

MMBF170LT1

Power MOSFET 500 mA, 60 V N-Channel SOT-23

Features

- Pb-Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	Vdc
Drain-Gate Voltage	V_{DGS}	60	Vdc
Gate-Source Voltage	V_{GS}	± 20	Vdc
– Continuous	V_{GSM}	± 40	Vpk
– Non-repetitive ($t_p \leq 50 \mu s$)			
Drain Current – Continuous	I_D	0.5	Adc
– Pulsed	I_{DM}	0.8	

THERMAL CHARACTERISTICS

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

1. FR-5 = $1.0 \times 0.75 \times 0.062$ in.

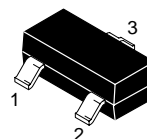
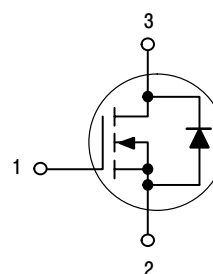


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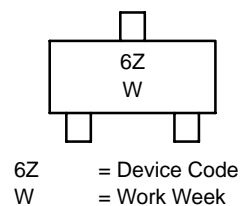
500 mA, 60 V
 $R_{DS(on)} = 5 \Omega$

N-Channel

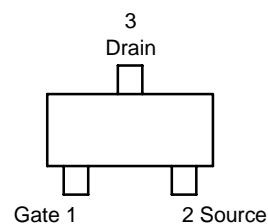


SOT-23
CASE 318
STYLE 21

MARKING DIAGRAM



PIN ASSIGNMENT



ORDERING INFORMATION

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

MMBF170LT1

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

Characteristic	Symbol	Min	Max	Unit
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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
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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.

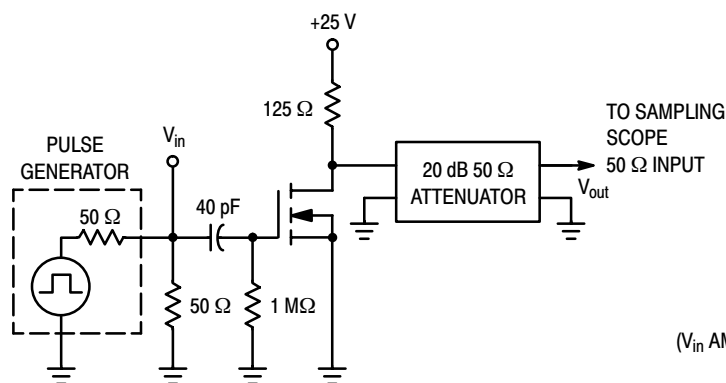


Figure 1. Switching Test Circuit

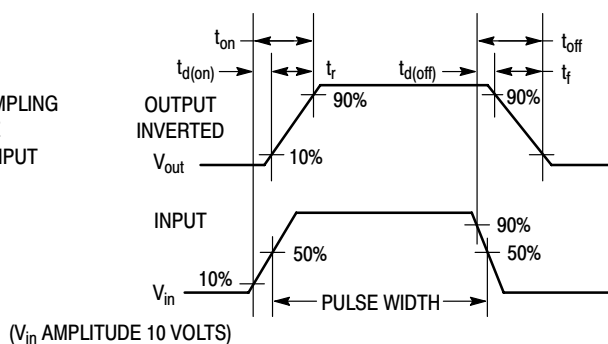


Figure 2. Switching Waveform

MMBF170LT1

TYPICAL ELECTRICAL CHARACTERISTICS

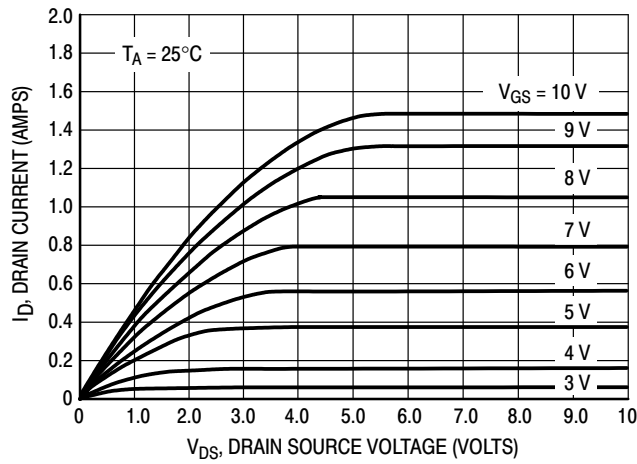


Figure 3. Ohmic Region

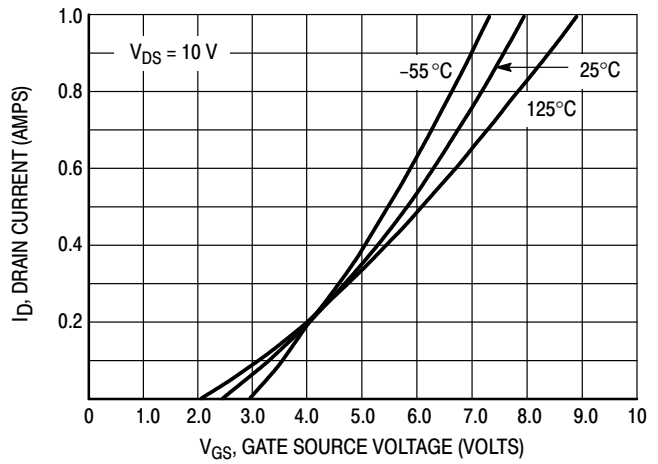


Figure 4. Transfer Characteristics

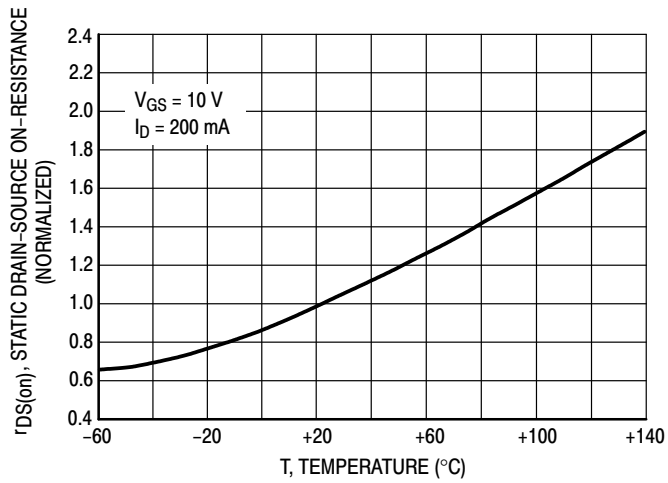


Figure 5. Temperature versus Static Drain-Source On-Resistance

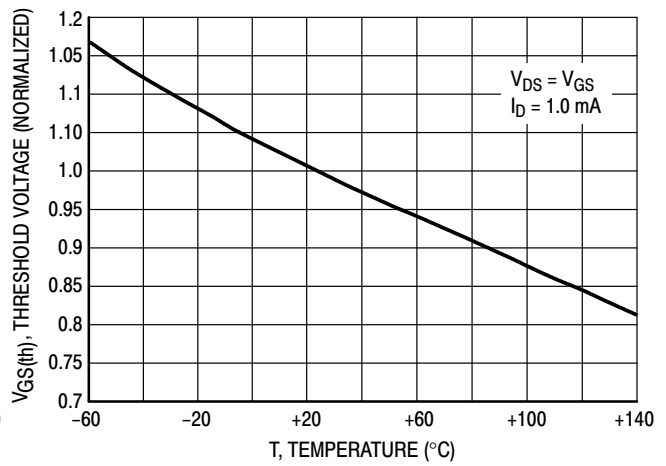


Figure 6. Temperature versus Gate Threshold Voltage

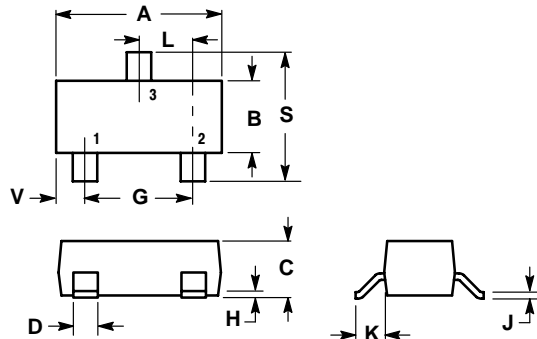
MMBF170LT1

PACKAGE DIMENSIONS

SOT-23 (TO-236)

CASE 318-08

ISSUE AH



NOTES:

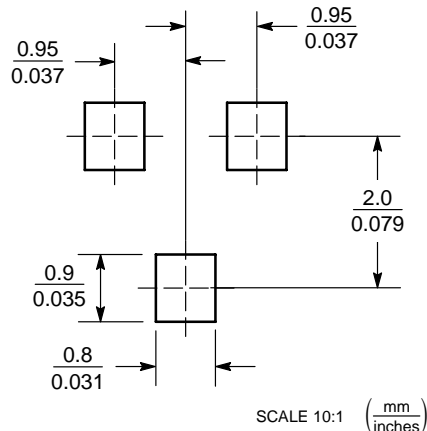
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-03 AND -07 OBSOLETE, NEW STANDARD 318-08.

DIM	INCHES		MILLIMETERS	
	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
- SOURCE
- DRAIN


SOLDERING FOOTPRINT*



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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