



South Sea Semiconductor

BSS138

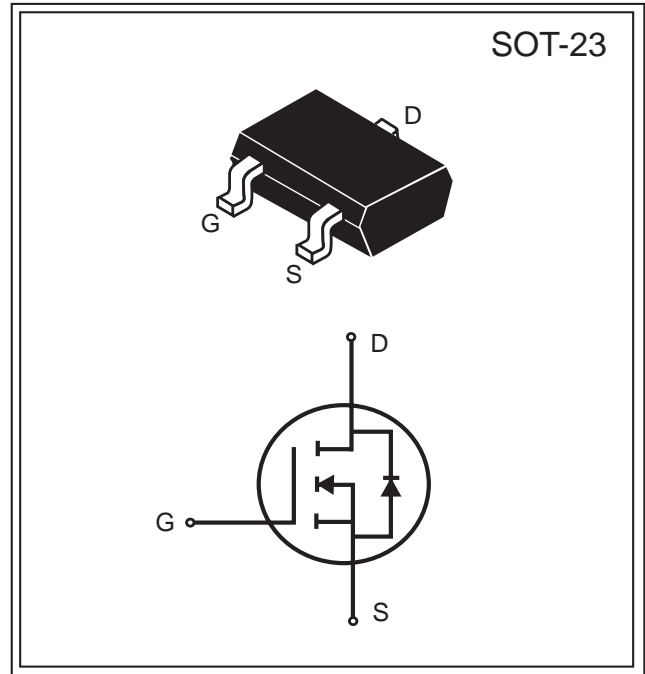
N-Channel Enhancement Mode MOSFET

Product Summary

V _{DS} (V)	I _D (A)	R _{DS(ON)} (Ω) Max
50V	0.22A	3.5 @V _{GS} = 10V
		6.0 @V _{GS} = 4.5V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- SOT-23 package.



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	50	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous @ T _J = 125 °C	I _D	220	mA
-Pulsed ^b	I _{DM}	880	mA
Drain-Source Diode Forward Current ^a	I _S	220	mA
Maximum Power Dissipation ^a	P _D	300	mW
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R _{JA}	417	°C/W
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South Sea Semiconductor reserves the right to make changes to improve reliability or manufacturability without advance notice.

South Sea Semiconductor, December 2005 (Rev 2.1)



N-Channel Electrical Characteristics (TA = 25°C unless otherwise noted)						
Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250 μA	50			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =50V, V _{GS} =0V			0.5	μA
Gate-Body Leakage	I _{GSS}	V _{GS} = ± 20V, V _{DS} =0V			± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} I _D =1mA	0.8	1.4	1.6	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =220mA		1.6	3.5	
		V _{GS} = 4.5V, I _D =220mA		2.5	6	
On-State Drain Current	I _{D(ON)}	V _{DS} =7V, V _{GS} =10V	500			mA
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =220mA	120	450		mS
Input Capacitance	C _{ISS}	V _{DS} =25V		20	50	PF
Output Capacitance	C _{OSS}	V _{GS} =0V		11	25	
Reverse Transfer Capacitance	C _{RSS}	f=1.0MHz		2.5	5	
Turn-On Delay Time	t _{D(ON)}	V _{DD} =30V,		7.8	20	ns
Rise Time	t _r	I _D =290mA,		5.5		
Turn-Off Delay Time	t _{D(OFF)}	V _{GS} =10V,		7.8	20	
Fall Time	t _f	R _{GEN} =50		2.8		
Diode-Forward Voltage	V _{SD}	V _{GS} =0V, I _D =220mA		0.8	1.4	V

Notes :

- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test : Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

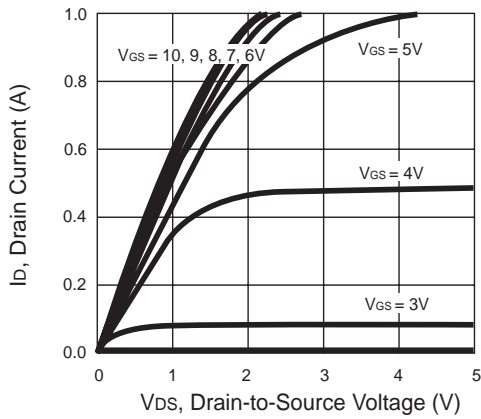


Figure 1. Output Characteristics

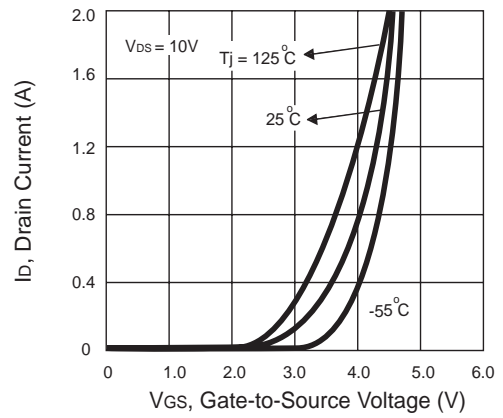


Figure 2. Transfer Characteristics

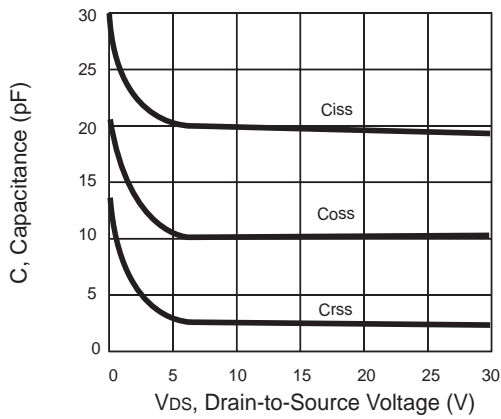


Figure 3. Capacitance

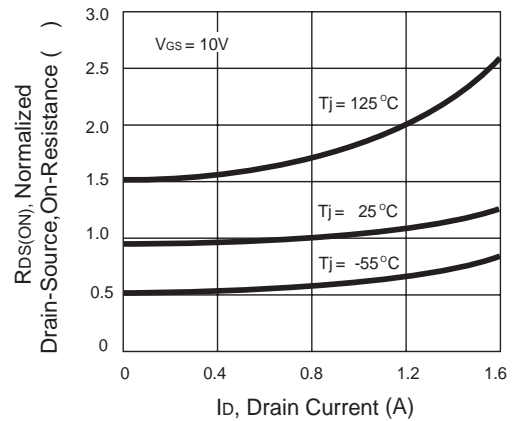


Figure 4. On-Resistance Variation with Temperature

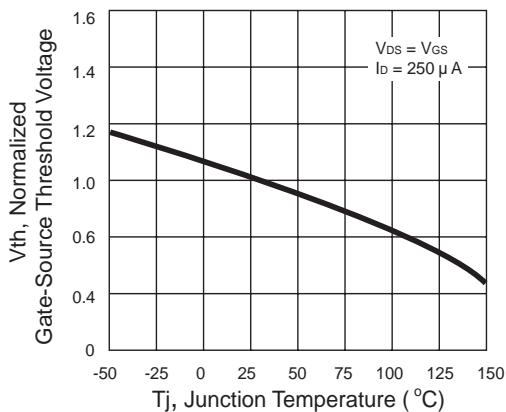


Figure 5. Gate Threshold Variation with Temperature

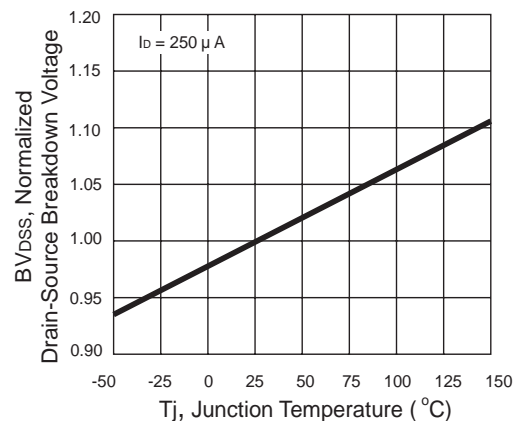


Figure 6. Breakdown Voltage Variation with Temperature

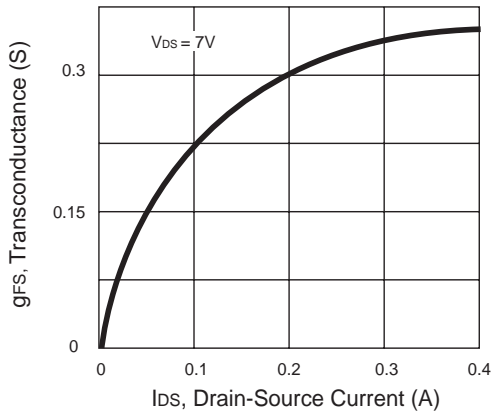


Figure 7. Transconductance Variation with Drain Current

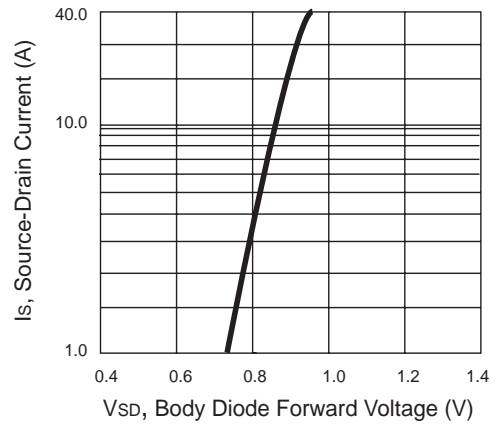


Figure 8. Body Diode Forward Voltage Variation with Source Current

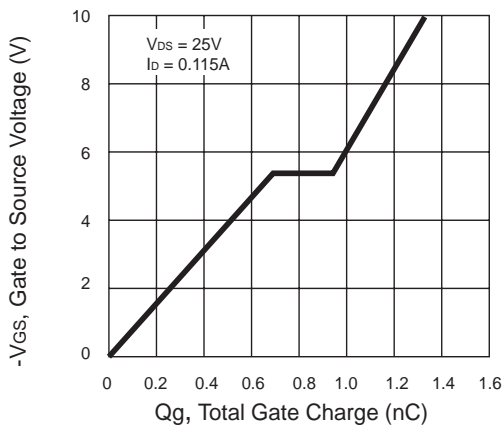


Figure 9. Gate Charge

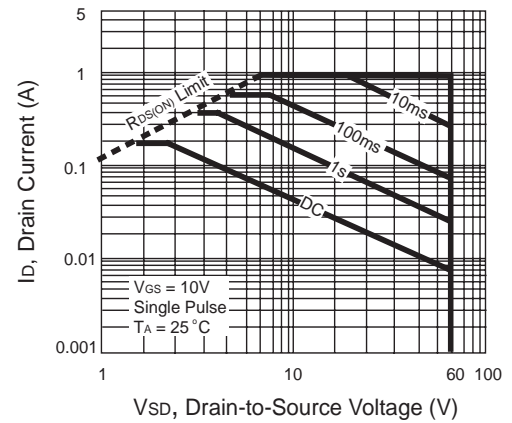


Figure 10. Maximum Safe Operating Area

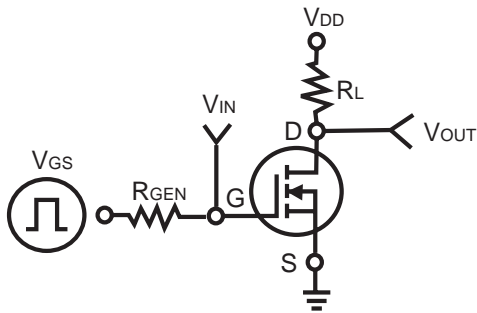


Figure 11. Switching Test Circuit

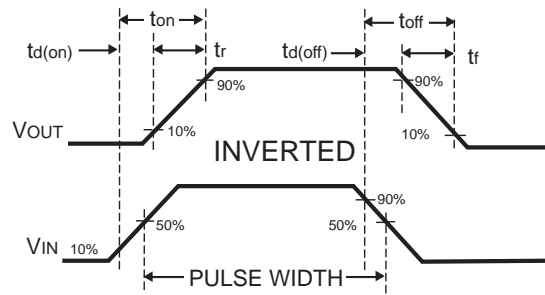


Figure 12. Switching Waveforms

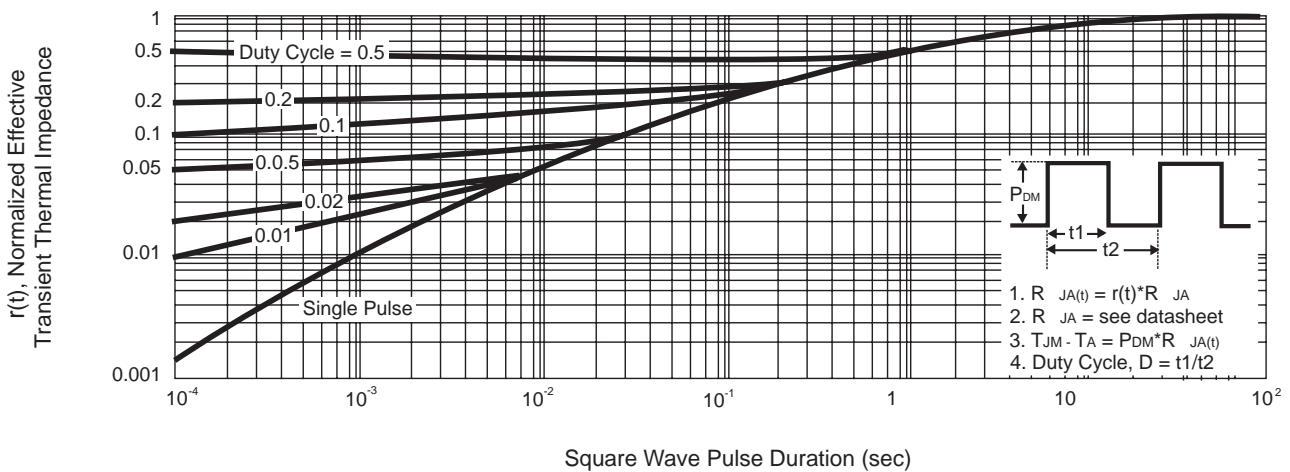
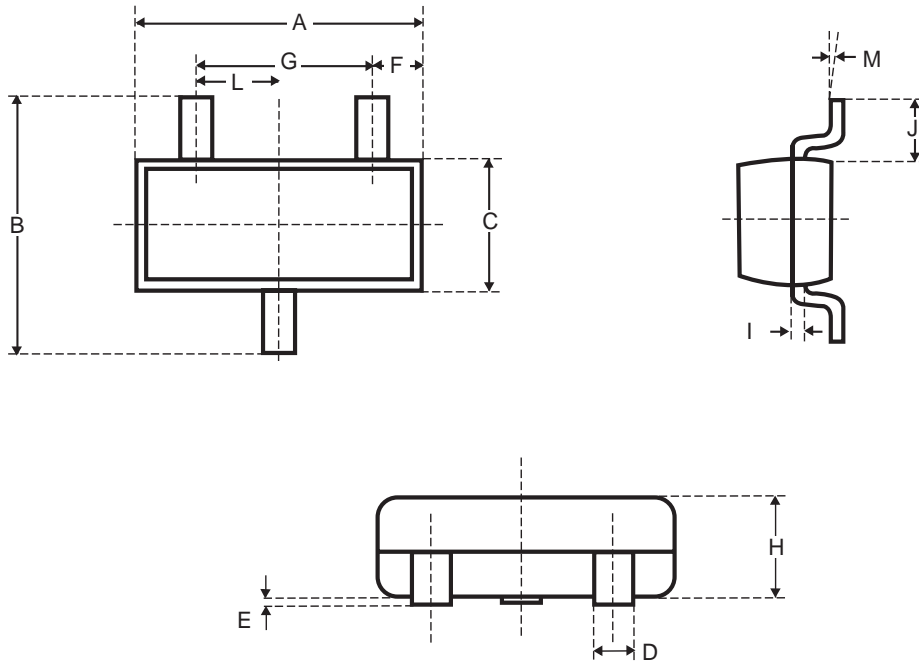


Figure 13. Normalized Thermal Transient Impedance Curve



Package Outline Dimensions

SOT-23

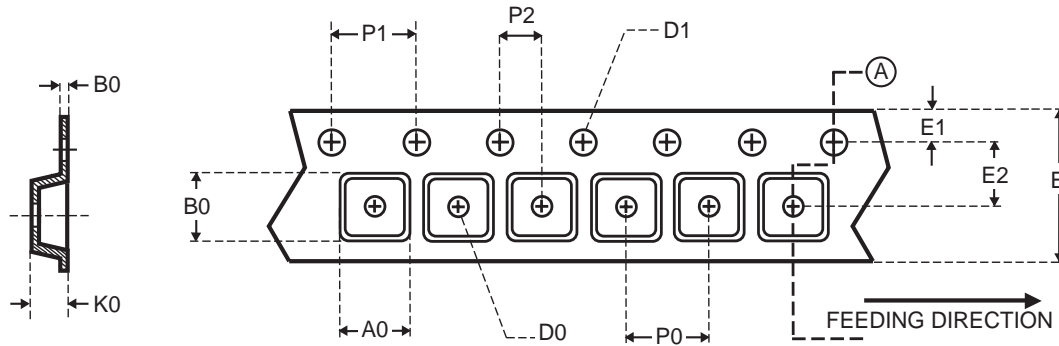


SYMBOLS	MILLIMETERS		INCHES	
	Min.	Max.	Min.	Max.
A	2.70	3.10	0.106	0.122
B	2.40	2.80	0.094	0.110
C	1.20	1.60	0.047	0.063
D	0.35	0.50	0.014	0.020
E	0	0.10	0	0.004
F	0.45	0.55	0.018	0.022
G	1.90 REF.		0.075 REF.	
H	1.00	1.30	0.039	0.051
I	0.10	0.20	0.004	0.008
J	0.40	-	0.016	-
L	0.85	1.15	0.033	0.045
M	0°	10°	0°	10°



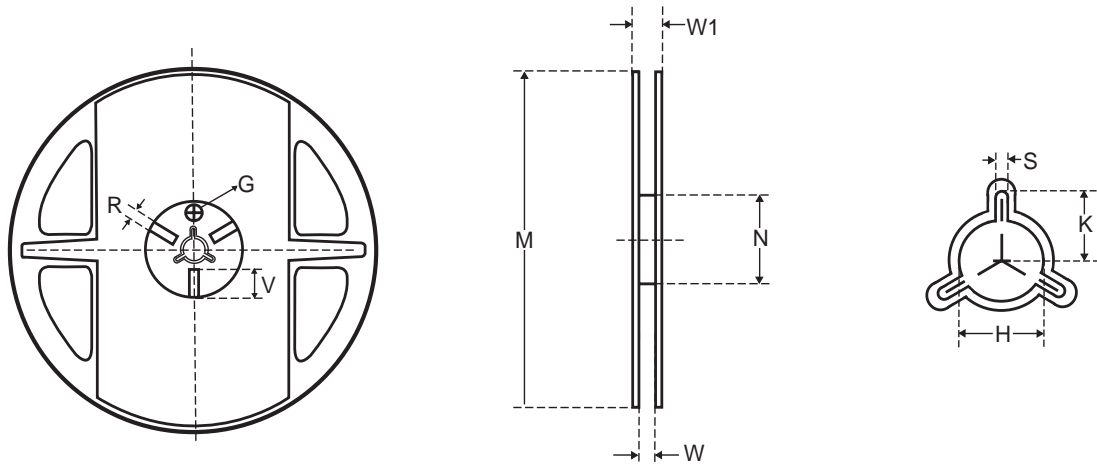
Carrier Tape & Reel Dimensions

SOT-23



Package	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOT-23	3.20 ± 0.10	3.00 ± 0.10	1.33 ± 0.10	1.00 + 0.25	1.50 + 0.10	8.00 +0.30 -0.10	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.20 ± 0.02

UNIT : mm



Tape size	Reel Size	M	N	W	W1	H	K	S	G	R	V
8mm	178	178 ± 1	60 ± 1	9.0 ± 0.5	12.0 ± 0.5	13.5 ± 0.5	10.5	2.0 ± 0.5	10.0	5.0	18.0

UNIT : mm