

BS170

Preferred Device

Small Signal MOSFET 500 mA, 60 V N-Channel TO-92 (TO-226)

Features

- Pb-Free Package is Available*

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 (Note)	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	$^\circ C$

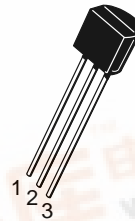
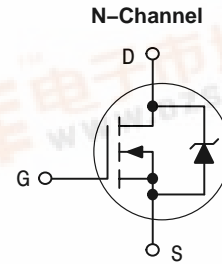
- The Power Dissipation of the package may result in a lower continuous drain current.



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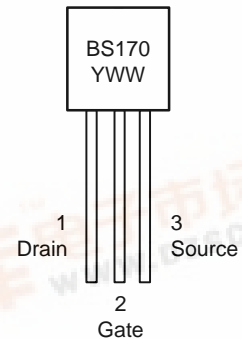
<http://onsemi.com>

500 mA, 60 V
 $R_{DS(on)} = 5 \Omega$



TO-92 (TO-226)
CASE 29
STYLE 30

MARKING DIAGRAM & PIN ASSIGNMENT



Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

Preferred devices are recommended choices for future use and best overall value.



BS170

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Gate Reverse Current ($V_{GS} = 15\text{ Vdc}$, $V_{DS} = 0$)	I_{GSS}	–	0.01	10	nAdc
Drain–Source Breakdown Voltage ($V_{GS} = 0$, $I_D = 100\ \mu\text{Adc}$)	$V_{(BR)DSS}$	60	90	–	Vdc

ON CHARACTERISTICS (Note 1)

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. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

ORDERING INFORMATION

Device	Package	Shipping†
BS170	TO–92 (TO–226)	1000 Unit / Box
BS170G	TO–92 (TO–226) (Pb–Free)	1000 Unit / Box
BS170RLRA	TO–92 (TO–226)	2000 Tape & Reel
BS170RLRM		2000 Tape & Ammo Box
BS170RLRP		2000 Tape & Ammo Box
BS170RL1		2000 Tape & Reel
BS170ZL1		2000 Tape & Ammo Box

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

BS170

RESISTIVE SWITCHING

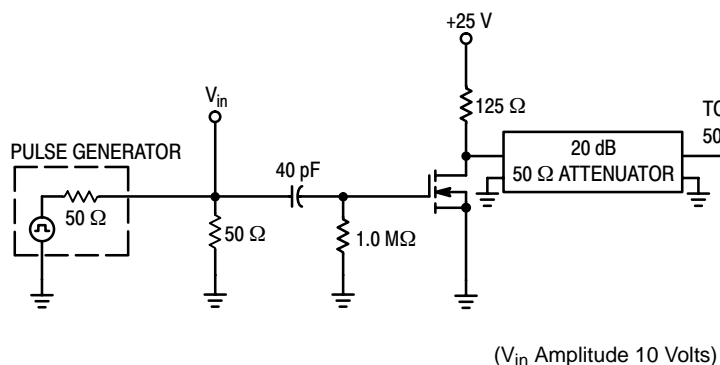


Figure 1. Switching Test Circuit

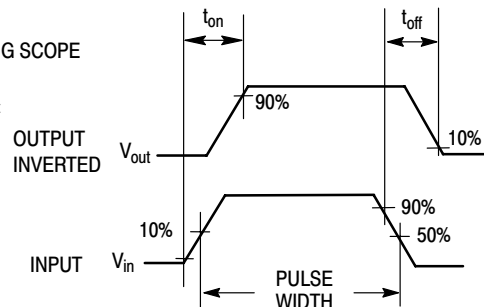


Figure 2. Switching Waveforms

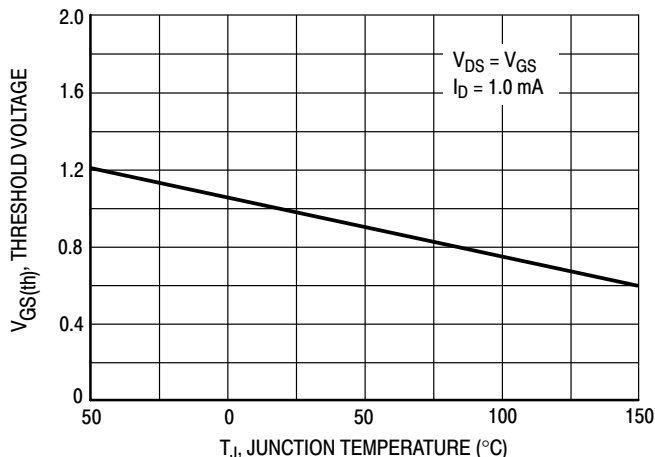


Figure 3. $V_{GS(th)}$ Normalized versus Temperature

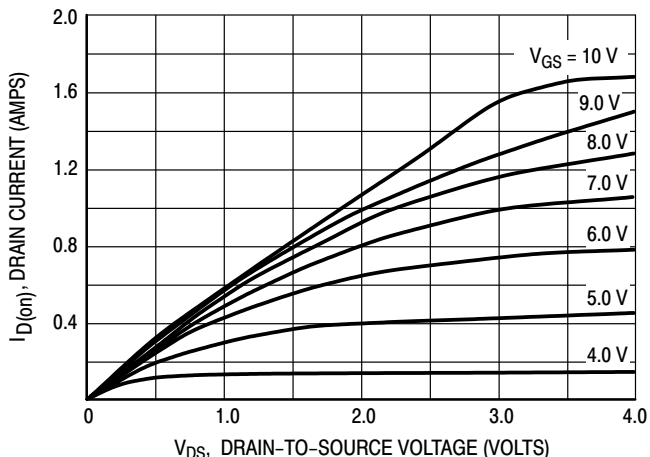


Figure 4. On-Region Characteristics

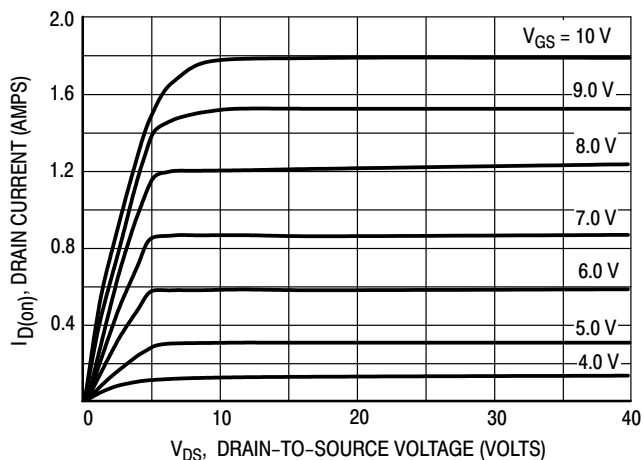


Figure 5. Output Characteristics

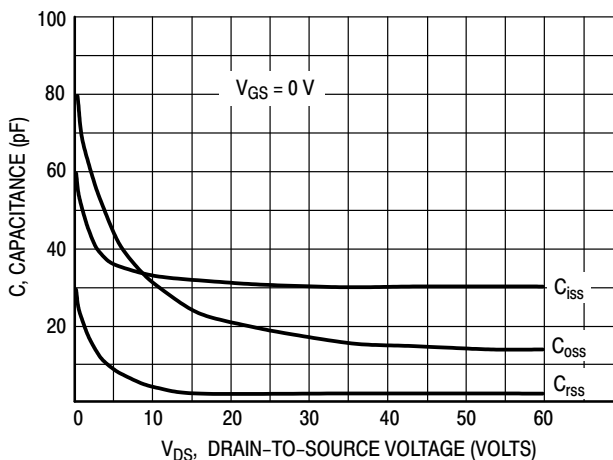
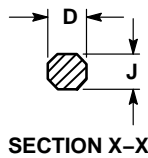
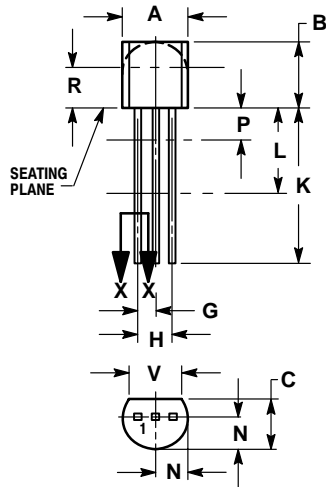


Figure 6. Capacitance versus Drain-To-Source Voltage

BS170

PACKAGE DIMENSIONS

TO-92 (TO-226) CASE 29-11 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	---

STYLE 30:

- PIN 1. DRAIN
- GATE
- SOURCE

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