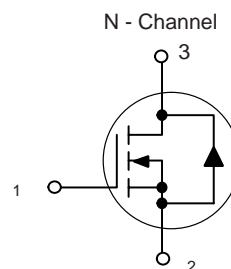
**L2N7002LT1**



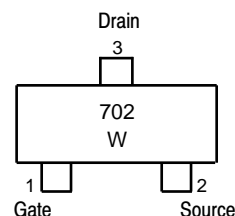
CASE 318, STYLE 21  
SOT-23 (TO-236AB)

**115 mAMPS**  
**60 VOLTS**

$R_{DS(on)} = 7.5 \Omega$



#### MARKING DIAGRAM & PIN ASSIGNMENT



702 = Device Code  
W = Work Week

#### ORDERING INFORMATION

Device	Marking	Shipping
L2N7002LT1	702	3000 Tape & Reel
L2N7002LT1G	702(Pb-Free)	3000 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 ( $V_{GS} = 0$ , $I_D = 10\ \mu\text{Adc}$ )	$V_{(BR)DSS}$	60	–	–	Vdc
Zero Gate Voltage Drain Current ( $V_{GS} = 0$ , $V_{DS} = 60\ \text{Vdc}$ )	$I_{DSS}$	–	–	1.0 500	$\mu\text{Adc}$
Gate–Body Leakage Current, Forward ( $V_{GS} = 20\ \text{Vdc}$ )	$I_{GSSF}$	–	–	100	nAdc
Gate–Body Leakage Current, Reverse ( $V_{GS} = -20\ \text{Vdc}$ )	$I_{GSSR}$	–	–	-100	nAdc

**ON CHARACTERISTICS** (Note 2.)

Gate Threshold Voltage ( $V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{Adc}$ )	$V_{GS(th)}$	1.0	1.6	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 ( $V_{GS} = 10\ \text{Vdc}$ , $I_D = 500\ \text{mAdc}$ ) ( $V_{GS} = 5.0\ \text{Vdc}$ , $I_D = 50\ \text{mAdc}$ )	$V_{DS(on)}$	– –	– –	3.75 0.375	Vdc
Static Drain–Source On–State Resistance ( $V_{GS} = 10\ \text{V}$ , $I_D = 500\ \text{mAdc}$ ) $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ ( $V_{GS} = 5.0\ \text{Vdc}$ , $I_D = 50\ \text{mAdc}$ ) $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	$r_{DS(on)}$	– – – –	1.4 – 1.8 –	7.5 13.5 7.5 13.5	Ohms
Forward Transconductance ( $V_{DS} \geq 2.0\ V_{DS(on)}$ , $I_D = 200\ \text{mAdc}$ )	$g_{FS}$	80	–	–	mmhos

**DYNAMIC CHARACTERISTICS**

Input Capacitance ( $V_{DS} = 25\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$ )	$C_{iss}$	–	17	50	pF
Output Capacitance ( $V_{DS} = 25\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$ )	$C_{oss}$	–	10	25	pF
Reverse Transfer Capacitance ( $V_{DS} = 25\ \text{Vdc}$ , $V_{GS} = 0$ , $f = 1.0\ \text{MHz}$ )	$C_{rss}$	–	2.5	5.0	pF

**SWITCHING CHARACTERISTICS** (Note 2.)

Turn–On Delay Time	(V <sub>DD</sub> = 25 Vdc, I <sub>D</sub> ≅ 500 mAdc, R <sub>G</sub> = 25 Ω, R <sub>L</sub> = 50 Ω, V <sub>gen</sub> = 10 V)	t <sub>d(on)</sub>	–	7	20	ns
Turn–Off Delay Time		t <sub>d(off)</sub>	–	11	40	ns

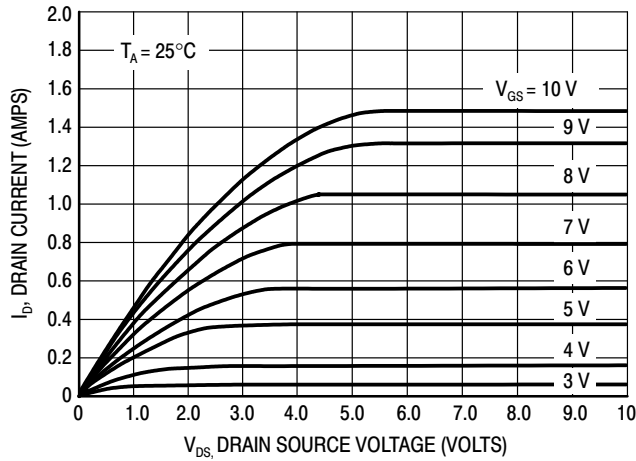
**BODY–DRAIN DIODE RATINGS**

Diode Forward On–Voltage (I <sub>S</sub> = 11.5 mAdc, V <sub>GS</sub> = 0 V)	$V_{SD}$	–	–	-1.5	Vdc
Source Current Continuous (Body Diode)	$I_S$	–	–	-115	mAdc
Source Current Pulsed	$I_{SM}$	–	–	-800	mAdc

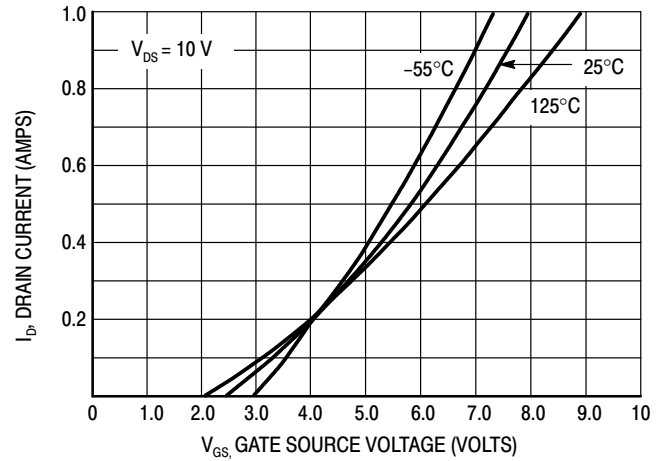
2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

**L2N7002LT1**

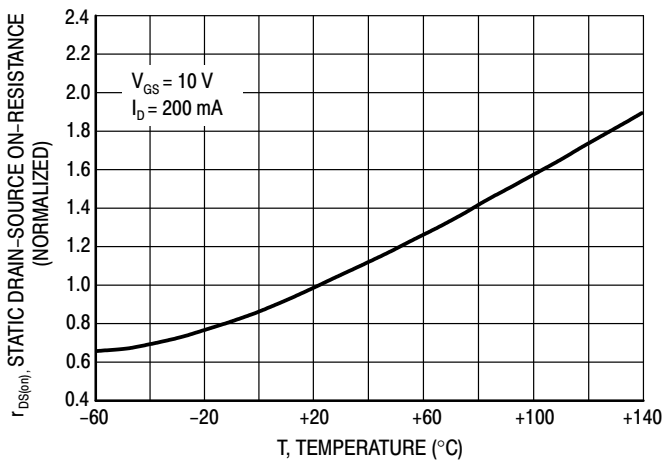
**TYPICAL ELECTRICAL CHARACTERISTICS**



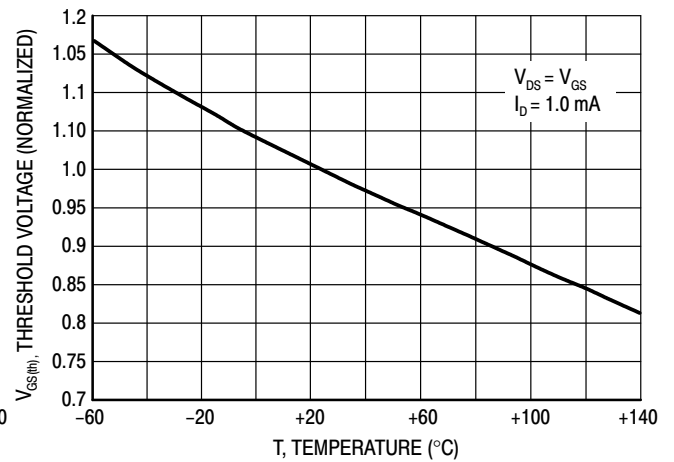
**Figure 1. Ohmic Region**



**Figure 2. Transfer Characteristics**



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



**Figure 4. Temperature versus Gate Threshold Voltage**