

Small Signal MOSFET

115 mAmps, 60 Volts

N-Channel SOT23-6

- We declare that the material of product compliance with RoHS requirements.
- ESD Protected:1000V
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

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	mA _{dc}
– Continuous $T_C = 25^\circ\text{C}$ (Note 1.)	I_D	± 75	
$T_C = 100^\circ\text{C}$ (Note 1.)	I_{DM}	± 800	
– Pulsed (Note 2.)			
Gate-Source Voltage	V_{GS}	± 20	V _{dc}
– Continuous	V_{GSM}	± 40	V _{pk}
– Non-repetitive ($t_p \leq 50 \mu\text{s}$)			

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

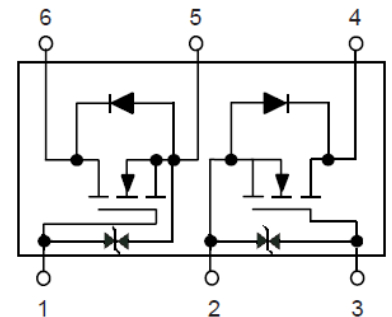
ORDERING INFORMATION

Device	Marking	Shipping
2N7002DM S-2N7002DM	72D	3000 Tape & Reel

2N7002DM
S-2N7002DM



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



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 = 250μAdc)	V _{(BR)DSS}	60	–	–	Vdc
Zero Gate Voltage Drain Current (V _{GS} = 0, V _{DS} = 60 Vdc)	I _{DSS}	–	–	1.0	μAdc
				500	
Gate–Body Leakage Current, Forward (V _{GS} = 20 Vdc)	I _{GSSF}	–	–	1.0	μAdc
Gate–Body Leakage Current, Reverse (V _{GS} = –20 Vdc)	I _{GSSR}	–	–	–1.0	μAdc

ON CHARACTERISTICS (Note 2.)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μAdc)	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 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) T _C = 25°C (V _{GS} = 10 V, I _D = 500 mAdc) T _C = 125°C (V _{GS} = 5.0 Vdc, I _D = 50 mAdc) T _C = 25°C (V _{GS} = 5.0 Vdc, I _D = 50 mAdc) T _C = 125°C	r _{DS(on)}	–	–	7.5 13.5 7.5 13.5	Ohms
Forward Transconductance (V _{DS} ≥ 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 ≅ 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%.



TYPICAL ELECTRICAL CHARACTERISTICS

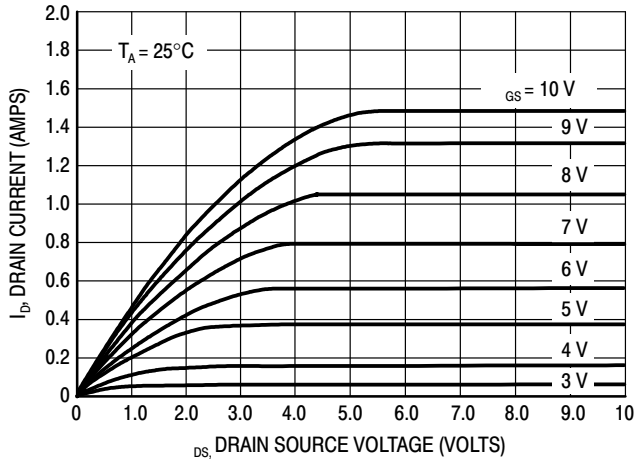


Figure 1. Ohmic Region

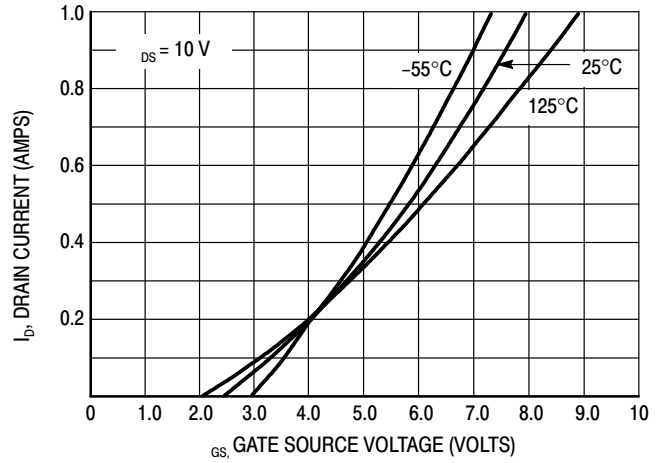


Figure 2. Transfer Characteristics

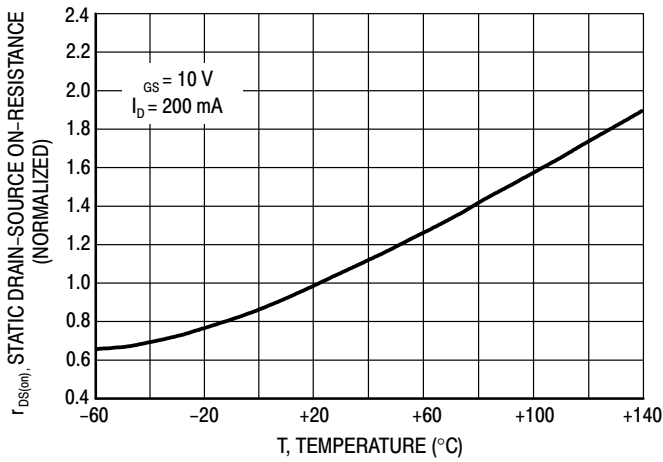


Figure 3. Temperature versus Static Drain-Source On-Resistance

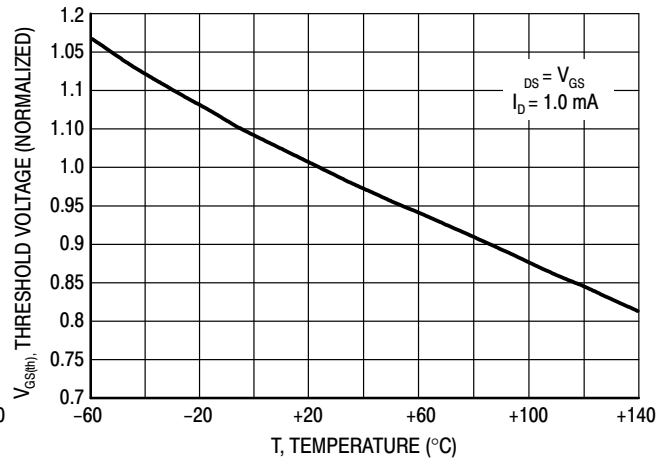
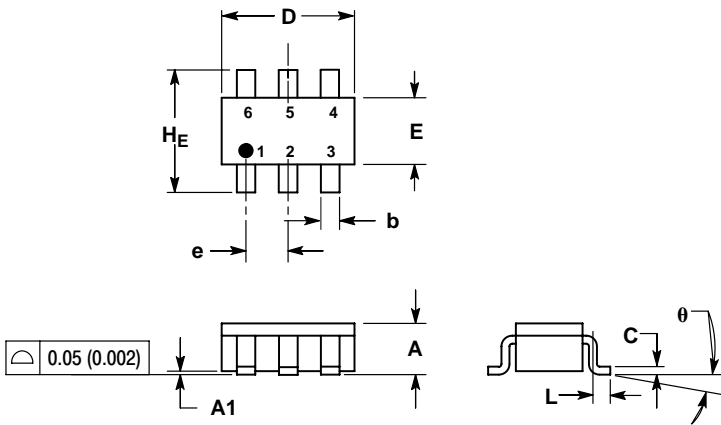


Figure 4. Temperature versus Gate Threshold Voltage



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DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.37	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	-	10°	0°	-	10°

