

2N7008

Small-Signal Field Effect Transistor

N-Channel Enhancement Mode Silicon Gate TMOS

...are designed for high voltage, high speed applications such as switching regulators, converters, solenoid, and relay drivers.

- Silicon Gate for Fast Switching Speeds
- Relay Driver
- Telecommunication Switch
- Automatic Insertable
- Available in Ammo Pack
- Available on Radial Tape and Reel
- N-Channel, Small Signal, TMOS FET

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	60	Vdc
Drain-to-Gate Voltage ($R_{GS} = 1 \text{ m}\Omega$)	V_{DGR}	60	Vdc
Gate-to-Source Voltage	V_{GS}	40	Vdc
Drain Current Continuous Pulsed	I_D I_{DM}	150 1000	mAdc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	400 3.2	mW mW/ $^\circ\text{C}$
Operating and Storage temperature Range	T_J, T_{stg}	-5.5 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTIC

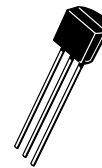
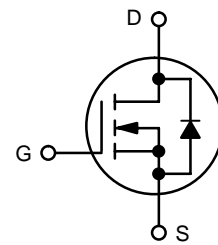
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	312.5	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes, 1/16 in from Case for 10 Seconds	T_L	300	$^\circ\text{C}$



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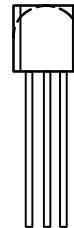
<http://onsemi.com>

**N-CHANNEL SMALL SIGNAL
TMOS FET, $R_{DS(ON)} = 7.5 \Omega$, 60 V**



TO-92 (TO-226)
CASE 29

MARKING DIAGRAM



2N7008

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristics	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Drain-to-Source Breakdown Voltage (V _{GS} = 0, I _D = 100 μA)	V _{(BR)DSS}	60	–	Vdc
Zero Gate Voltage Drain Current (V _{DS} = 50 V, V _{GS} = 0) (V _{DS} = 50 V, V _{GS} = 0, T _J = 125°C)	I _{DSS}	–	1.0 500	μAdc
Gate-to-Body Leakage Current, Forward (V _{GSF} = 30 Vdc, V _{DS} = 0)	I _{GSSF}	–	–100	nAdc

ON CHARACTERISTICS (Note 1)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 mA)	V _{GS(th)}	–	–	Vdc
Static Drain-to-Source On-Resistance (V _{GS} = 5 Vdc, I _D = 50 mAdc) (V _{GS} = 10 Vdc, I _D = 500 mA, T _C = 125°C)	R _{DS(ON)}	–	7.5 13.5	Ω
Drain-to-Source On-Voltage (V _{GS} = 5 V, I _D = 50 mA) (V _{GS} = 10 V, I _D = 500 mA)	V _{DS(ON)}	–	1.5 3.75	Vdc
On-State Drain Current (V _{GS} = 10 V, V _{DS} ≥ 2 V _{DS(ON)})	I _{D(ON)}	500	–	mA
Forward Transconductance (V _{DS} ≥ 2 V _{DS(ON)} , I _D = 200 mA)	g _{FS}	80	–	μmhos

DYNAMIC CHARACTERISTICS

Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 f = 1 MHz	C _{ISS}	–	50	pF
Output Capacitance		C _{OSS}	–	25	
Reverse Transfer Capacitance		C _{RSS}	–	5	

SWITCHING CHARACTERISTICS (Note 1)

Turn-on Delay Time	V _{DD} = 30 V, I _D = 200 mA R _{GEN} = 25 Ω, R _L = 150 Ω	t _{ON}	–	20	ns
Turn-off Delay Time		t _{OFF}	–	20	

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

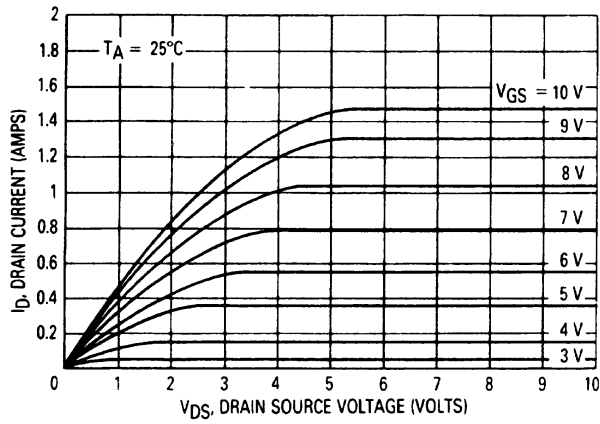


Figure 1. Ohmic Region

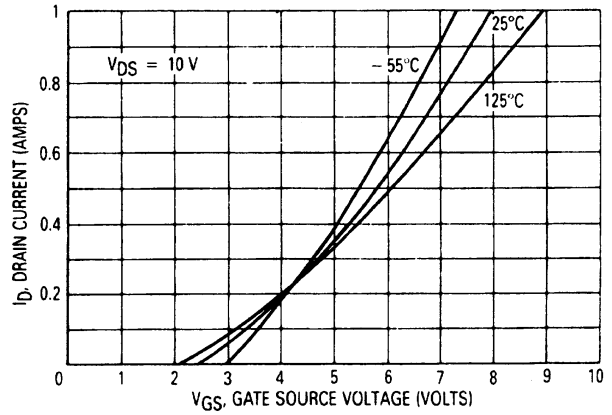


Figure 2. Transfer Characteristics

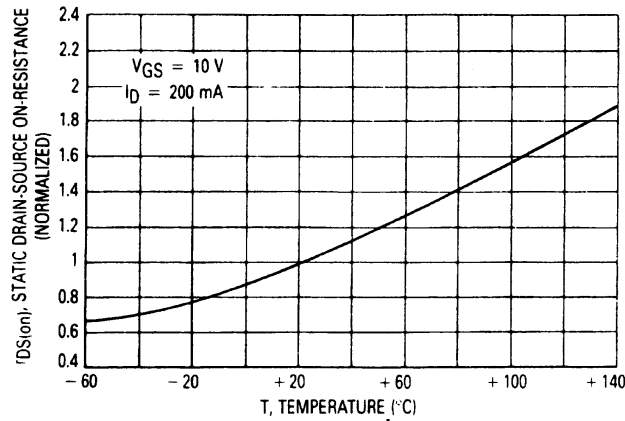


Figure 3. Temperature versus Static Drain-Source On-Resistance

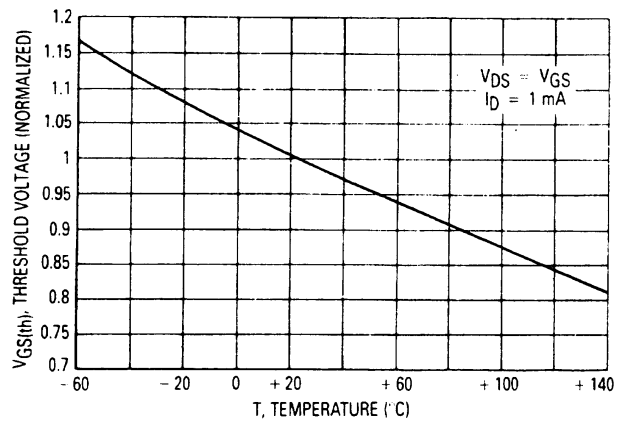
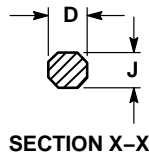
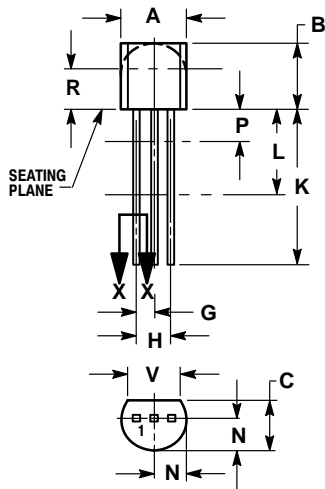


Figure 4. Temperature versus Gate Threshold Voltage

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PACKAGE DIMENSIONS


TO-92 (TO-226)
CASE 29
ISSUE AL



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

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