

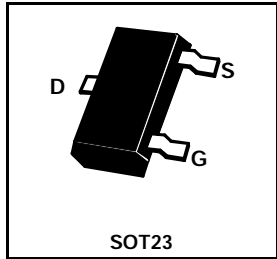
# SOT23 N-CANNEL ENHANCEMENT MODE VERTICAL DMOS FET

ISSUE 3 – MARCH 1996



## BSS138

PARTMARKING DETAIL - SS



### ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Drain-Source Voltage	$V_{DS}$	50	V
Continuous Drain Current at $T_{amb}=25^{\circ}C$	$I_D$	200	mA
Pulsed Drain Current	$I_{DM}$	800	mA
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation at $T_{amb}=25^{\circ}C$	$P_{tot}$	360	mW
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150	$^{\circ}C$

### ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}C$ unless otherwise stated).

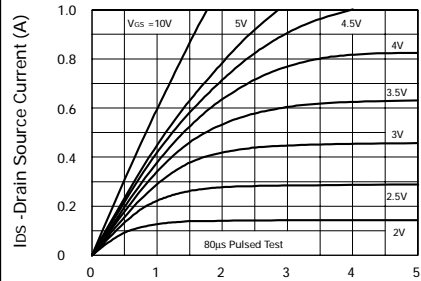
PARAMETER	SYMBOL	MIN.	MIN.	MAX.	UNIT	CONDITIONS.
Drain-Source Breakdown Voltage	$BV_{DSS}$	50			V	$I_D=0.25mA, V_{GS}=0V$
Gate-Source Threshold Voltage	$V_{GS(th)}$	0.5		1.5	V	$I_D=1mA, V_{DS}=V_{GS}$
Gate-Body Leakage	$I_{GSS}$			100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Zero Gate Voltage Drain Current	$I_{DSS}$			0.5 5 100	$\mu A$ $\mu A$ nA	$V_{DS}=50V, V_{GS}=0$ $V_{DS}=50V, V_{GS}=0V, T=125^{\circ}C(2)$ $V_{DS}=20V, V_{GS}=0$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			3.5	$\Omega$	$V_{GS}=5V, I_D=200mA$
Forward Transconductance(1)(2)	$g_{fs}$	120			mS	$V_{DS}=25V, I_D=200mA$
Input Capacitance (2)	$C_{iss}$			50	pF	$V_{DS}=25V, V_{GS}=0V, f=1MHz$
Common Source Output Capacitance (2)	$C_{oss}$			25	pF	
Reverse Transfer Capacitance (2)	$C_{rss}$			8	pF	
Turn-On Delay Time (2)(3)	$t_{d(on)}$		10		ns	$V_{DD}=30V, I_D=280mA$
Rise Time (2)(3)	$t_r$		10		ns	
Turn-Off Delay Time (2)(3)	$t_{d(off)}$		15		ns	
Fall Time (2)(3)	$t_f$		25		ns	

(1) Measured under pulsed conditions. Width=300 $\mu s$ . Duty cycle  $\leq 2\%$  (2) Sample test.

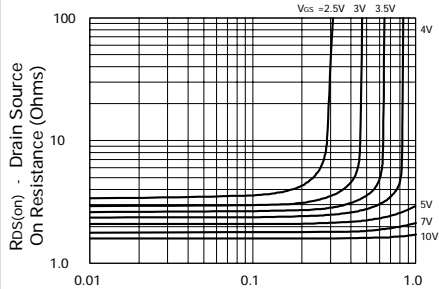
(3) Switching times measured with 50 $\Omega$  source impedance and <5ns rise time on a pulse generator

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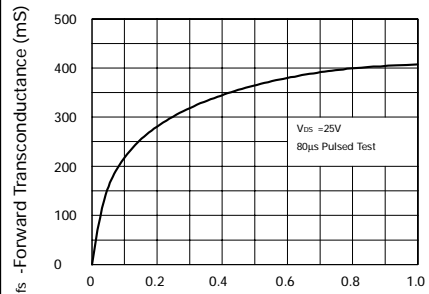
## TYPICAL CHARACTERISTICS



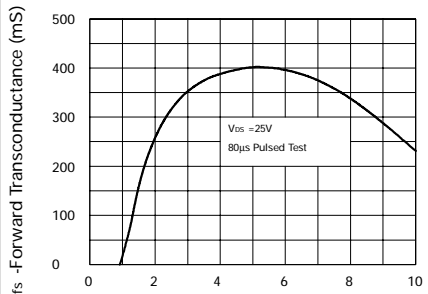
**Saturation Characteristics**



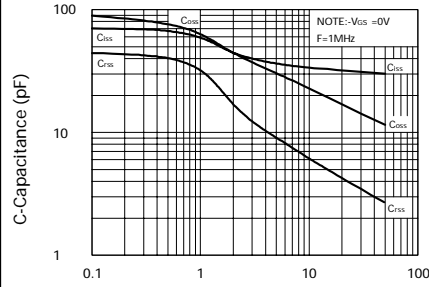
**Typical On Resistance vs. Drain Current**



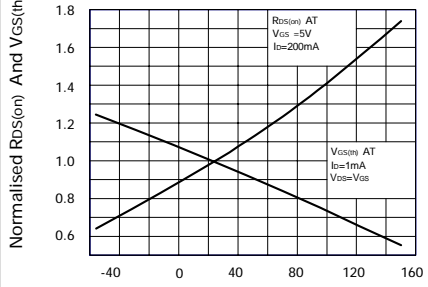
**Typical Transconductance vs. Drain Current**



**Typical Transconductance vs. Gate - Source Voltage**



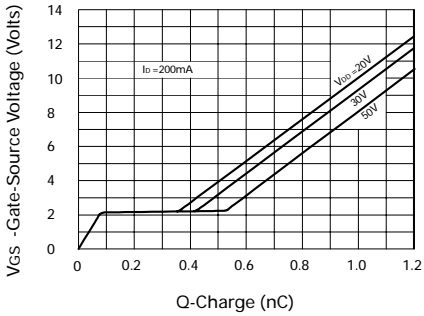
**Typical Capacitance vs. Drain - Source Voltage**



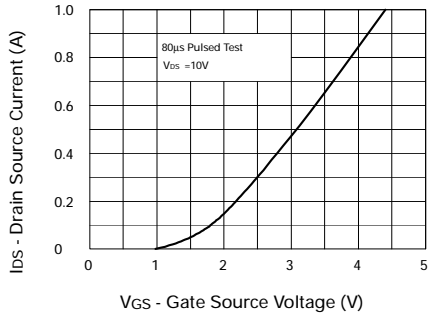
**Normalised  $R_{DS(on)}$  And  $V_{GS(th)}$  vs. Temperature**

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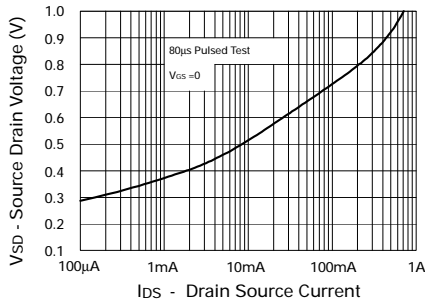
## TYPICAL CHARACTERISTICS



**Typical Gate Charge vs. Gate-Source Voltage**



**Typical Transfer Characteristics**



**Typical Diode Forward Voltage**