

N-Channel SOT-23

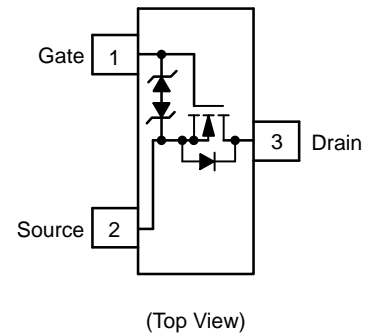
- We declare that the material of product are Halogen Free and compliance with RoHS requirements.
- ESD Protected:1000V
- **Pb-Free package is available**
RoHS product for packing code suffix "G"
Halogen free product for packing code suffix "H"



MAXIMUM RATINGS

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

Simplified Schematic

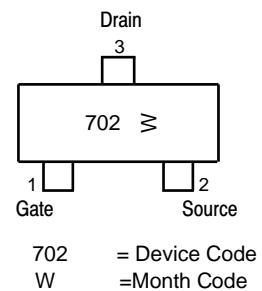


THERMAL CHARACTERISTICS

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 Alumina Substrate, (Note 4.) $T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}$

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 = $1.0 \times 0.75 \times 0.062$ in.
4. Alumina = $0.4 \times 0.3 \times 0.025$ in 99.5% alumina.

MARKING DIAGRAM & PIN ASSIGNMENT



ORDERING INFORMATION

Device	Marking	Shipping
2N7002LT1	702	3000 Tape & Reel



Small Signal MOSFET 115 mAmps, 60 Volts

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 μA _{dc})	V _{(BR)DSS}	60	–	–	Vdc
Zero Gate Voltage Drain Current (V _{GS} = 0, V _{DS} = 60 Vdc)	I _{DSS}	– –	– –	1.0 500	μA _{dc}
Gate-Body Leakage Current, Forward (V _{GS} = 20 Vdc)	I _{GSSF}	–	–	1	μA _{dc}
Gate-Body Leakage Current, Reverse (V _{GS} = –20 Vdc)	I _{GSSR}	–	–	–1	μA _{dc}

ON CHARACTERISTICS (Note 2.)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μA _{dc})	V _{GS(th)}	1.0	1.6	2	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 mA _{dc}) (V _{GS} = 5.0 Vdc, I _D = 50 mA _{dc})	V _{DS(on)}	– –	– –	3.75 0.375	Vdc
Static Drain-Source On-State Resistance (V _{GS} = 10 V, I _D = 500 mA _{dc}) T _C = 25°C T _C = 125°C (V _{GS} = 5.0 Vdc, I _D = 50 mA _{dc}) T _C = 25°C T _C = 125°C	r _{DS(on)}	– – – –	1.4 – 1.8 –	7.5 13.5 7.5 13.5	Ohms
Forward Transconductance (V _{DS} ≥ 2.0 V _{DS(on)} , I _D = 200 mA _{dc})	g _{FS}	80	–	–	mmhos

DYNAMIC CHARACTERISTICS

Input Capacitance (V _{DS} = 25 Vdc, V _{GS} = 0, f = 1.0 MHz)	C _{iss}	–	17	50	pF
Output Capacitance (V _{DS} = 25 Vdc, V _{GS} = 0, f = 1.0 MHz)	C _{oss}	–	10	25	pF
Reverse Transfer Capacitance (V _{DS} = 25 Vdc, V _{GS} = 0, f = 1.0 MHz)	C _{rss}	–	2.5	5.0	pF

SWITCHING CHARACTERISTICS (Note 2.)

Turn-On Delay Time	(V _{DD} = 25 Vdc, I _D ≅ 500 mA _{dc} , R _G = 25 Ω, R _L = 50 Ω, V _{gen} = 10 V)	t _{d(on)}	–	7	20	ns
Turn-Off Delay Time		t _{d(off)}	–	11	40	ns

BODY-DRAIN DIODE RATINGS

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

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



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2N7002LT1

Small Signal MOSFET 115 mAmps, 60 Volts

TYPICAL ELECTRICAL CHARACTERISTICS

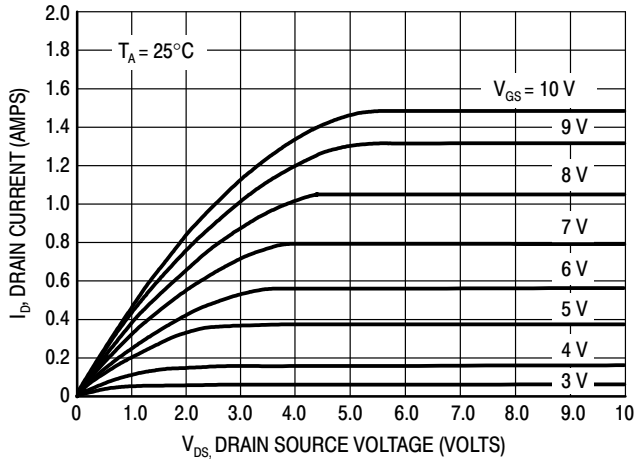


Figure 1. Ohmic Region

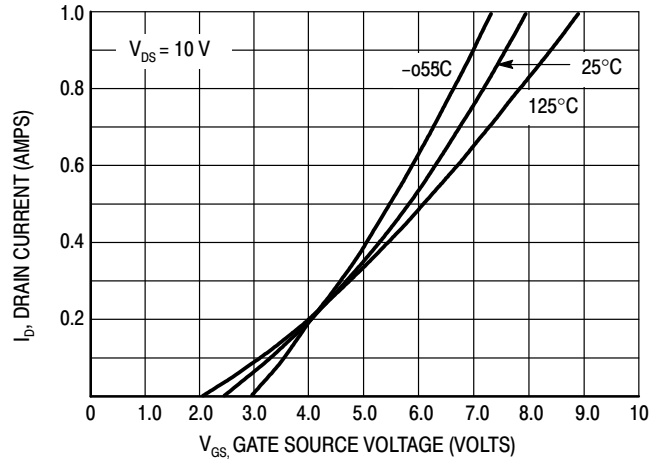


Figure 2. Transfer Characteristics

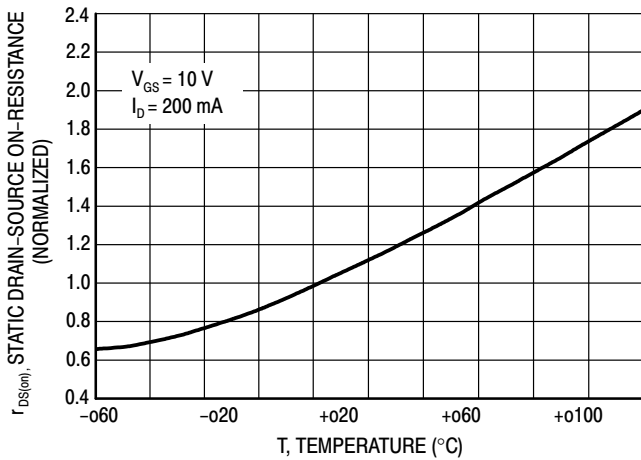


Figure 3. Temperature versus Static Drain-Source On-Resistance

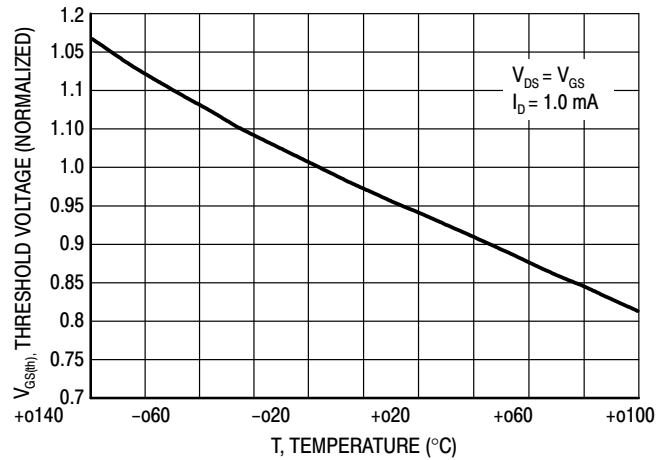
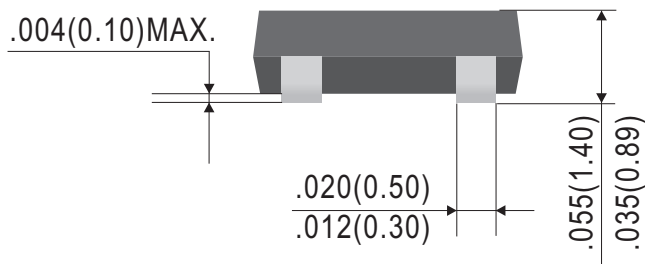
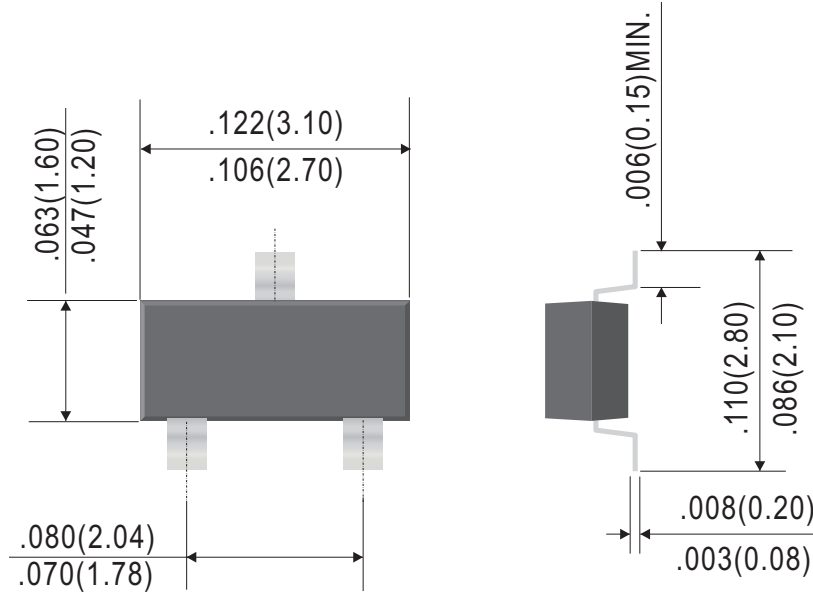


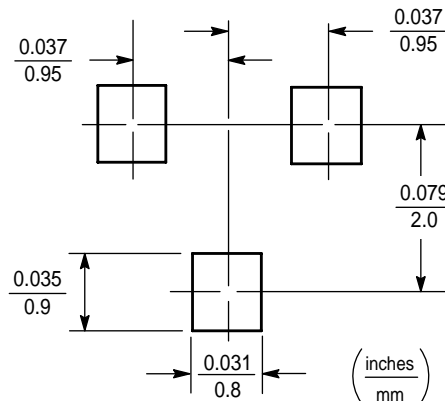
Figure 4. Temperature versus Gate Threshold Voltage



SOT-23



Dimensions in inches and (millimeters)





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Small Signal MOSFET 115 mAmps, 60 Volts

2N7002LT1

Ordering Information:

Device PN	Packing
2N7002LT1G ⁽¹⁾ -WS	Tape&Reel: 3 Kpcs/Reel

Note: (1) RoHS product for packing code suffix "G" ; Halogen free product for packing code suffix "H"

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