

# BS107, BS107A

Preferred Device

## Small Signal MOSFET 250 mAmps, 200 Volts N-Channel TO-92

### Features

- AEC Qualified
- PPAP Capable
- Pb-Free Package is Available\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	200	Vdc
Gate-Source Voltage	$V_{GS}$	$\pm 20$	Vdc
- Continuous	$V_{GSM}$	$\pm 30$	Vpk
- Non-repetitive ( $t_p \leq 50 \mu s$ )			
Drain Current			mAdc
Continuous (Note 1)	$I_D$	250	
Pulsed (Note 2)	$I_{DM}$	500	
Total Device Dissipation @ $T_A = 25^\circ C$	$P_D$	350	mW
Derate above $25^\circ C$			
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ C$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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  $\leq 2.0\%$ .



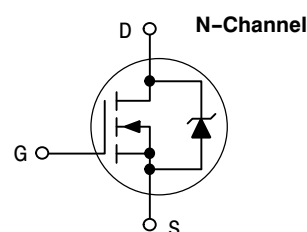
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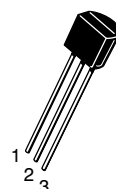
**250 mAmps, 200 Volts**

$R_{DS(on)} = 14 \Omega$  (BS107)

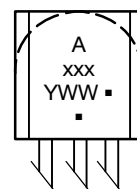
$R_{DS(on)} = 6.4 \Omega$  (BS107A)



### MARKING DIAGRAM



TO-92  
CASE 29-11  
STYLE 30



xxx = BS107 or BS107A  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping
BS107	TO-92	1000 Units/Box
BS107G	TO-92 (Pb-Free)	1000 Units/Box
BS107A	TO-92	1000 Units/Box
BS107AG	TO-92 (Pb-Free)	1000 Units/Box
BS107ARL1	TO-92	2000/Ammo Pack
BS107ARL1G	TO-92 (Pb-Free)	2000/Ammo Pack

\*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.

# BS107, BS107A

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Zero-Gate-Voltage Drain Current ( $V_{DS} = 130\text{ Vdc}$ , $V_{GS} = 0$ )	$I_{DSS}$	-	-	30	nAdc
Drain-Source Breakdown Voltage ( $V_{GS} = 0$ , $I_D = 100\ \mu\text{Adc}$ )	$V_{(BR)DSX}$	200	-	-	Vdc
Gate Reverse Current ( $V_{GS} = 15\text{ Vdc}$ , $V_{DS} = 0$ )	$I_{GSS}$	-	0.01	10	nAdc

### ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage ( $I_D = 1.0\text{ mAdc}$ , $V_{DS} = V_{GS}$ )	$V_{GS(Th)}$	1.0	-	3.0	Vdc
Static Drain-Source On Resistance	$r_{DS(on)}$	-	-	-	$\Omega$
BS107 ( $V_{GS} = 2.6\text{ Vdc}$ , $I_D = 20\text{ mAdc}$ )		-	-	28	
( $V_{GS} = 10\text{ Vdc}$ , $I_D = 200\text{ mAdc}$ )		-	-	14	
BS107A ( $V_{GS} = 10\text{ Vdc}$ )		-	4.5	6.0	
( $I_D = 100\text{ mAdc}$ )		-	4.8	6.4	
( $I_D = 250\text{ mAdc}$ )		-	-	-	

### SMALL-SIGNAL CHARACTERISTICS

Input Capacitance ( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1.0\text{ MHz}$ )	$C_{iss}$	-	60	-	pF
Reverse Transfer Capacitance ( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1.0\text{ MHz}$ )	$C_{rss}$	-	6.0	-	pF
Output Capacitance ( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1.0\text{ MHz}$ )	$C_{oss}$	-	30	-	pF
Forward Transconductance ( $V_{DS} = 25\text{ Vdc}$ , $I_D = 250\text{ mAdc}$ )	$g_{fs}$	200	400	-	mmhos

### SWITCHING CHARACTERISTICS

Turn-On Time	$t_{on}$	-	6.0	15	ns
Turn-Off Time	$t_{off}$	-	12	15	ns

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

## RESISTIVE SWITCHING

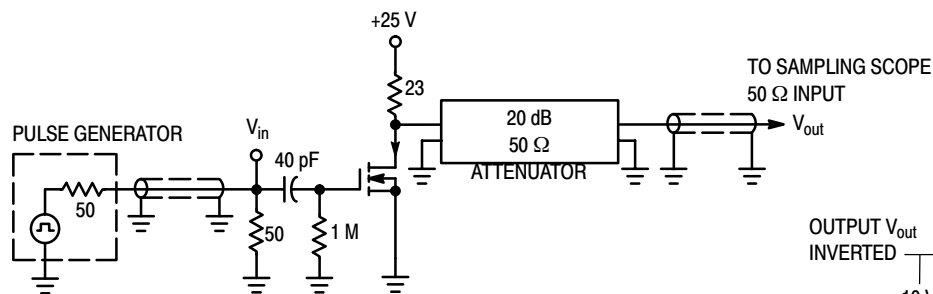


Figure 1. Switching Test Circuit

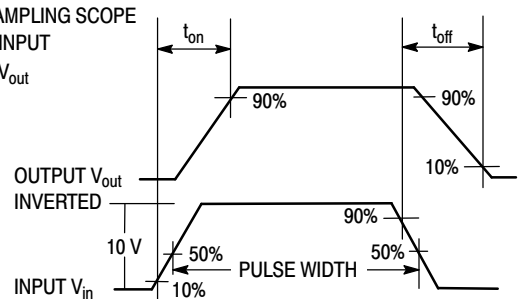


Figure 2. Switching Waveforms

# BS107, BS107A

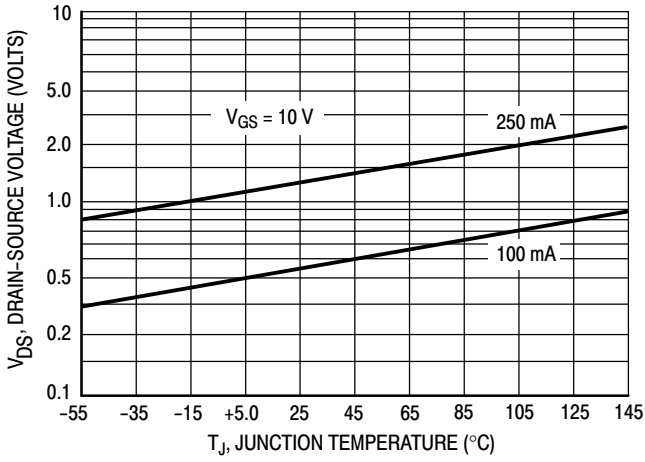


Figure 3. On Voltage versus Temperature

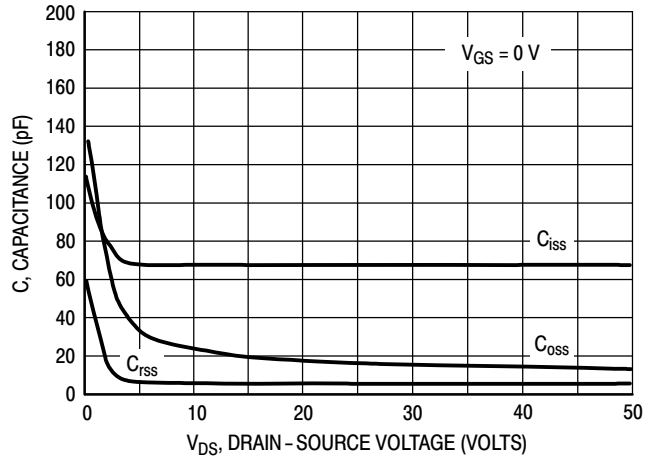


Figure 4. Capacitance Variation

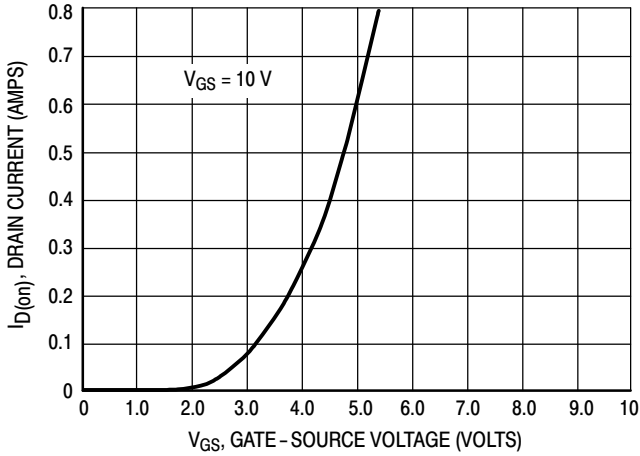


Figure 5. Transfer Characteristic

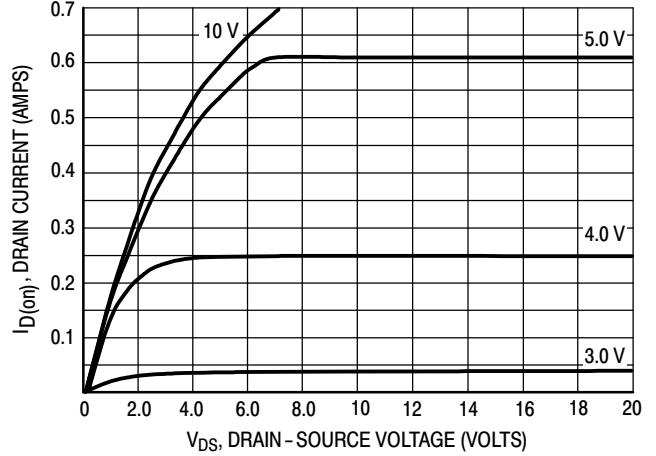


Figure 6. Output Characteristic

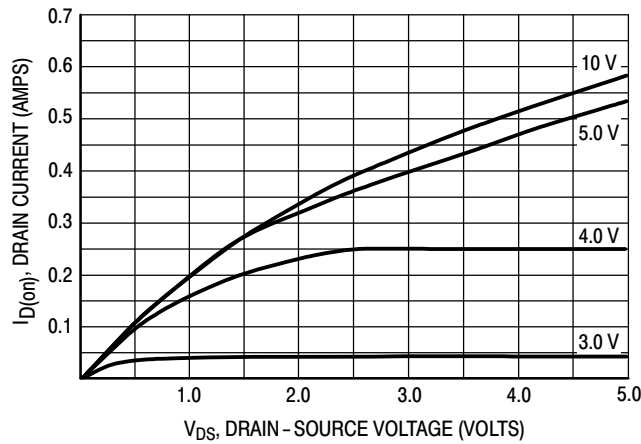
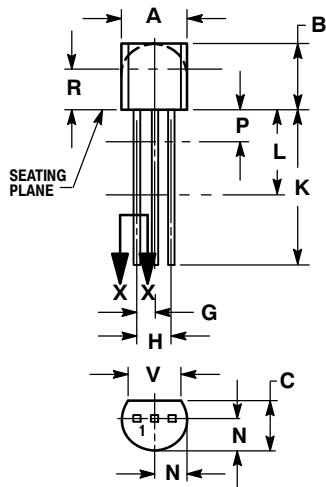


Figure 7. Saturation Characteristic

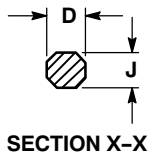
# BS107, BS107A

## PACKAGE DIMENSIONS

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



STRAIGHT LEAD  
BULK PACK



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

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