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 mΩ)	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°C Derate above 25°C	P_D	400 3.2	mW mW/°C
Operating and Storage temperature Range	T_J, T_{stg}	−5.5 to +150	°C

THERMAL CHARACTERISTIC

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

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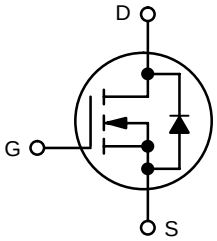
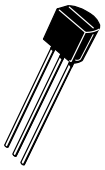
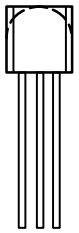
N−CHANNEL SMALL SIGNAL TMOS FET, $R_{DS(ON)}$ = 7.5 Ω, 60 V





TO−92 (TO−226)
CASE 29

MARKING DIAGRAM



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	C_{ISS}	−	50	pF
Output Capacitance	C_{OSS}	−	25	
Reverse Transfer Capacitance	C_{RSS}	−	5	
SWITCHING CHARACTERISTICS (Note 1)				
Turn−on Delay Time	t_{ON}	−	20	ns
Turn−off Delay Time	t_{OFF}	−	20	

(V_{DS} = 25 V, V_{GS} = 0, f = 1 MHz)

(V_{DD} = 30 V, I_D = 200 mA, R_{GEN} = 25 Ω, R_L = 150 Ω)

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

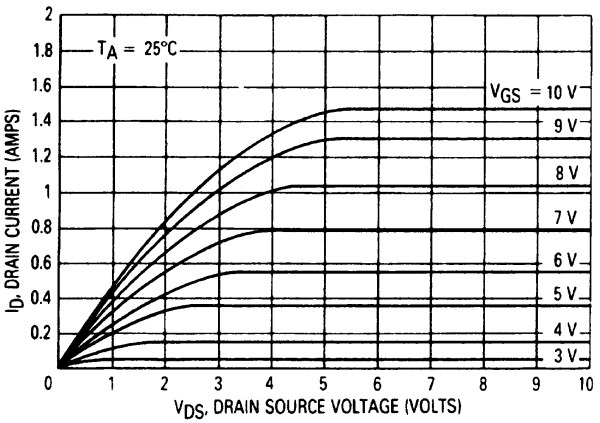


Figure 1. Ohmic Region

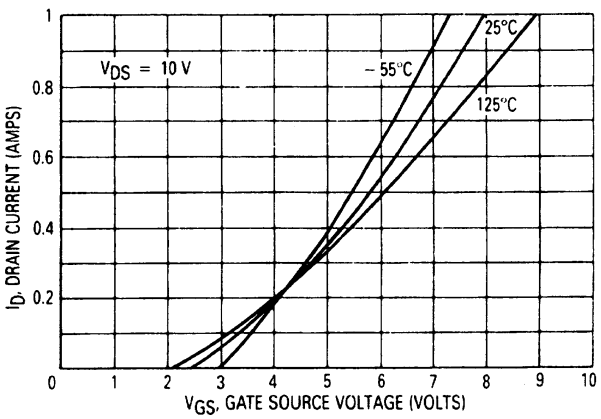


Figure 2. Transfer Characteristics

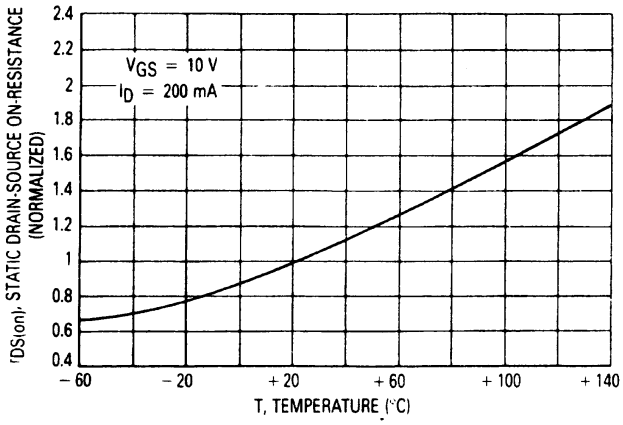


Figure 3. Temperature versus Static Drain-Source On-Resistance

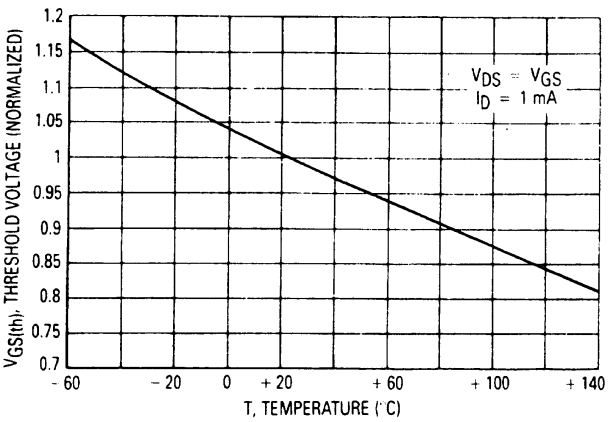
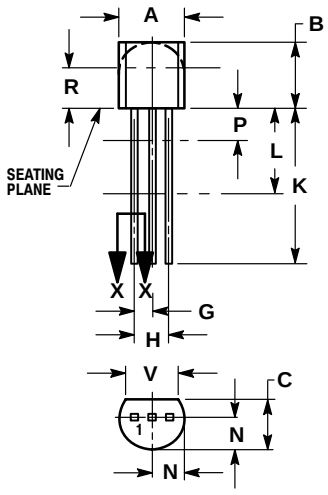
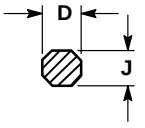


Figure 4. Temperature versus Gate Threshold Voltage

PACKAGE DIMENSIONS

TO−92 (TO−226)
CASE 29
ISSUE AL





SECTION X−X

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.

	INCHES		MILLIMETERS	
DIM	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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