WILLAS

RoHS COMPLIANT

Small Signal MOSFET 310 mAmps, 60 Volts

2N7002ELT1

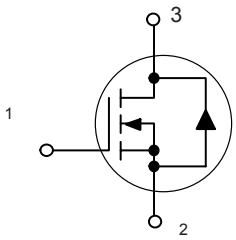
N–Channel SOT–23

- **Pb-Free package is available**
  RoHS product for packing code suffix ”G”
  Halogen free product for packing code suffix “H”

SOT– 23

310 mAMPS
60 VOLTS
$R_{DS(on)}$ = 1.5 Ω
$V_{GS(th)}$ = 1.8 V

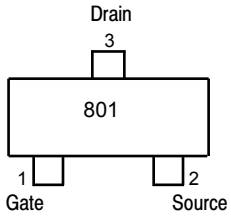
N - Channel



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain–Source Voltage	V_{DSS}	60	Vdc
Drain–Gate Voltage (R_{GS} = 1.0 MΩ)	V_{DGR}	60	Vdc
Drain Current – Continuous T_C = 25°C (Note 1.) – Pulse t < 10us	 I_D I_{DM}	 310 1200	mAdc
Gate–Source Voltage – Continuous – Non–repetitive ($t_p \leq 50$ µs)	 V_{GS} V_{GSM}	 ±20 ±40	Vdc Vpk

MARKING DIAGRAM & PIN ASSIGNMENT



801 = Device Code
W = Work Week

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board (Note 2.) 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 3.) T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	–55 to +150	°C

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. FR–5 = 1.0 x 0.75 x 0.062 in.
3. Alumina = 0.4 x 0.3 x 0.025 in 99.5% alumina.

ORDERING INFORMATION

Device	Marking	Shipping
2N7002ELT1	801	3000 Tape & Reel

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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)	T_J = 25°C T_J = 125°C	I_{DSS}	– –	– –	1.0 500	μAdc
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 2.)						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μAdc)		$V_{GS(th)}$	1.0	1.8	2.2	Vdc
On–State Drain Current ($V_{DS} \geq 2.0\ V_{DS(on)}$, 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 0.375	Vdc
Static Drain–Source On–State Resistance (V_{GS} = 10 V, I_D = 500 mAdc) (V_{GS} = 5.0 Vdc, I_D = 50 mAdc)		$r_{DS(on)}$	 – –	 1.5 1.7	 2.5 2.5	Ohms
Forward Transconductance ($V_{DS} \geq 2.0\ V_{DS(on)}$, I_D = 200 mAdc)		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 , $I_D \cong$ 500 mAdc, 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 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

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

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TYPICAL ELECTRICAL CHARACTERISTICS

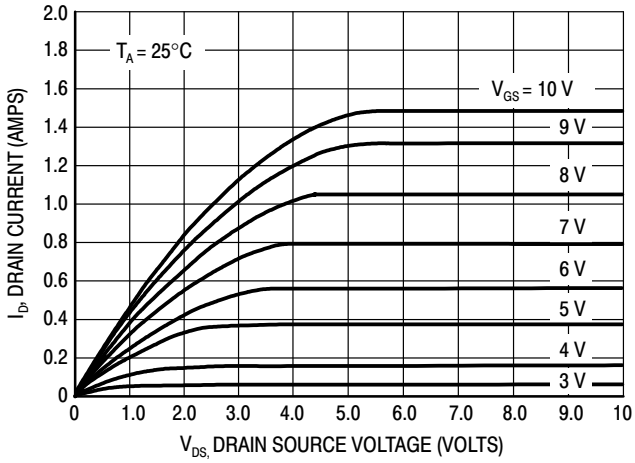

Figure 1. Ohmic Region

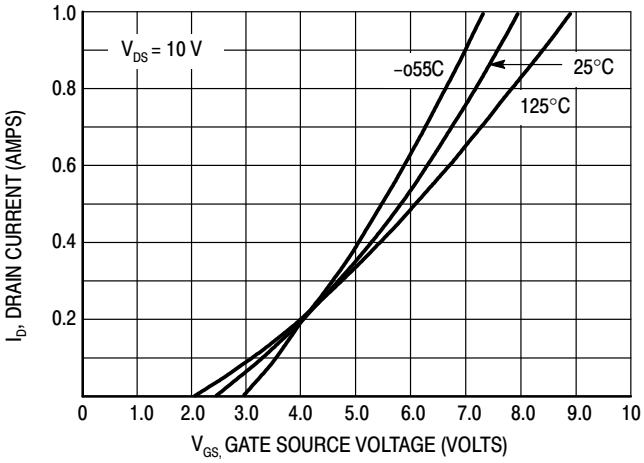

Figure 2. Transfer Characteristics

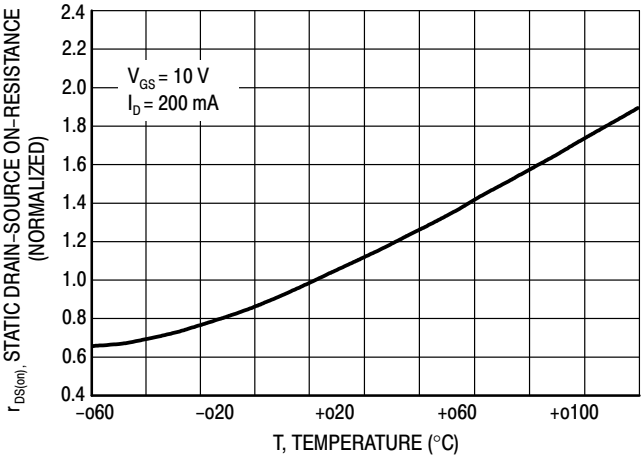

Figure 3. Temperature versus Static Drain–Source On–Resistance

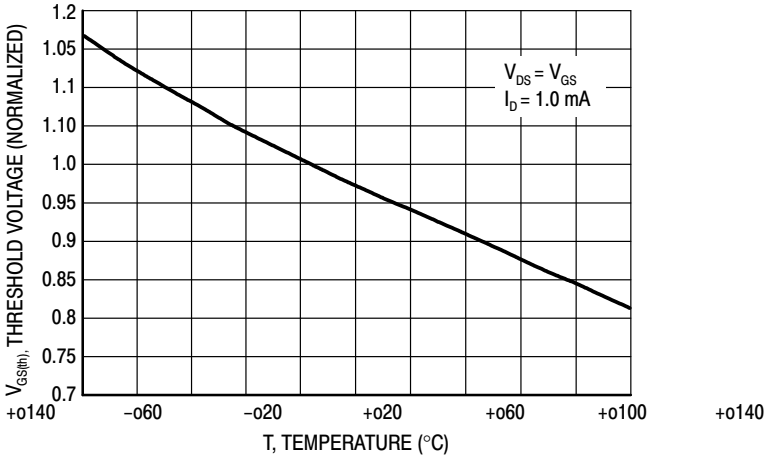

Figure 4. Temperature versus Gate Threshold Voltage

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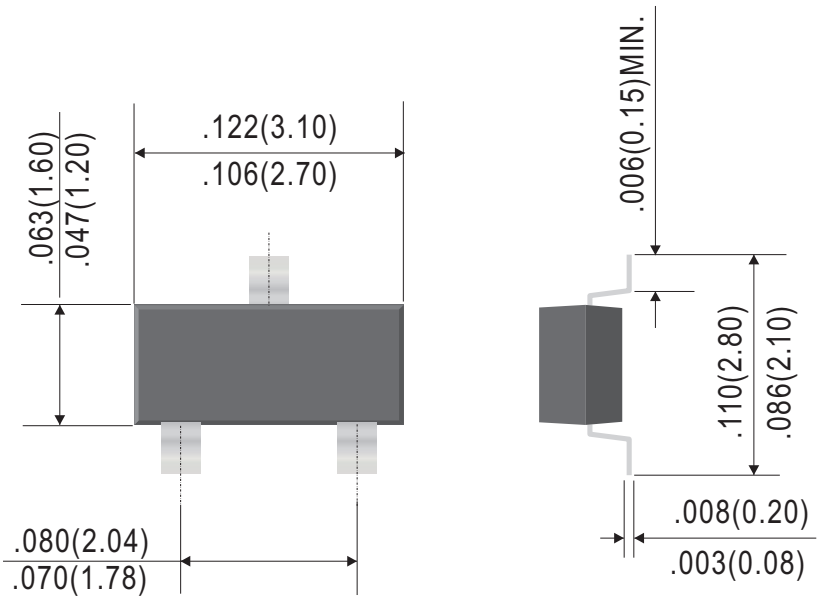
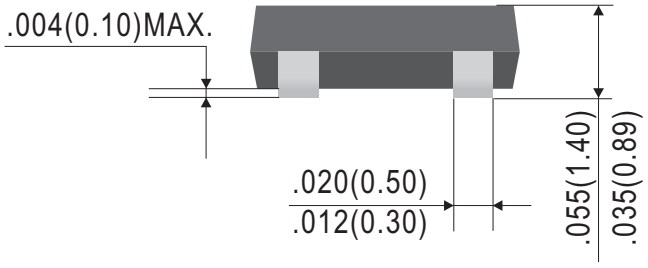
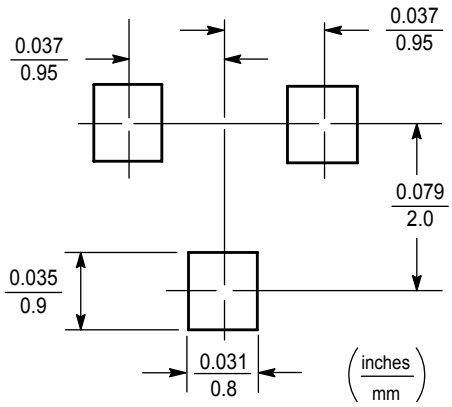




Dimensions in inches and (millimeters)



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Ordering Information:

Device PN	Packing
2N7002ELT1G(1)-WS	Tape&Reel: 3 Kpcs/Reel

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