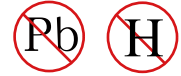




Dual N-Channel Enhancement MOSFET



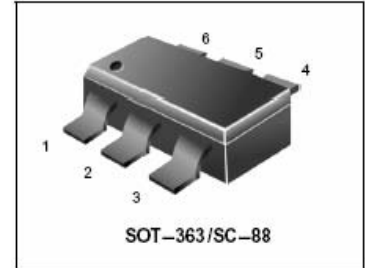
VDS= 60V, ID= 115mA

MARKING

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PACKAGE INFORMATION

Package	Shipping
SOT-323	3000/Tape&Reel



MAXIMUM RATINGS

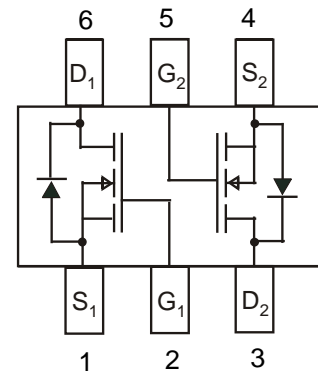
Rating	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	Vdc
Drain-Gate Voltage (R _{GS} = 1.0 MΩ)	V _{DGR}	60	Vdc
Drain Current - Continuous T _C = 25°C (Note 1) T _C = 100°C (Note 1) - Pulsed (Note 2)	I _D I _D I _{DM}	±115 ±75 ±800	mAdc
Gate-Source Voltage - Continuous - Non-repetitive (t _p ≤ 50 μs)	V _{GS} V _{GSM}	±20 ±40	Vdc Vpk

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation Per Device FR-5 Board (Note 1) T _A = 25°C Derate Above 25°C	P _D	380 250 3.0	mW mW/°C
Thermal Resistance, Junction to Ambient	R _{θJA}	328	°C/W
Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +150	°C

1. FR-5 = 1.0 x 0.75 x 0.062 in

DUAL N - Channel



MARKING DIAGRAM & PIN ASSIGNMENT

DEVICE CHARACTERISTICS

2N7002DW

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

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	μAdc
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	–	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 ($V_{GS} = 10 \text{ V}, I_D = 500 \text{ mAdc}$) $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ ($V_{GS} = 5.0 \text{ Vdc}, I_D = 50 \text{ mAdc}$) $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	$r_{DS(on)}$	– – – –	– – – –	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}	–	–	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	$(V_{DD} = 25 \text{ Vdc}, I_D \cong 500 \text{ mAdc}, R_G = 25 \Omega, R_L = 50 \Omega, V_{gen} = 10 \text{ V})$	$t_{d(on)}$	–	–	20	ns
Turn–Off Delay Time		$t_{d(off)}$	–	–	40	ns

BODY–DRAIN DIODE RATINGS

Diode Forward On–Voltage ($I_S = 11.5 \text{ mAdc}, V_{GS} = 0 \text{ V}$)	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 $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

DEVICE CHARACTERISTICS

2N7002DW

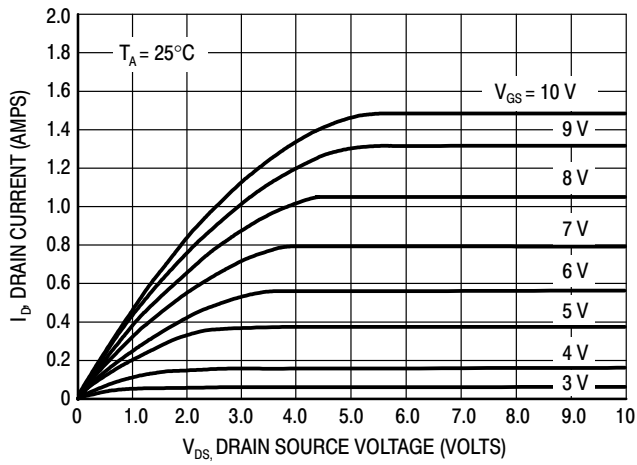


Figure 1. Ohmic Region

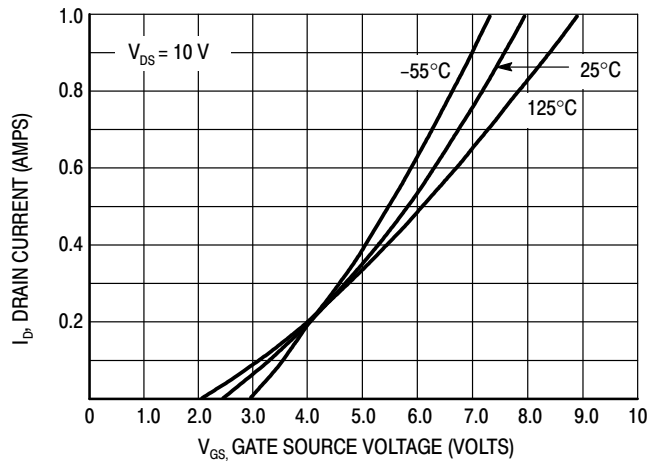


Figure 2. Transfer Characteristics

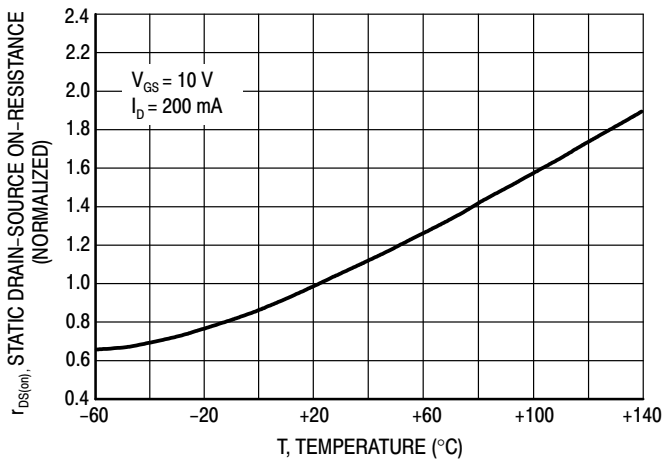


Figure 3. Temperature versus Static Drain-Source On-Resistance

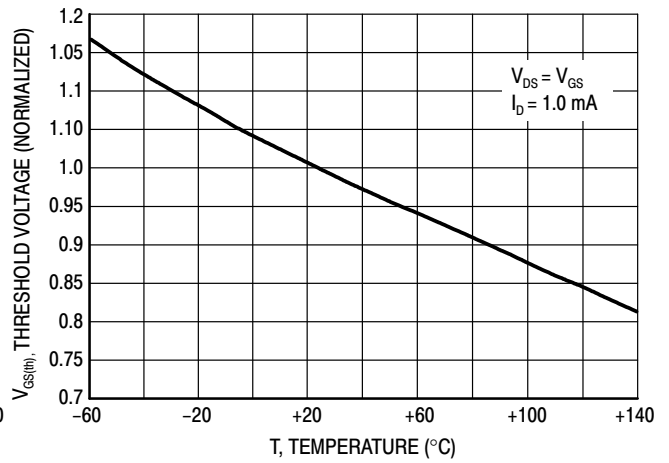
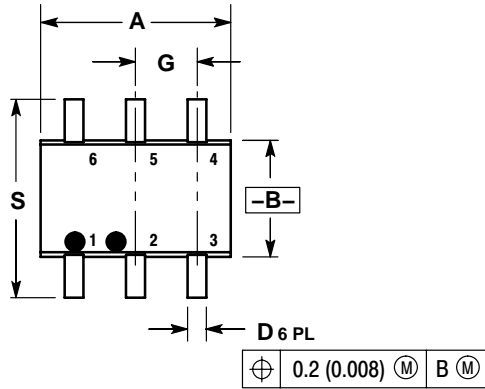


Figure 4. Temperature versus Gate Threshold Voltage

PACKAGE OUTLINE & DIMENSIONS

2N7002DW

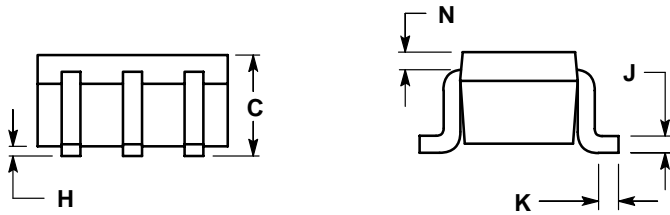
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NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20



SOLDERING FOOTPRINT*

