

BSS84KW

-50V P-Channel Enhancement Mode MOSFET

1. Description

This -50V P-channel MOSFET is based on MDD's unique device design to achieve low $R_{DS(on)}$ and fast switching and good ESD rating performance.

2. Features

- $V_{DS}=-50V$, $I_D=-0.13A$, $R_{DS(on)typ}=5.8\Omega$ @ $V_{GS}=-5V$
- Lead free product is acquired
- Surface mount package
- Moisture Sensitivity Level 3

3. Application

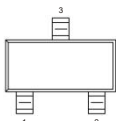
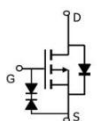
- Battery Switch
- DC/DC Convert

4. Absolute Maximum Ratings($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-50	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	-0.13	A
Power Dissipation	P_D	225	mW
Thermal Resistance From Junction to Ambient(note2)	$R_{\theta JA}$	556	$^{\circ}C/W$
Storage Temperature	T_{stg}	-50~+150	$^{\circ}C$
Junction Temperature	T_J	150	$^{\circ}C$
Pulsed Drain Current($t_p<10\mu s$)(note1)	I_{DM}	-0.52	A
Maximum Lead Temperature for Soldering Purposes ,Duration for 5 Seconds	T_L	260	$^{\circ}C$

- 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

5. Pinning information

Pin	Symbol	Description	Simplified outline	Equivalent Circuit	Marking	Package
1	G	Gate			84K	SOT-323
2	S	Source				
3	D	Drain				

6. $T_A=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-50	—	—	V
I_{GSS}	Gate-body Leakage	$V_{DS}=0V, V_{GS}=\pm 20V$	—	—	± 10	μA
I_{DSS}	Zero Gate Voltage Drain current	$V_{DS}=-50V, V_{GS}=0V$	—	—	-15	μA
		$V_{DS}=-25V, V_{GS}=0V$	—	—	-0.1	μA
$V_{GS(TH)}$	Gate Threshold Voltage(note3)	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.9	-1.6	-2.0	V
g_{fs}	Forward trans conductance (note1)	$V_{DS}=-25V, I_D=-0.1A$	50	—	—	mS
V_{SD}	Diode forward voltage	$V_{GS}=0V, I_S=0.34A$	—	—	1.3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance(note3)	$V_{GS}=-5V, I_D=-0.1A$	—	5.8	10	Ω
		$V_{GS}=-10V, I_C=-0.1A$	—	4.5	8	Ω

7. Dynamic Electrical Characteristics(note4)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS}=0V$ $V_{DS}=5V$ $f=1.0MHz$	—	30	—	pF
C_{oss}	Output Capacitance		—	10	—	pF
C_{rss}	Reverse Transfer Capacitance		—	5	—	pF

8. Switching Characteristics(note3, 4)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$t_{d(on)}$	Turn on Delay Time	$V_{DD}=-15V$ $I_D \approx -0.25A$ $R_L=50\Omega$	—	2.5	—	nS
t_r	Turn on Rise Time		—	1	—	nS
$t_{d(off)}$	Turn Off Delay Time		—	16	—	nS
t_f	Turn Off Fall Time		—	8	—	nS

9. Source Drain Diode Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{SD}	Diode Forward voltage(note3)	$I_S=-0.13A, V_{GS}=0V$	—	—	-2.2	V
I_{SM}	Pulsed Current		—	—	-0.52	A
I_S	Continuous Current		—	—	-0.13	A

- Notes: 1.Repetitive rating: Pulse width limited by junction temperature
2.Surface mounted on FR4 board, $t \leq 10s$
3.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
4.Guaranteed by design, not subject to producing

10. Electrical Characteristics Diagrams

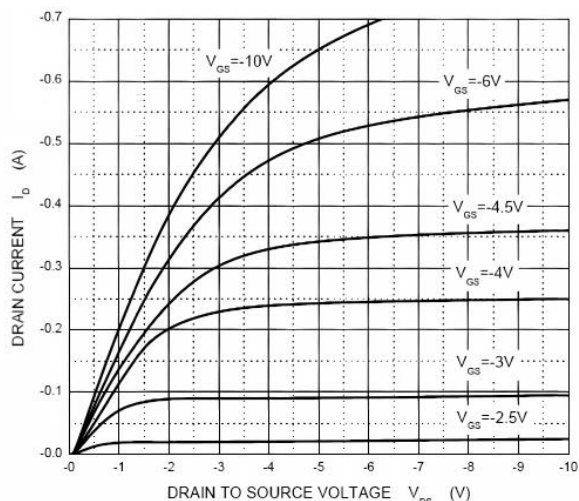


Figure 1. Output Characteristics

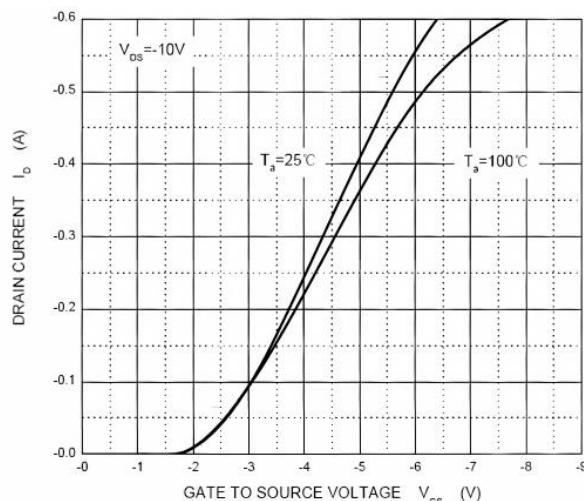


Figure 2. Transfer Characteristics

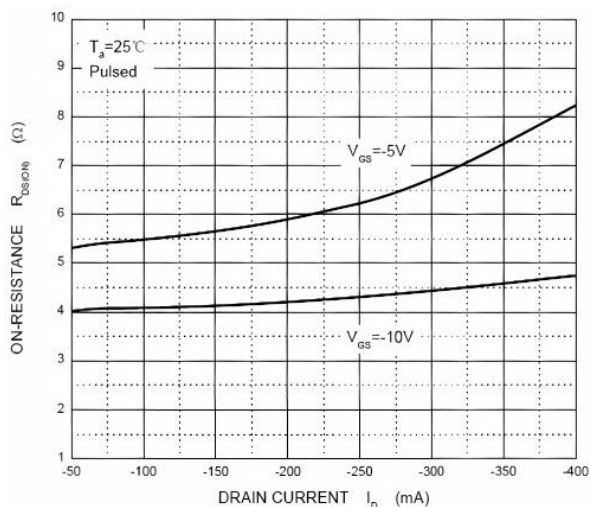


Figure 3. On-Resistance vs Drain Current

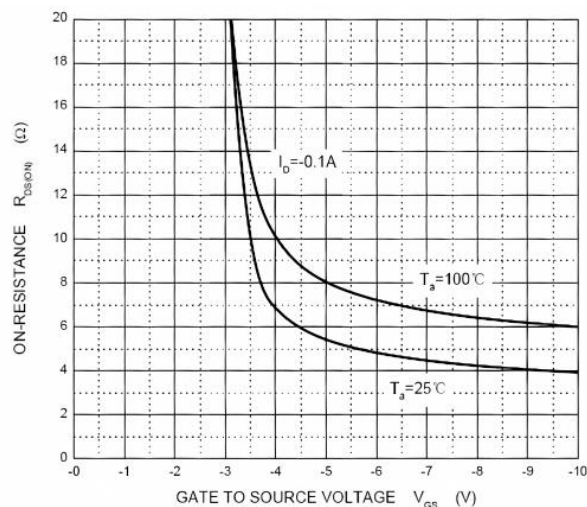


Figure 4. On-Resistance vs V_{GS}

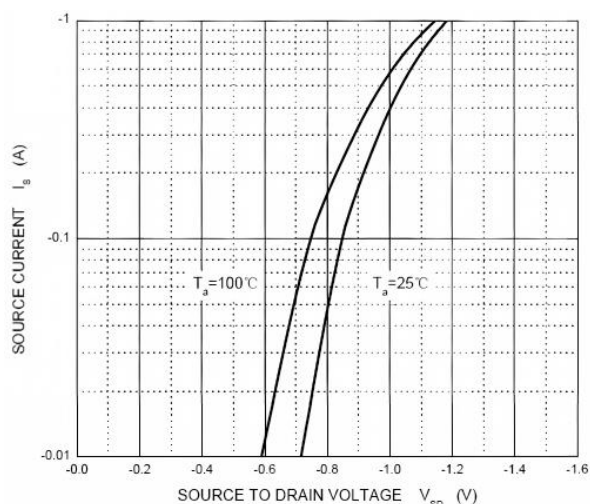


Figure 5. Source-Drain Diode Forward Characteristics

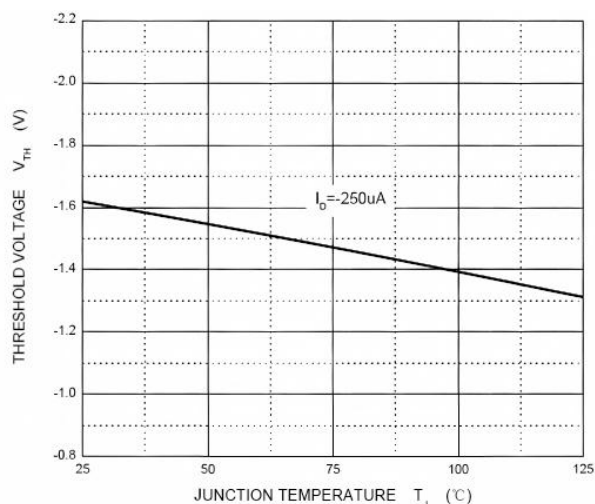
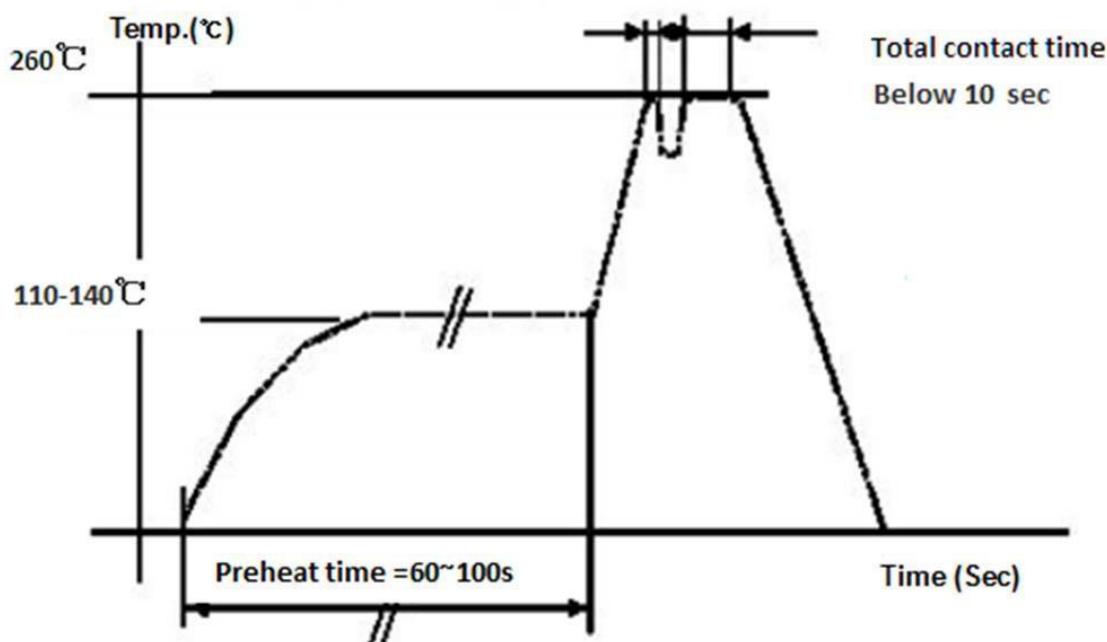


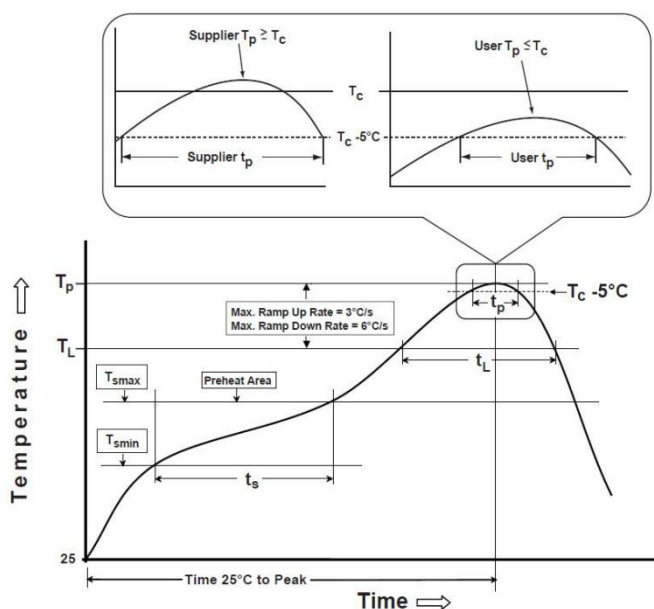
Figure 6. Threshold Voltage vs Junction Temperature

11. Recommended Soldering Profile for Rectifier Diodes (PbFree)

a) Wave Soldering Profile



b) Reflow Soldering Profile (PbFree Application), refer to IPC/JEDEC J-STD-020

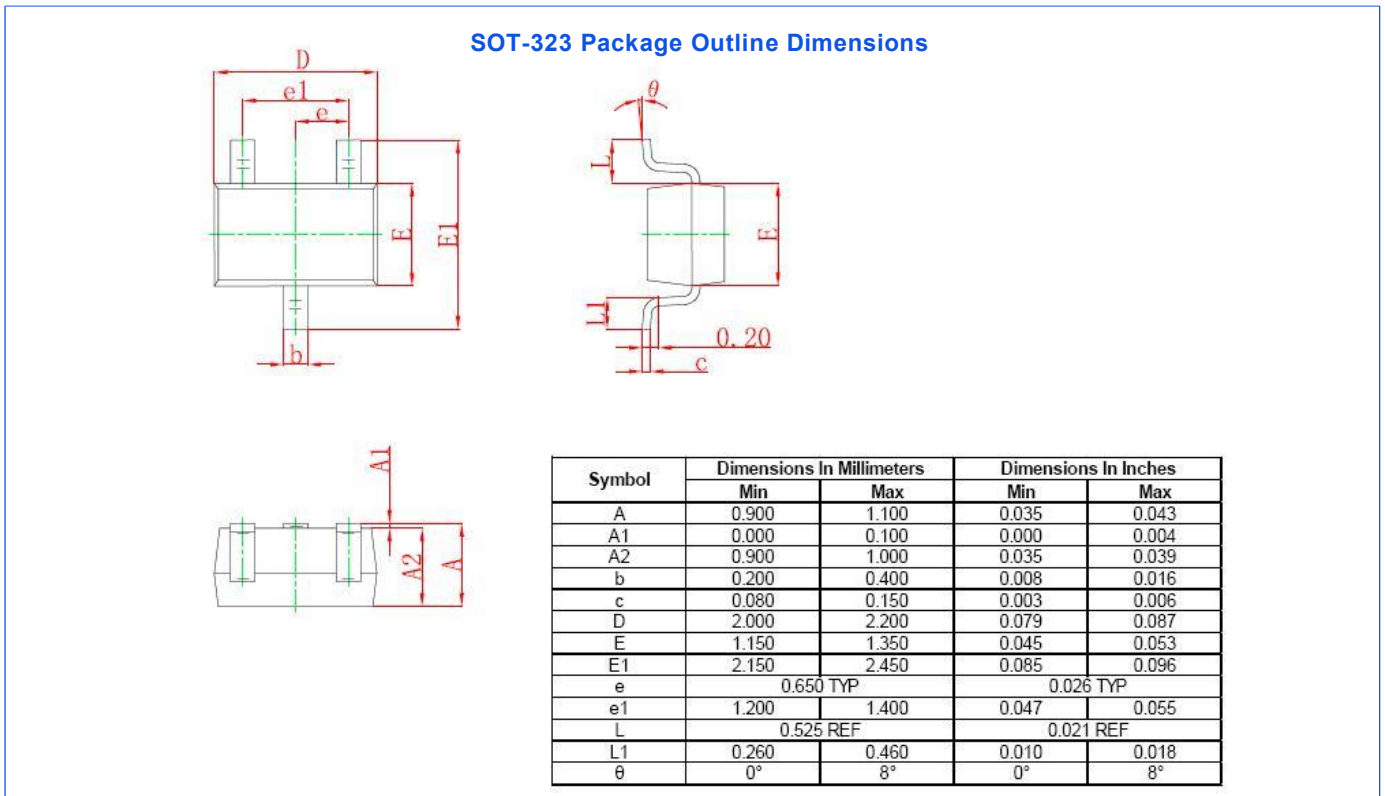


Preheat/Soak Temperature Min (T _{smin}) Temperature Max (T _{smax}) Time (ts) from (T _{smin} to T _{smax})	50 °C 200 °C 60-120 seconds
Melting Point of Solder (Sn Ag Cu)	217°C
Ramp-up Rate to 217°C (Melting Point of Solder)	3°C/sec
Time at Temp. > 217°C (Melting Point of Solder)	60~150 Sec
Peak Temperature	255±5°C
Time within 5°C below Peak Temp.	20~40 Sec
Cooling Rate	6°C/sec (max)
Time from 25°C to Peak Temp.	8min (max)

c) Manual Soldering

When using an electric soldering iron for manual soldering, it is recommended that the temperature does not exceed 300°C and the soldering time is less than 10 seconds.

12. Outline Drawing



13. Important Notice and Disclaimer

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