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## Features

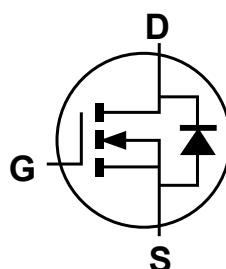
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

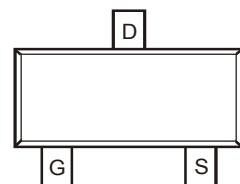
- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)



Top View



Equivalent Circuit



Top View

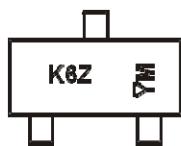
## Ordering Information (Note 4)

Part Number	Case	Packaging
MMBF170-7-F	SOT23	3000/Tape & Reel
MMBF170-13-F	SOT23	10000/Tape & Reel

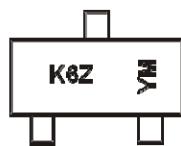
## Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant
2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



Chengdu A/T Site



Shanghai A/T Site

K6Z = Product Type Marking Code

YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)

YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)

Y or YM = Year (ex: A = 2014)

M = Month (ex: 9 = September)

## Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	...	2011	2012	2013	2014	2015	2016	2017
Code	J	K	L	M	N	P	R	...	Y	Z	A	B	C	D	E
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Code	1	2	3	4	5	6	7	8	9	O	N	D			

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	$V_{DSS}$	60	V
Drain-Gate Voltage $R_{GS} \leq 1.0\text{M}\Omega$	$V_{DGR}$	60	V
Gate-Source Voltage	Continuous Pulsed	$V_{GSS}$	$\pm 20$ $\pm 40$
Drain Current (Note 5)	Continuous Pulsed	$I_D$	500 800
			mA

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	$P_D$	300 1.80	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	K/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	70	—	V	$V_{GS} = 0\text{V}$ , $I_D = 100\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 60\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$	—	—	$\pm 10$	nA	$V_{GS} = \pm 15\text{V}$ , $V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	$V_{GS(\text{th})}$	0.8	2.1	3.0	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	—	5.0 5.3	$\Omega$	$V_{GS} = 10\text{V}$ , $I_D = 200\text{mA}$ $V_{GS} = 4.5\text{V}$ , $I_D = 50\text{mA}$
Forward Transconductance	$g_{FS}$	80	—	—	mS	$V_{DS} = 10\text{V}$ , $I_D = 0.2\text{A}$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	—	22	40	pF	$V_{DS} = 10\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	11	30	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	2.0	5.0	pF	
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Time	$t_{on}$	—	—	10	ns	$V_{DD} = 25\text{V}$ , $I_D = 0.5\text{A}$ , $V_{GS} = 10\text{V}$ , $R_{\text{GEN}} = 50\Omega$
Turn-Off Time	$t_{off}$	—	—	10	ns	

Notes: 5. Device mounted on FR-4 PCB 1.0 x 0.75 x 0.062 inch pad layout as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at <http://www.diodes.com>.  
 6. Short duration pulse test used to minimize self-heating effect.

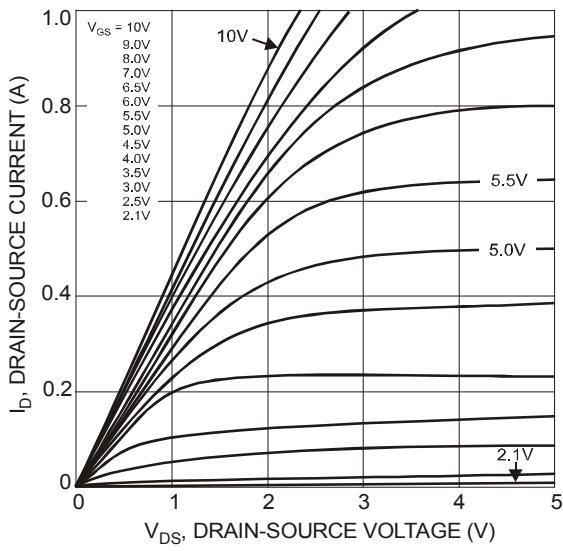


Fig. 1 On-Region Characteristics

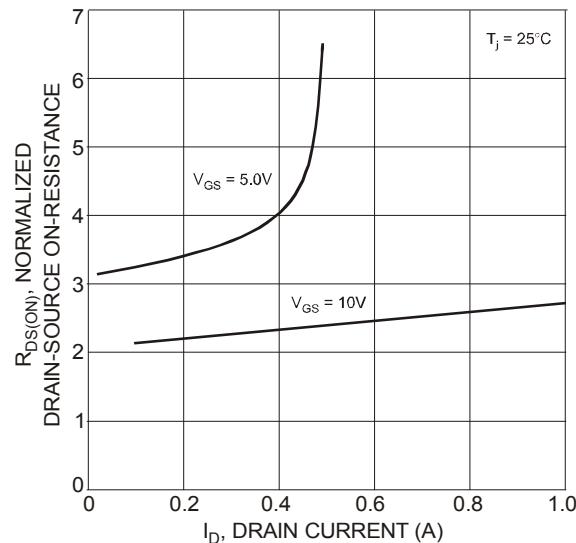


Fig. 2 On-Resistance vs. Drain Current

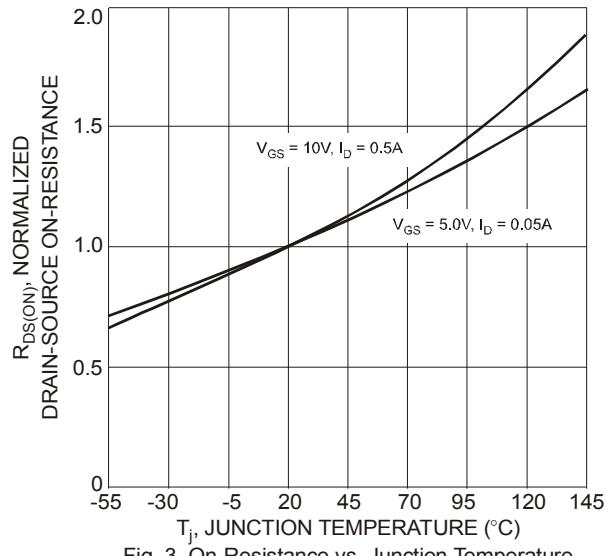


Fig. 3 On-Resistance vs. Junction Temperature

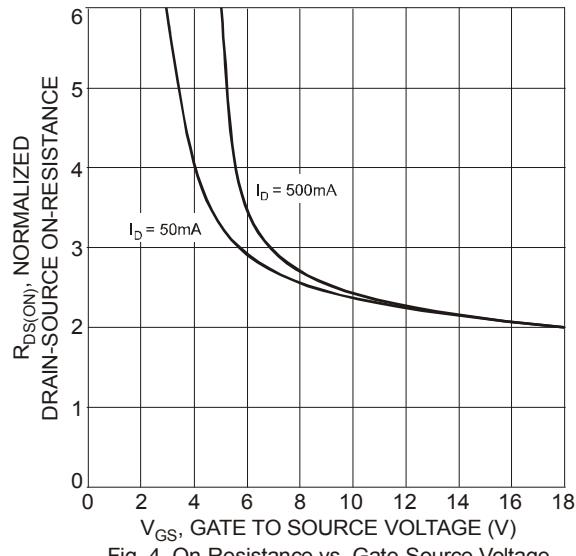


Fig. 4 On-Resistance vs. Gate-Source Voltage

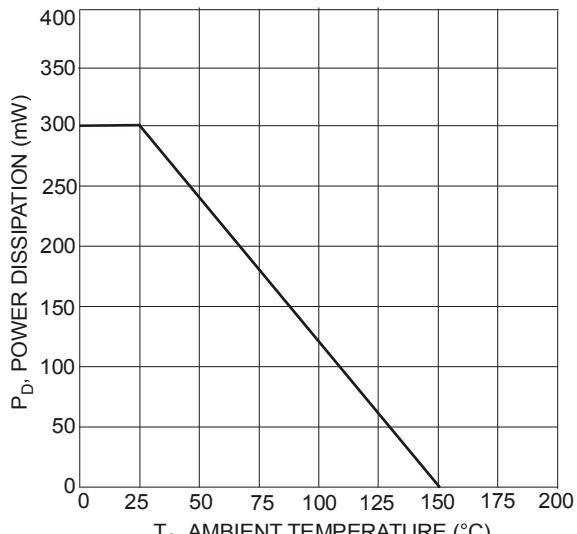
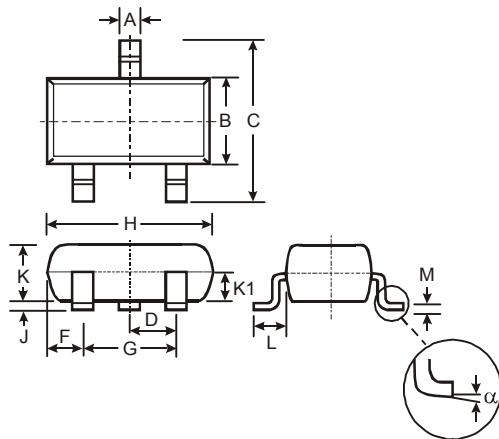


Fig. 5 Max Power Dissipation vs. Ambient Temperature

## Package Outline Dimensions

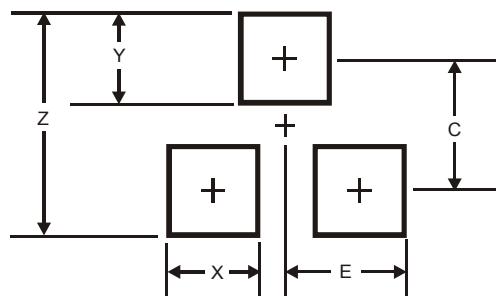
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
$\alpha$	0°	8°	-
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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