## **Power MOSFET Single P-Channel SOT-23** -50 V, 10 Ω

- SOT-23 Surface Mount Package Saves Board Space
- BV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

#### **MAXIMUM RATINGS** (T<sub>J</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DSS}$	50	Vdc
Gate-to-Source Voltage - Continuous	V <sub>GS</sub>	± 20	Vdc
Drain Current Continuous @ $T_A = 25^{\circ}C$ Pulsed Drain Current $(t_p \le 10 \ \mu s)$	I <sub>D</sub> I <sub>DM</sub>	130 520	mA
Total Power Dissipation @ T <sub>A</sub> = 25°C	P <sub>D</sub>	225	mW
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	– 55 to 150	°C
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	556	°C/W
Maximum Lead Temperature for Soldering Purposes, for 10 seconds	TL	260	°C

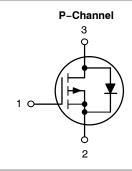
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



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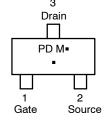
V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub> MAX		
–50 V	10 Ω @ 10 V		





SOT-23 **CASE 318** STYLE 21

## MARKING DIAGRAM & PIN ASSIGNMENT



PD= Specific Device Code

= Date Code M = Pb-Free Package

(\*Note: Microdot may be in either location)

#### **ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
BSS84LT1G, BVSS84LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
BSS84LT7G	SOT-23 (Pb-Free)	3,500 / Tape & Reel

†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.

## **ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise noted)

Cha	Symbol	Min	Тур	Max	Unit	
OFF CHARACTERISTICS					-	•
Drain-to-Source Breakdown Voltaç ( $V_{GS} = 0 \text{ Vdc}, I_D = -250 \mu\text{Adc}$ )	V <sub>(BR)DSS</sub>	-50	-	-	Vdc	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	- - -	- - -	-0.1 -15 -60	μAdc	
Gate-Body Leakage Current (V <sub>GS</sub>	= ± 20 Vdc, V <sub>DS</sub> = 0 Vdc)	I <sub>GSS</sub>	-	_	±10	nAdc
ON CHARACTERISTICS (Note 1)						
Gate–Source Threaded Voltage (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = –250 μA)			-0.9	_	-2.0	Vdc
Static Drain-to-Source On-Resistance (V <sub>GS</sub> = -5.0 Vdc, I <sub>D</sub> = -100 mAdc)			-	4.7	10	Ω
Transfer Admittance (V <sub>DS</sub> = −25 Vc	y <sub>fs</sub>	50	_	-	mS	
DYNAMIC CHARACTERISTICS						
Input Capacitance	V <sub>DS</sub> = 5.0 Vdc	C <sub>iss</sub>	-	36	-	pF
Output Capacitance	V <sub>DS</sub> = 5.0 Vdc	C <sub>oss</sub>	-	17	-	
Transfer Capacitance	V <sub>DG</sub> = 5.0 Vdc	C <sub>rss</sub>	-	6.5	-	
SWITCHING CHARACTERISTICS	(Note 2)					
Turn-On Delay Time		t <sub>d(on)</sub>	-	3.6	-	ns
Rise Time	$V_{DD} = -15 \text{ Vdc}, I_D = -2.5 \text{ Adc},$	t <sub>r</sub>	-	9.7	-	
Turn-Off Delay Time	$R_L = 50 \Omega$	t <sub>d(off)</sub>	-	12	-	
Fall Time	7	t <sub>f</sub>	-	1.7	-	
Gate Charge	$V_{DD} = -40 \text{ Vdc}, I_D = -0.5 \text{ A}, V_{GS} = -10 \text{ V}$	Q <sub>T</sub>	-	2.2	_	nC
SOURCE-DRAIN DIODE CHARAC	TERISTICS					
Continuous Current	Is	-	-	-0.130	Α	
Pulsed Current	I <sub>SM</sub>	-	-	-0.520		
Forward Voltage (Note 2)	$V_{GS} = 0 \text{ V, } I_{S} = -130 \text{ mA}$	$V_{SD}$	-	_	-2.2	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

- 1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
- 2. Switching characteristics are independent of operating junction temperature.

## TYPICAL ELECTRICAL CHARACTERISTICS

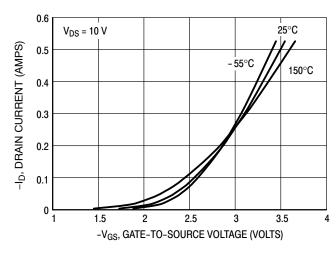


Figure 1. Transfer Characteristics

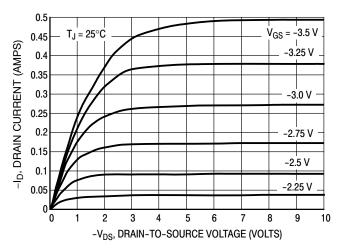


Figure 2. On-Region Characteristics

#### TYPICAL ELECTRICAL CHARACTERISTICS

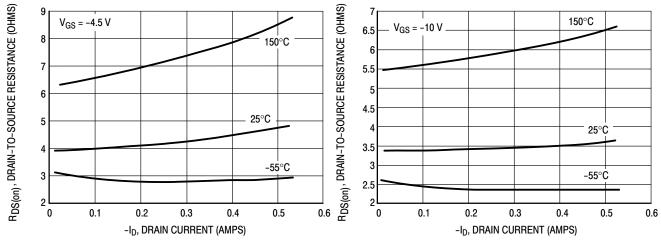


Figure 3. On-Resistance versus Drain Current

Figure 4. On-Resistance versus Drain Current

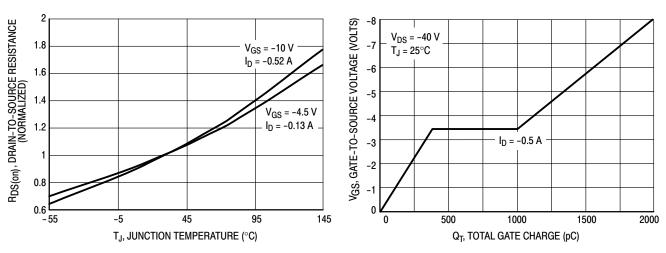


Figure 5. On-Resistance Variation with Temperature

Figure 6. Gate Charge

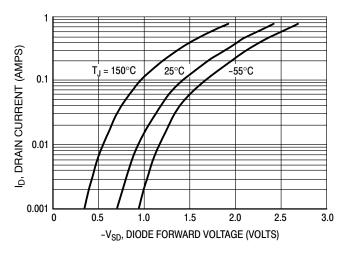
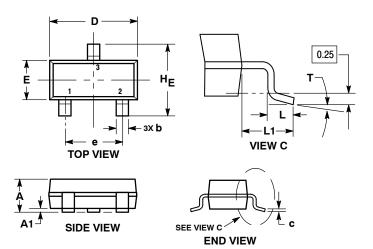


Figure 7. Body Diode Forward Voltage

#### PACKAGE DIMENSIONS

#### SOT-23 (TO-236) CASE 318-08 **ISSUE AS**



#### NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  CONTROLLING DIMENSION: MILLIMETERS.
  MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH.
  MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
  DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH,
- PROTRUSIONS, OR GATE BURRS

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
Α	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
С	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
е	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
HE	2.10	2.40	2.64	0.083	0.094	0.104
Т	0°		10°	0°		10°

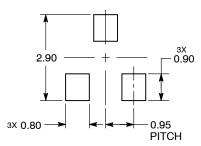
STYLE 21:

PIN 1. GATE

SOURCE

DRAIN

#### **RECOMMENDED** SOLDERING FOOTPRINT\*



**DIMENSIONS: MILLIMETERS** 

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

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