

BS170

Preferred Device

Small Signal MOSFET 500 mAmps, 60 Volts N-Channel TO-92

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 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	$^\circ C$

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

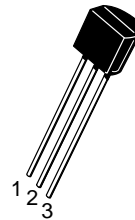
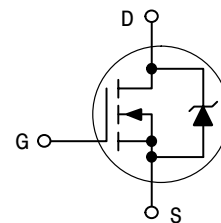


ON Semiconductor

<http://onsemi.com>

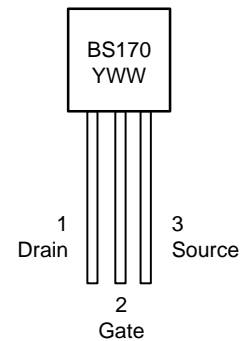
500 mAmps
60 Volts
 $R_{DS(on)} = 5 \Omega$

N-Channel



TO-92
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.

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

BS170

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Gate Reverse Current (V _{GS} = 15 Vdc, V _{DS} = 0)	I _{GSS}	–	0.01	10	nAdc
Drain–Source Breakdown Voltage (V _{GS} = 0, I _D = 100 μAdc)	V _{(BR)DSS}	60	90	–	Vdc

ON CHARACTERISTICS (Note 2.)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 1.0 mAdc)	V _{GS(Th)}	0.8	2.0	3.0	Vdc
Static Drain–Source On Resistance (V _{GS} = 10 Vdc, I _D = 200 mAdc)	r _{DS(on)}	–	1.8	5.0	Ω
Drain Cutoff Current (V _{DS} = 25 Vdc, V _{GS} = 0 Vdc)	I _{D(off)}	–	–	0.5	μA
Forward Transconductance (V _{DS} = 10 Vdc, I _D = 250 mAdc)	g _{fs}	–	200	–	mmhos

SMALL–SIGNAL CHARACTERISTICS

Input Capacitance (V _{DS} = 10 Vdc, V _{GS} = 0, f = 1.0 MHz)	C _{iss}	–	–	60	pF
---	------------------	---	---	----	----

SWITCHING CHARACTERISTICS

Turn–On Time (I _D = 0.2 Adc) See Figure 1	t _{on}	–	4.0	10	ns
Turn–Off Time (I _D = 0.2 Adc) See Figure 1	t _{off}	–	4.0	10	ns

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

ORDERING INFORMATION

Device	Package	Shipping
BS170	TO–92	1000 Unit/Box
BS170RLRA	TO–92	2000 Tape & Reel
BS170RLRM	TO–92	2000 Ammo Pack
BS170RLRP	TO–92	2000 Ammo Pack
BS170RL1	TO–92	2000 Tape & Reel
BS170ZL1	TO–92	2000 Ammo Pack

RESISTIVE SWITCHING

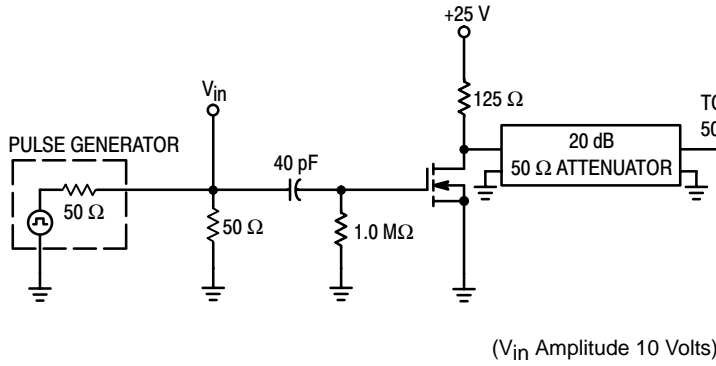


Figure 1. Switching Test Circuit

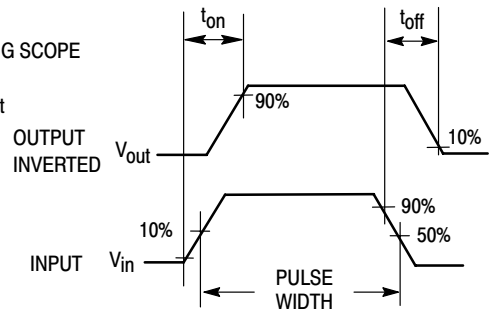


Figure 2. Switching Waveforms

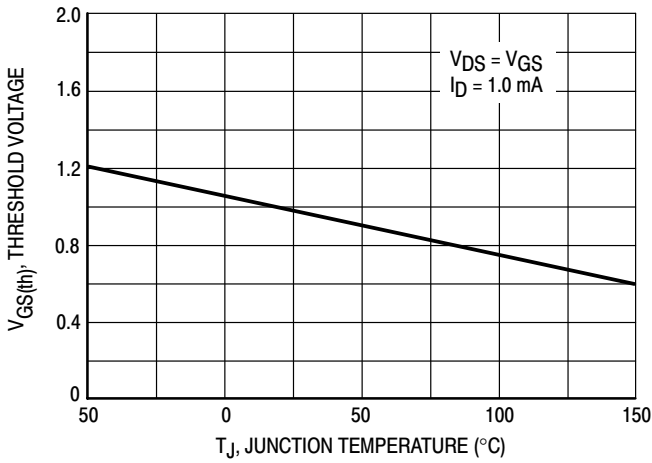


Figure 3. $V_{GS(th)}$ Normalized versus Temperature

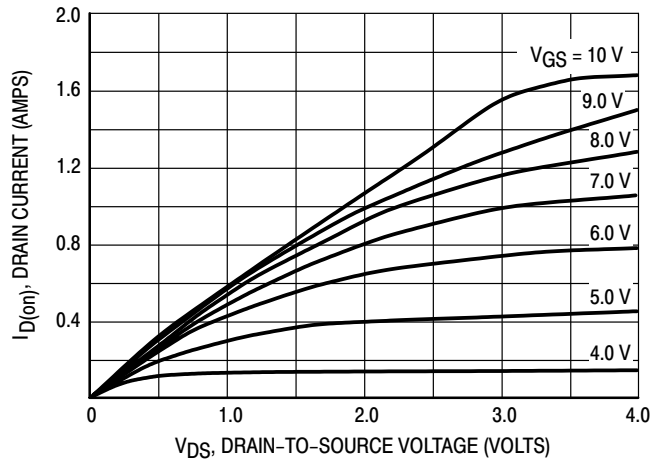


Figure 4. On-Region Characteristics

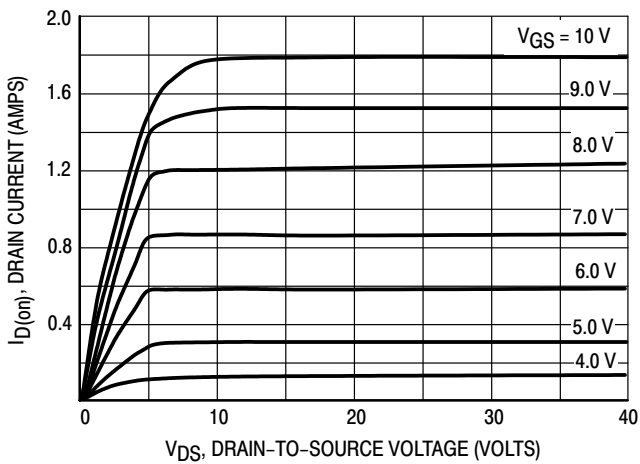


Figure 5. Output Characteristics

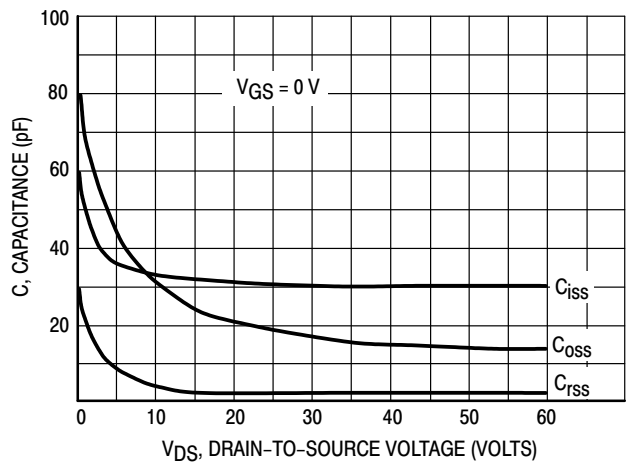
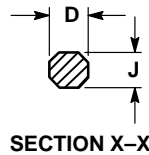
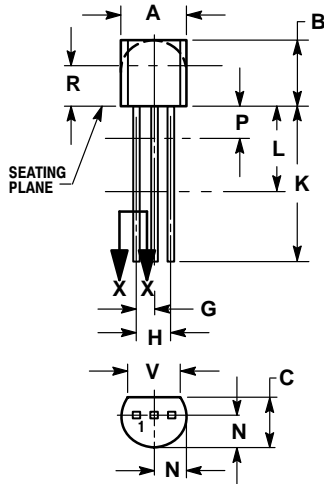


Figure 6. Capacitance versus Drain-To-Source Voltage

BS170

PACKAGE DIMENSIONS

TO-92
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:

1. DRAIN
2. GATE
3. SOURCE

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

PUBLICATION ORDERING INFORMATION

NORTH AMERICA Literature Fulfillment:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com
Fax Response Line: 303-675-2167 or 800-344-3810 Toll Free USA/Canada

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

EUROPE: LDC for ON Semiconductor – European Support

German Phone: (+1) 303-308-7140 (Mon-Fri 2:30pm to 7:00pm CET)
Email: ONlit-german@hibbertco.com
French Phone: (+1) 303-308-7141 (Mon-Fri 2:00pm to 7:00pm CET)
Email: ONlit-french@hibbertco.com
English Phone: (+1) 303-308-7142 (Mon-Fri 12:00pm to 5:00pm GMT)
Email: ONlit@hibbertco.com

EUROPEAN TOLL-FREE ACCESS*: 00-800-4422-3781

*Available from Germany, France, Italy, UK, Ireland

CENTRAL/SOUTH AMERICA:

Spanish Phone: 303-308-7143 (Mon-Fri 8:00am to 5:00pm MST)
Email: ONlit-spanish@hibbertco.com
Toll-Free from Mexico: Dial 01-800-288-2872 for Access –
then Dial 866-297-9322

ASIA/PACIFIC: LDC for ON Semiconductor – Asia Support

Phone: 303-675-2121 (Tue-Fri 9:00am to 1:00pm, Hong Kong Time)
Toll Free from Hong Kong & Singapore:
001-800-4422-3781
Email: ONlit-asia@hibbertco.com

JAPAN: ON Semiconductor, Japan Customer Focus Center

4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.