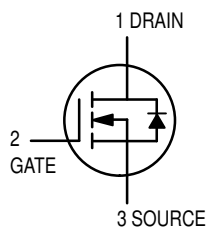


TMOS FET Switching

N-Channel — Enhancement



BS170



CASE 29-04, STYLE 30
TO-92 (TO-226AA)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	Vdc
Gate-Source Voltage — Continuous — Non-repetitive ($t_p \leq 50 \mu s$)	V_{GS} V_{GSM}	± 20 ± 40	Vdc Vpk
Drain Current ⁽¹⁾	I_D	0.5	Adc
Total Device Dissipation @ $T_A = 25^\circ C$	P_D	350	mW
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ C$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Gate Reverse Current ($V_{GS} = 15 \text{ Vdc}, V_{DS} = 0$)	I_{GSS}	—	0.01	10	nAdc
Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 100 \mu A$)	$V_{(BR)DSS}$	60	90	—	Vdc

ON CHARACTERISTICS⁽²⁾

Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1.0 \text{ mAdc}$)	$V_{GS(Th)}$	0.8	2.0	3.0	Vdc
Static Drain-Source On Resistance ($V_{GS} = 10 \text{ Vdc}, I_D = 200 \text{ mAdc}$)	$r_{DS(on)}$	—	1.8	5.0	Ω
Drain Cutoff Current ($V_{DS} = 25 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}$)	$I_{D(off)}$	—	—	0.5	μA
Forward Transconductance ($V_{DS} = 10 \text{ Vdc}, I_D = 250 \text{ mAdc}$)	g_{fs}	—	200	—	mmhos

SMALL-SIGNAL CHARACTERISTICS

Input Capacitance ($V_{DS} = 10 \text{ Vdc}, V_{GS} = 0, f = 1.0 \text{ MHz}$)	C_{iss}	—	—	60	pF
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SWITCHING CHARACTERISTICS

Turn-On Time ($I_D = 0.2 \text{ Adc}$) See Figure 1	t_{on}	—	4.0	10	ns
Turn-Off Time ($I_D = 0.2 \text{ Adc}$) See Figure 1	t_{off}	—	4.0	10	ns

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Test: Pulse Width $\leq 300 \mu s$, Duty Cycle $\leq 2.0\%$.

RESISTIVE SWITCHING

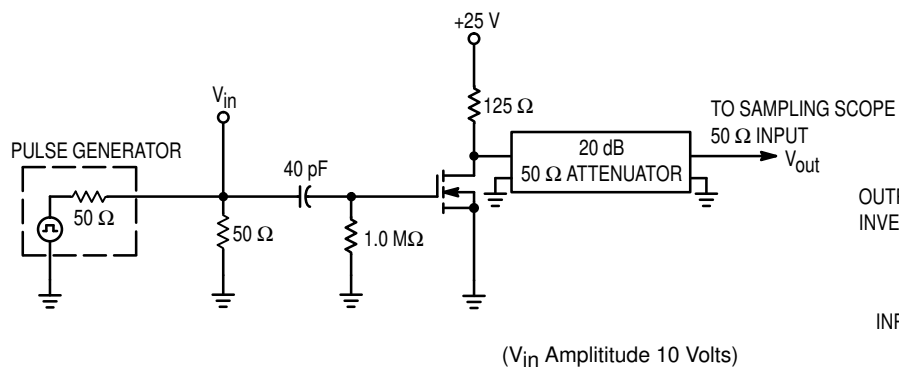


Figure 1. Switching Test Circuit

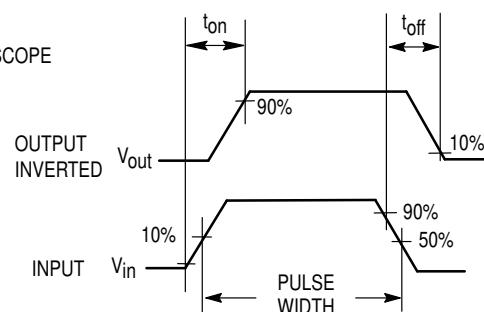


Figure 2. Switching Waveforms

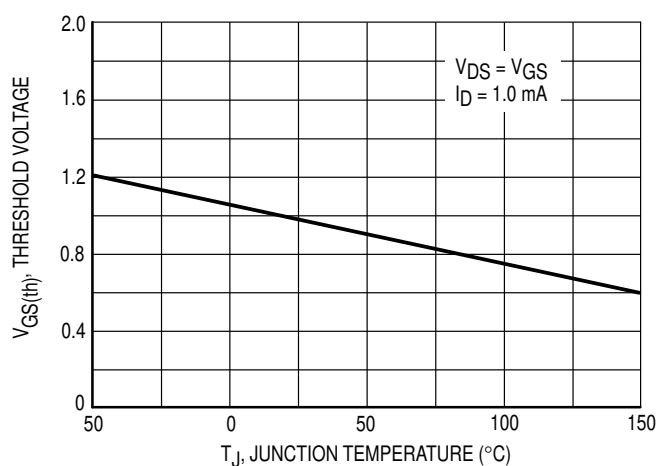
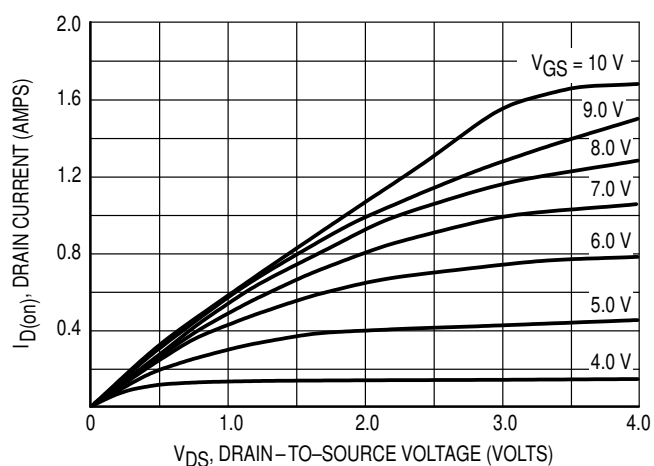
Figure 3. $V_{GS(th)}$ Normalized versus Temperature

Figure 4. On-Region Characteristics

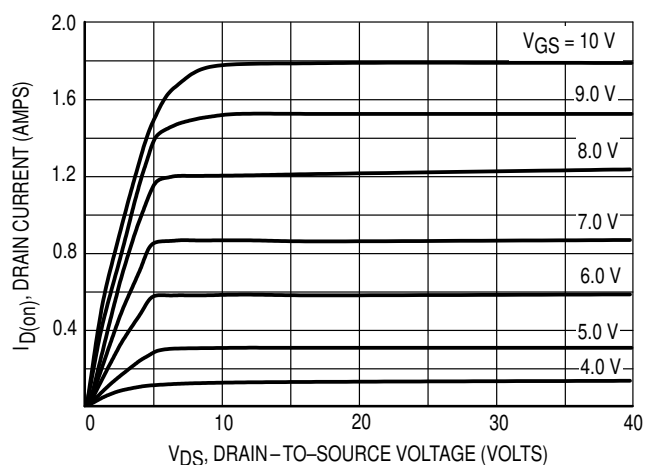
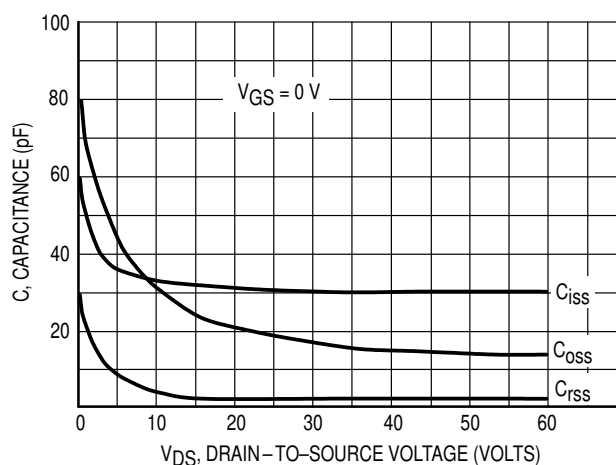
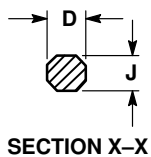
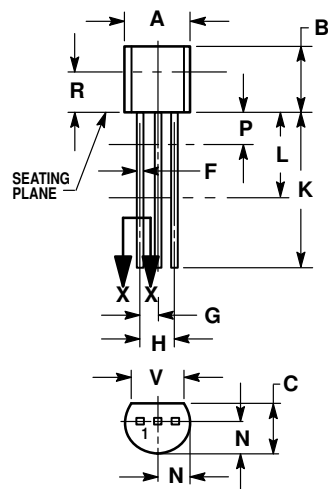


Figure 5. Output Characteristics

Figure 6. Capacitance versus
Drain-To-Source Voltage

PACKAGE DIMENSIONS



NOTES:


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. 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	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
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	—

**CASE 029-04
(TO-226AA)
ISSUE AD**

STYLE 30:

- PIN 1. DRAIN
2. GATE
3. SOURCE

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How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 303-675-2140 or 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 81-3-3521-8315

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609
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51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

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