MMBF170LT1

Power MOSFET 500 mA, 60 V

N−Channel SOT−23

ON Semiconductor®

http://onsemi.com

500 mA, 60 V
$R_{DS(on)}$ = 5 Ω

Features

- Pb−Free Packages are Available

MAXIMUM RATINGS

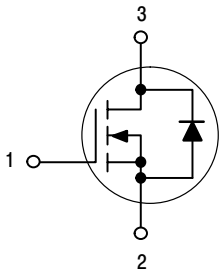
Rating	Symbol	Value	Unit
Drain−Source Voltage	V_{DSS}	60	Vdc
Drain−Gate Voltage	V_{DGS}	60	Vdc
Gate−Source Voltage − Continuous − Non−repetitive ($t_p \le 50$ μs)	 V_{GS} V_{GSM}	 ±20 ±40	 Vdc Vpk
Drain Current − Continuous − Pulsed	I_D I_{DM}	0.5 0.8	Adc

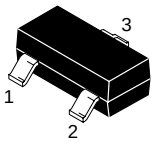
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR−5 Board (Note 1.) T_A = 25°C Derate above 25°C	P_D	 225 1.8	 mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°C

1. FR−5 = 1.0 × 0.75 × 0.062 in.

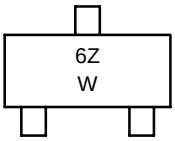
N−Channel





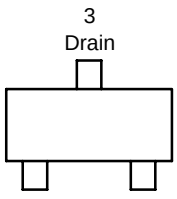
SOT−23
CASE 318
STYLE 21

MARKING DIAGRAM



6Z = Device Code
W = Work Week

PIN ASSIGNMENT



ORDERING INFORMATION

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

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Drain−Source Breakdown Voltage (V_{GS} = 0, I_D = 100 μA)		$V_{(BR)DSS}$	60	−	Vdc
Gate−Body Leakage Current, Forward (V_{GSF} = 15 Vdc, V_{DS} = 0)		I_{GSS}	−	10	nAdc
ON CHARACTERISTICS (Note 1)					
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0 mA)		$V_{GS(th)}$	0.8	3.0	Vdc
Static Drain−Source On−Resistance (V_{GS} = 10 Vdc, I_D = 200 mA)		$r_{DS(on)}$	−	5.0	Ω
On−State Drain Current (V_{DS} = 25 Vdc, V_{GS} = 0)		$I_{D(off)}$	−	0.5	μA
DYNAMIC CHARACTERISTICS					
Input Capacitance (V_{DS} = 10 Vdc, V_{GS} = 0 V, f = 1.0 MHz)		C_{iss}	−	60	pF
SWITCHING CHARACTERISTICS (Note 1)					
Turn−On Delay Time	(V_{DD} = 25 Vdc, I_D = 500 mA, R_{gen} = 50 Ω) Figure 1	$t_{d(on)}$	−	10	ns
Turn−Off Delay Time		$t_{d(off)}$	−	10	

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

ORDERING INFORMATION

Device	Package	Shipping†
MMBF170LT1	SOT−23 (TO−236)	10,000 Tape & Reel
MMBF170LT1G	SOT−23 (TO−236) (Pb−Free)	3,000 Tape & Reel
MMBF170LT3	SOT−23 (TO−236)	10,000 Tape & Reel
MMBF170LT3G	SOT−23 (TO−236) (Pb−Free)	3,000 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.

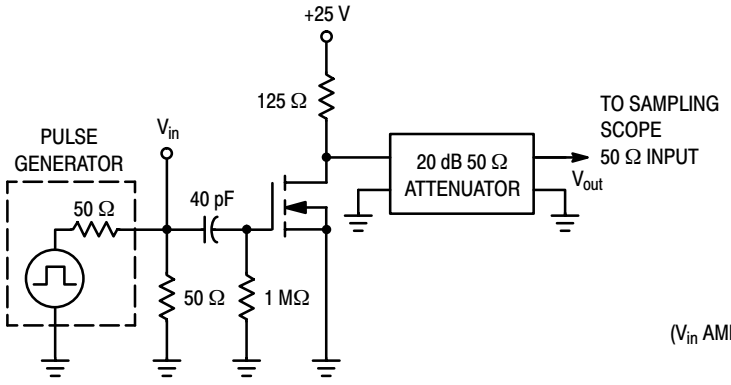


Figure 1. Switching Test Circuit

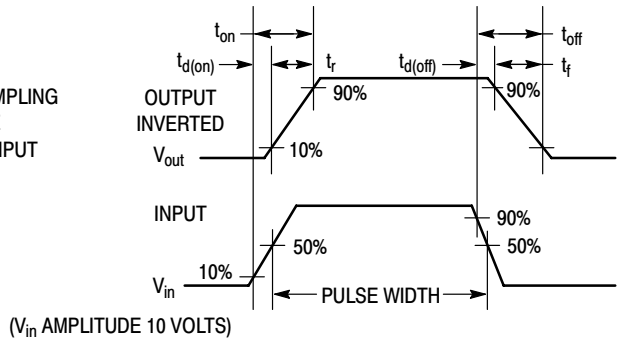


Figure 2. Switching Waveform

TYPICAL ELECTRICAL CHARACTERISTICS

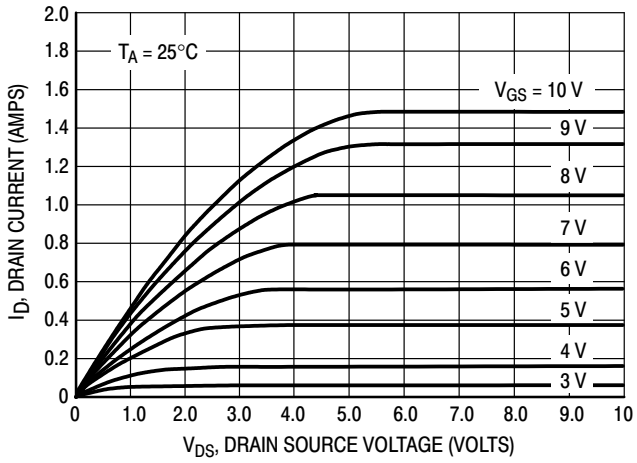


Figure 3. Ohmic Region

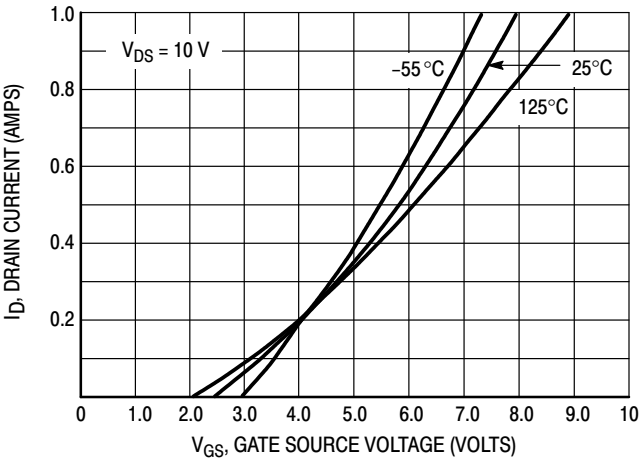


Figure 4. Transfer Characteristics

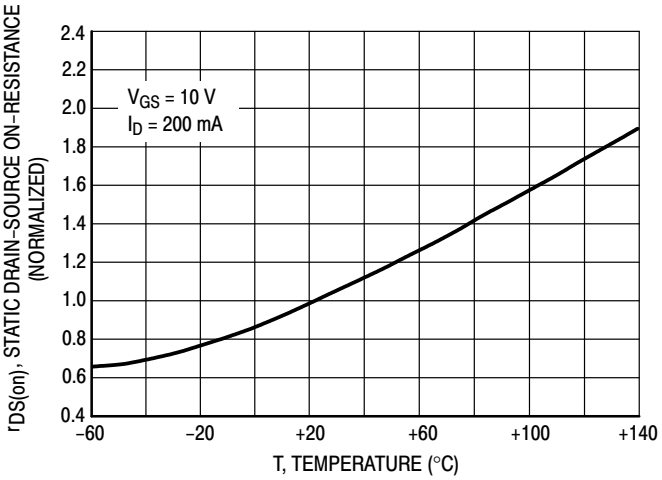


Figure 5. Temperature versus Static Drain−Source On−Resistance

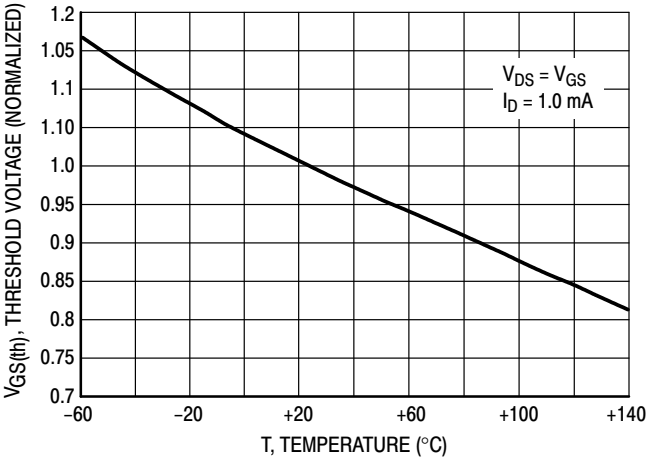
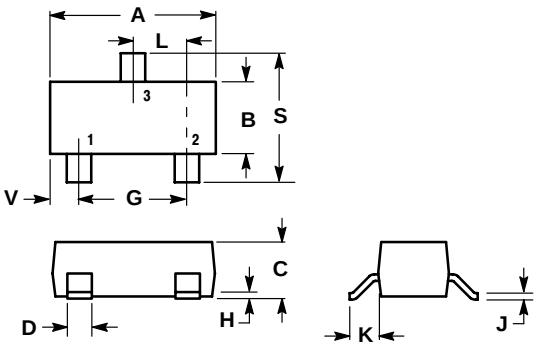


Figure 6. Temperature versus Gate Threshold Voltage

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AH

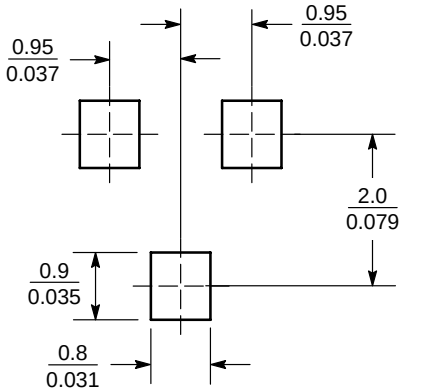


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−03 AND −07 OBSOLETE, NEW STANDARD 318−08.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

SOT−23

*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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PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
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Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.