



IS2302S

Sep. 3 2005

N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
20V	4A	47 @ V _{GS} = 4.5V 60 @ V _{GS} = 2.5V

FEATURES

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



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	± 12	V
Drain Current-Continuous @ T _J =25°C -Pulsed ^b	I _D	4	A
	I _{DM}	15	A
Drain-Source Diode Forward Current	I _S	1.25	A
Maximum Power Dissipation ^a	P _D	1.25	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R _{thJA}	100	°C/W
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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250uA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 16V, V _{GS} = 0V			1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ± 12V, V _{DS} = 0V			±100	nA
ON CHARACTERISTICS^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250uA	0.5	0.8	1.3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 4.5V, I _D = 4A		40	47	m-ohm
		V _{GS} = 2.5V, I _D = 2A		55	60	m-ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = 5V, V _{GS} = 4.5V	6			A
Forward Transconductance	g _{FS}	V _{DS} = 5V, I _D = 3.8A		19		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C _{ISS}	V _{DS} = 15V, V _{GS} = 0V f = 1.0MHz		495		pF
Output Capacitance	C _{OSS}			88		pF
Reverse Transfer Capacitance	C _{RSS}			65		pF
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 10V, I _D = 1A, V _{GS} = 4.5V, R _{GEN} = 6 ohm		12		ns
Rise Time	t _r			13		ns
Turn-Off Delay Time	t _{D(OFF)}			44		ns
Fall Time	t _f			18		ns
Total Gate Charge	Q _g	V _{DS} = 10V, I _D = 4A, V _{GS} = 4.5V		6.8		nC
Gate-Source Charge	Q _{gs}			1.5		nC
Gate-Drain Charge	Q _{gd}			3		nC

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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS^b						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_s = 1.25A$		0.87	1.2	V

Notes

- a. Surface mounted on FR-4 board, $t \leq 10$ sec
- b. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- c. Guaranteed by design, not subject to production testing.

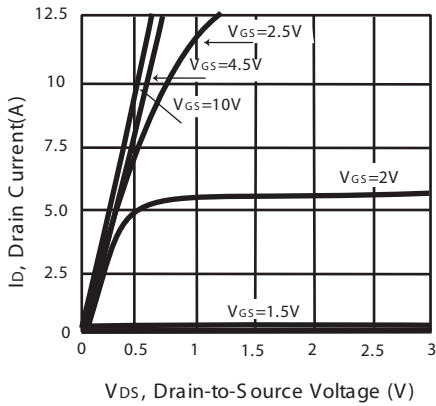


Figure 1. Output Characteristics

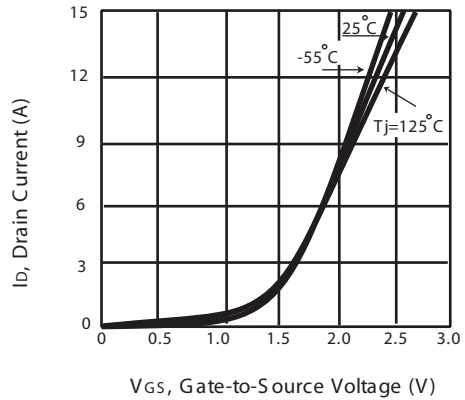


Figure 2. Transfer Characteristics

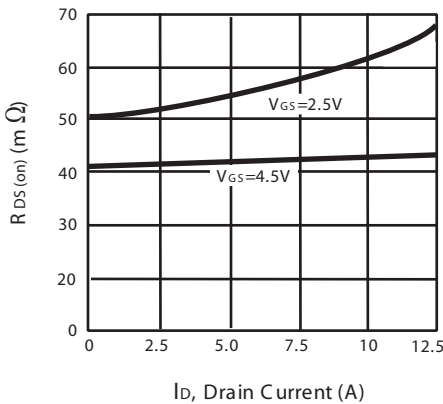


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

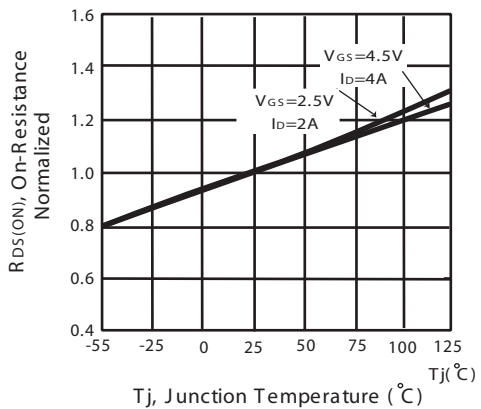


Figure 4. On-Resistance Variation with Drain Current and Temperature

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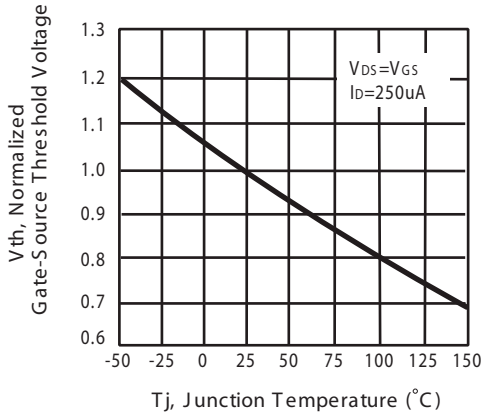


Figure 5. Gate Threshold Variation with Temperature

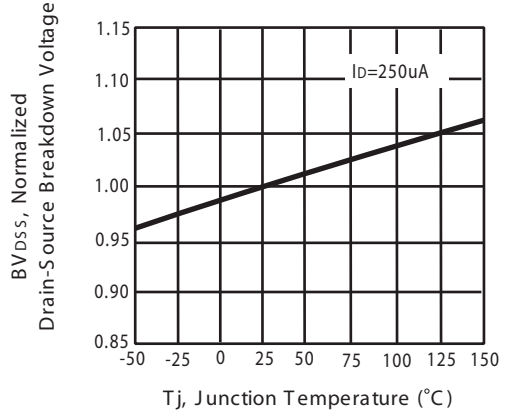


Figure 6. Breakdown Voltage Variation with Temperature

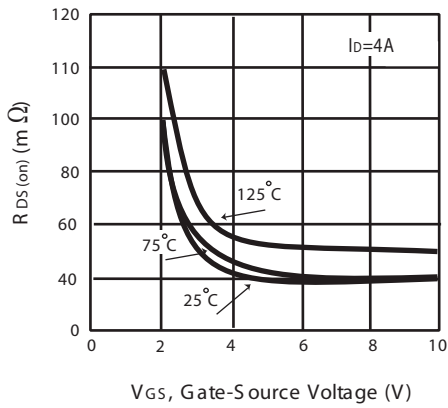


Figure 7. On-Resistance vs. Gate-Source Voltage

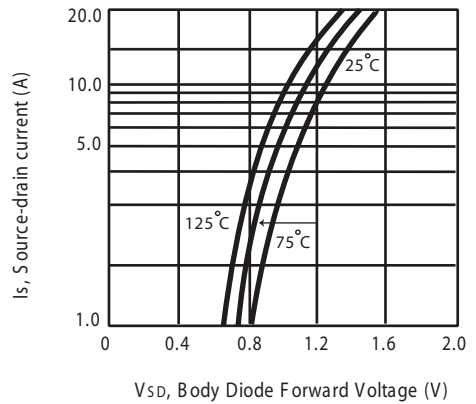


Figure 8. Body Diode Forward Voltage Variation with Source Current

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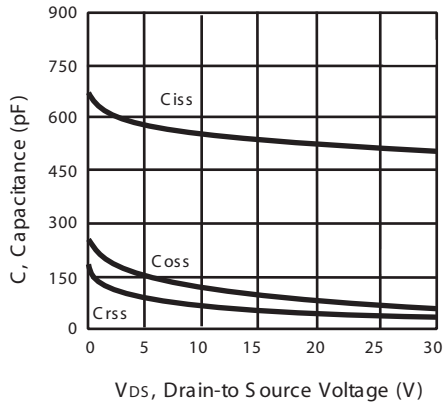


Figure 9. Capacitance

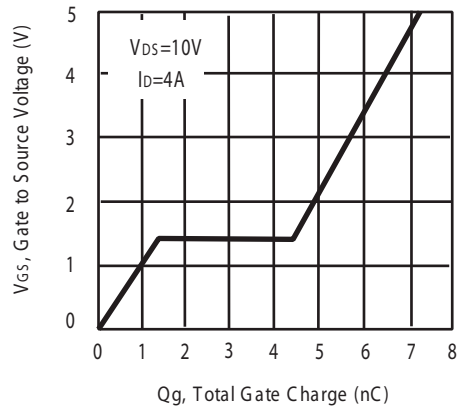


Figure 10. Gate Charge

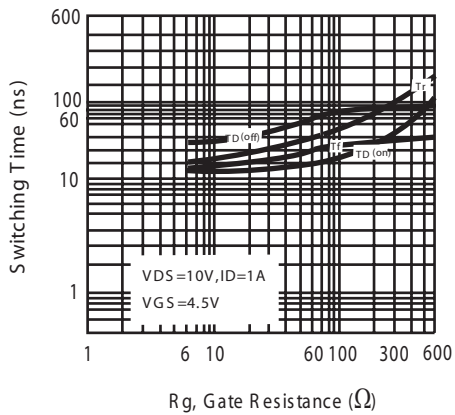


Figure 11. switching characteristics

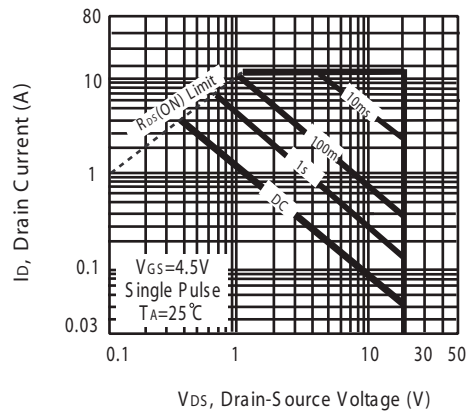


Figure 12. Maximum Safe Operating Area

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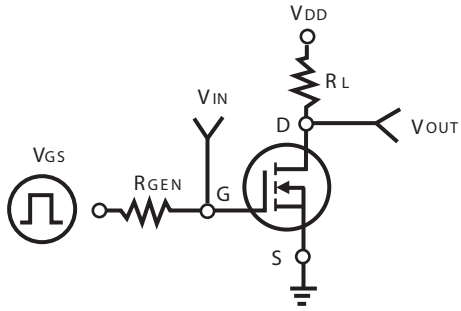


Figure 11. Switching Test Circuit

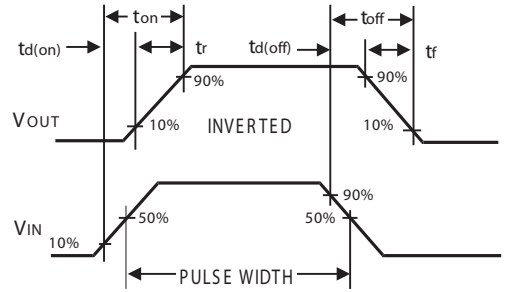
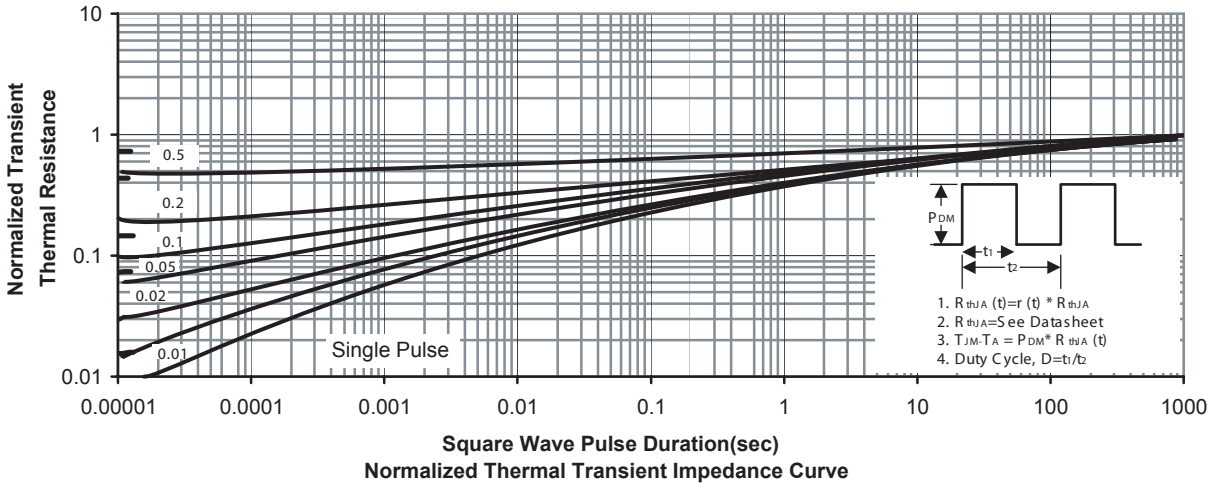


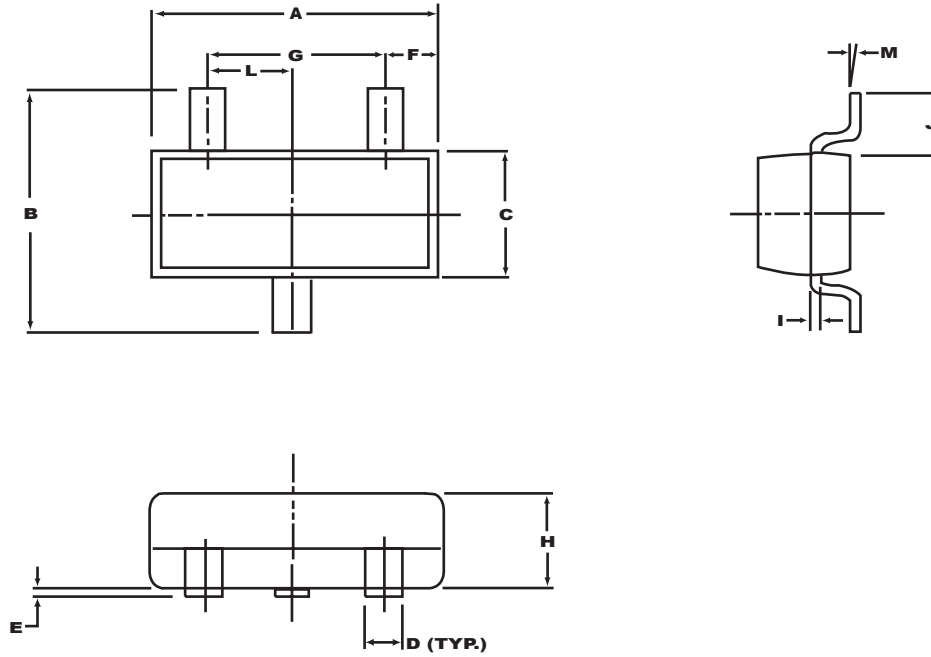
Figure 12. Switching Waveforms



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PACKAGE OUTLINE DIMENSIONS

SOT-23

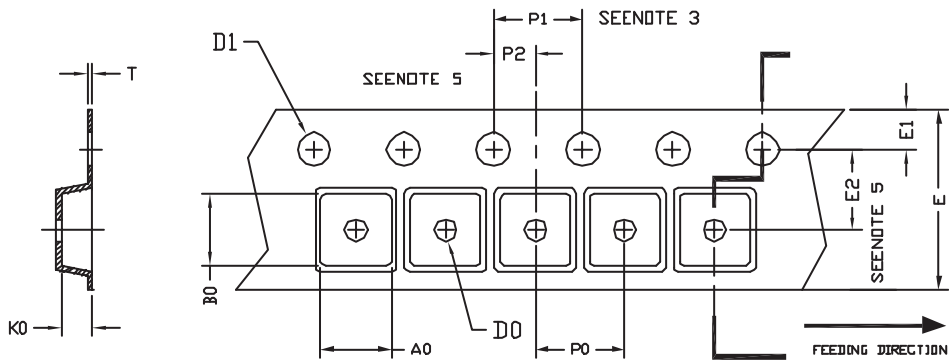


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.70	3.10	0.106	0.122
B	2.40	2.80	0.094	0.110
C	1.40	1.60	0.055	0.063
D	0.35	0.50	0.014	0.020
E	0	0.10	0	0.004
F	0.45	0.55	0.018	0.022
G	1.90 REF.		0.075 REF.	
H	1.00	1.30	0.039	0.051
I	0.10	0.20	0.004	0.008
J	0.40	-	0.016	-
L	0.45	1.15	0.033	0.045
M	0°	10°	0°	10°

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SOT-23 Tape and Reel Data

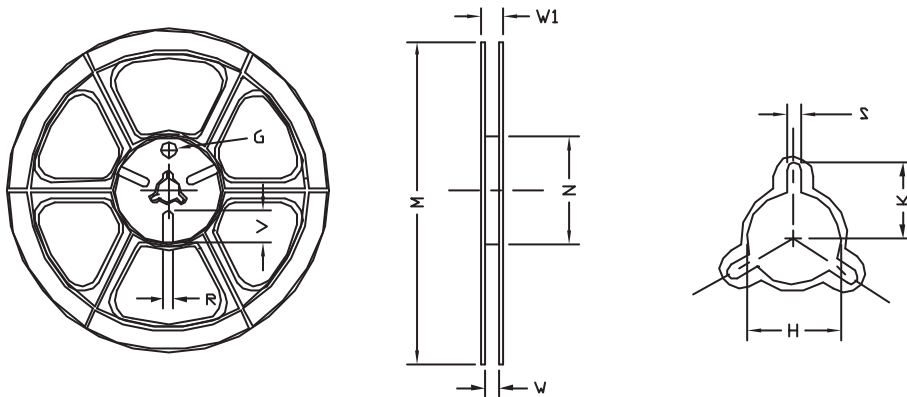
SOT-23 Carrier Tape



UNIT:mm

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	\varnothing 1.00 $+0.25$	\varnothing 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

SOT-23 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
8mm	\varnothing 178	\varnothing 178 ± 1	\varnothing 60 ± 1	9.00 ± 0.5	12.00 ± 0.5	\varnothing 13.5 ± 0.5	10.5	2.00 ± 0.5	\varnothing 10.0	5.00	18.00