





50V N-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET IN SOT23

Features and Benefits

- BV_{DSS} > 50V
- $R_{DS(on)} \le 3.5\Omega$ @ $V_{GS} = 5V$
- Maximum continuous drain current I_D = 200mA
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

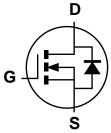
Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matt Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

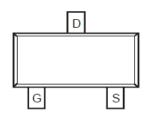
SOT-23



Top View



Device symbol



Pin-Out Top View

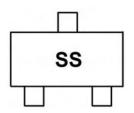
Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BSS138TA	SS	7	8	3000

Notes:

- 1. No purposefully added lead
- 2. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com.
- 3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



SS = Product Type Marking Code





Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	50	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I _D	200	mA
Pulsed Drain Current (Note 5)	I _{DM}	800	mA

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit	
Power Dissipation	(Note 4)	P _D	350	mW
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	357	°C/W
Thermal Resistance, Junction to Leads	(Note 6)	R ₀ JL	195	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C	

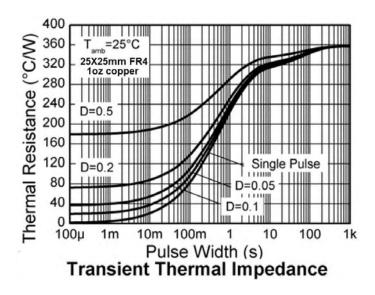
Notes:

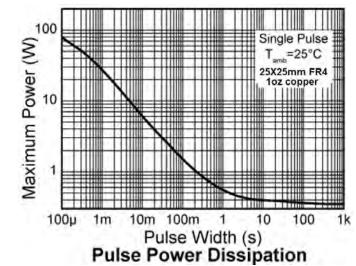
- 4. For a device mounted on 25mm X 25mm X 1.6mm FR-4 PCV with high coverage of single sided 1oz copper, in still air condition.
- 5. Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
- 6. Thermal resistance from junction to solder-point (at the end of the collector lead).

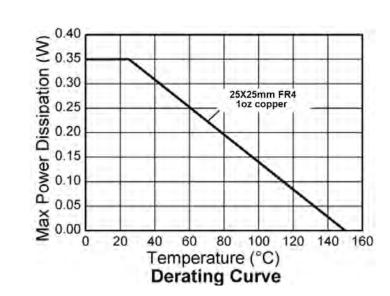




Thermal Characteristics











Electrical Characteristics @T_A = 25°C unless otherwise specified

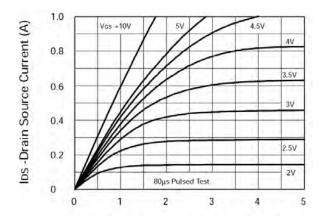
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	50	-	-	V	$V_{GS} = 0V, I_D = 0.25mA$	
Zero Gate Voltage Drain Current	I _{DSS}	-	-	0.5 5	μA μA	$V_{DS} = 50V, V_{GS} = 0V$ $V_{DS} = 50V, V_{GS} = 0V, T_A = 125^{\circ}C$	
-				100	nΑ	$V_{DS} = 20V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(th)}	0.5	-	1.5	V	$V_{DS} = V_{GS}$, $I_D = 1mA$	
Static Drain-Source On-Resistance (Note 7)	R _{DS (on)}	-	-	3.5	Ω	$V_{GS} = 5V, I_D = 200mA$	
Forward Transconductance (Note 7 & 8)	g _{fs}	120	-	-	mS	$V_{DS} = 25V, I_D = 200mA$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C _{iss}	-	-	50	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	
Output Capacitance	Coss	-	-	25	pF		
Reverse Transfer Capacitance	C _{rss}	-	-	8	pF		
Turn-On Delay Time (Note 9)	t _{D(on)}	-	10	-	ns	V _{DD} = 30V, I _D = 280mA	
Turn-On Rise Time (Note 9)	t _r	-	10	-	ns		
Turn-Off Delay Time (Note 9)	t _{D(off)}	-	15	-	ns		
Turn-Off Fall Time (Note 9)	t _f	-	25	-	ns		

Notes:

- 7. Measured under pulsed conditions. Width = 300µs. Duty cycle ≤ 2%.
- Sample test.
- 9. Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator.

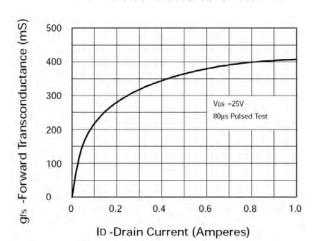


Electrical Characteristics



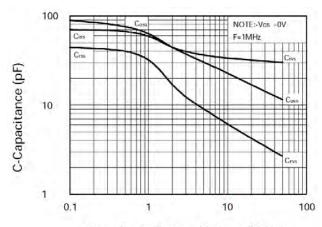
VDS -Drain Source Voltage (Volts)

Saturation Characteristics



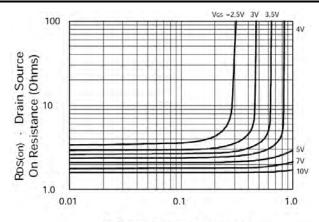
Typical Transconductance vs.

Drain Current



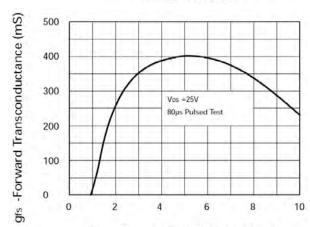
VDS -Drain Source Voltage (Volts)

Typical Capacitance vs. Drain - Source Voltage



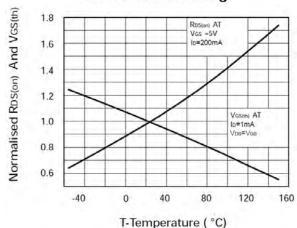
ID-Drain Current (Amperes)

Typical On Resistance vs. Drain Current



VGS -Gate Source Voltage (Volts)

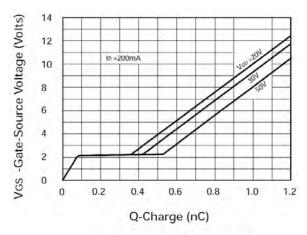
Typical Transconductance vs. Gate - Source Voltage



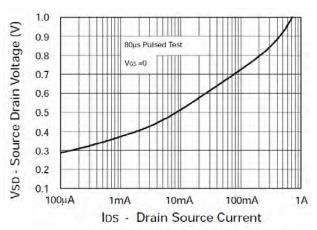
Normalised RDS(on) And VGS(th) vs. Temperature



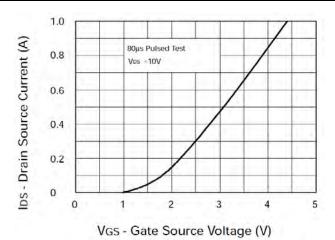
Electrical Characteristics – (Continuous)



Typical Gate Charge vs. Gate-Source Voltage



Typical Diode Forward Voltage

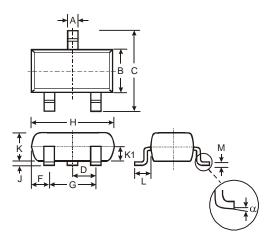


Typical Transfer Characteristics



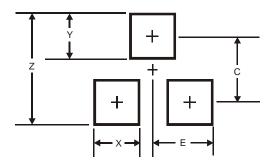


Package Outline Dimensions



SOT23					
Dim	Dim Min		Тур		
Α	0.37	0.51	0.40		
В	1.20	1.40	1.30		
С	2.30	2.50	2.40		
D	0.89	1.03	0.915		
F	F 0.45		0.535		
G	1.78	2.05	1.83		
Н	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		
α	0°	8°	-		
All Dimensions in mm					

Suggested Pad Layout



Dimensions	Value (in mm)		
Z	2.9		
Х	0.8		
Y	0.9		
С	2.0		
E	1.35		





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