



SamHop Microelectronics Corp.

STS3402

AUG.18 2004

N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
30V	4.6A	30@ V _{GS} = 10V 42@ 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}	30	V
Gate-Source Voltage	V _{GS}	± 20	V
Drain Current-Continuous ^a @ T _J =125°C -Pulsed ^b	I _D	4.6	A
	I _{DM}	16	A
Drain-Source Diode Forward Current ^a	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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STS 3402

ELECTRICAL CHARACTERISTICS (TA = 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 = 250µA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24V, V _{GS} = 0V		1		uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ± 20V, V _{DS} = 0V		±100		nA
ON CHARACTERISTICS^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250µA	1	1.5	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 4.6A		26	30	m-ohm
		V _{GS} = 4.5V, I _D = 4.0A		38	42	m-ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = 5V, V _{GS} = 4.5V	10			A
Forward Transconductance	g _{Fs}	V _{DS} = 5V, I _D = 4.6A		5		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C _{ISS}	V _{DS} = 15V, V _{GS} = 0V f = 1.0MHz		782		pF
Output Capacitance	C _{OSS}			135		pF
Reverse Transfer Capacitance	C _{RSS}			93		pF
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 15V, I _D = 1A, V _{GS} = 10V, R _L = 15 ohm R _{GEN} = 6 ohm		4.8		ns
Rise Time	t _r			3.9		ns
Turn-Off Delay Time	t _{D(OFF)}			27.7		ns
Fall Time	t _f			5.5		ns
Total Gate Charge	Q _g	V _{DS} = 15V, I _D = 4.6A, V _{GS} = 10V		15.8		nC
Gate-Source Charge	Q _{gs}			2		nC
Gate-Drain Charge	Q _{gd}			3		nC

STS 3402

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

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS ^b						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 1.25A$		0.78	1.2	V

Notes

- a. Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.
- b. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- c. Guaranteed by design, not subject to production testing.

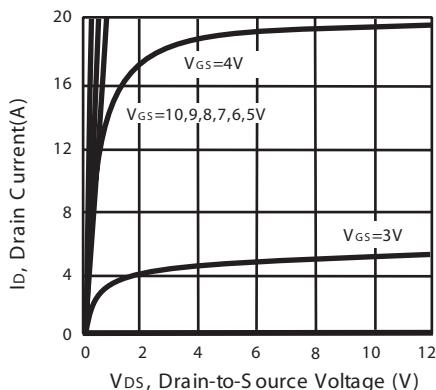


Figure 1. Output Characteristics

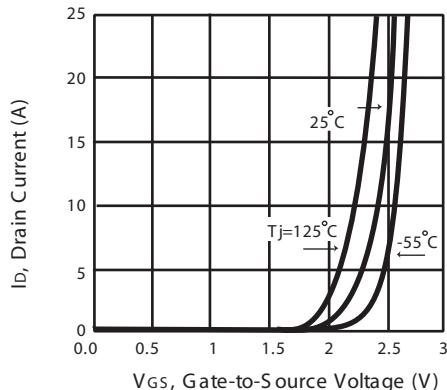


Figure 2. Transfer Characteristics

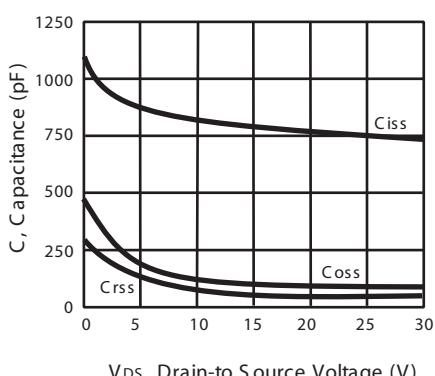


Figure 3. Capacitance

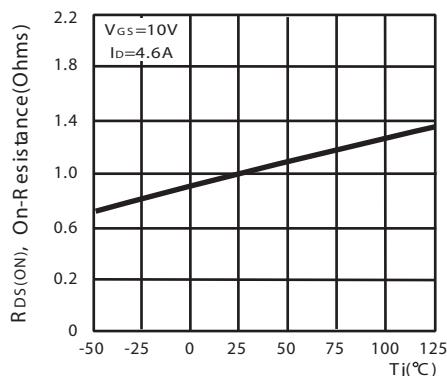
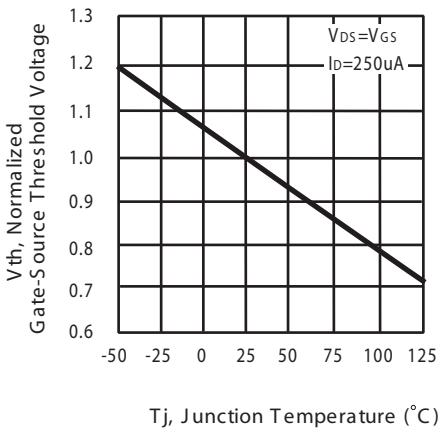
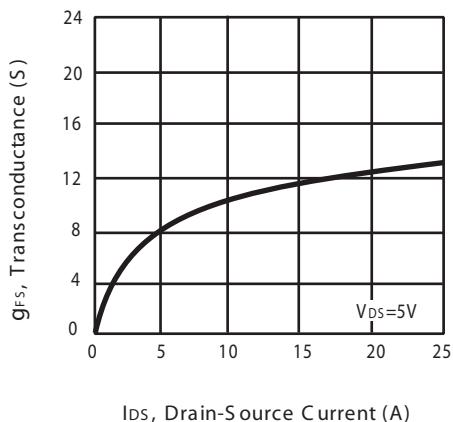


Figure 4. On-Resistance Variation with Temperature

STS 3402



with Temperature



I_{DS} , Drain-Source Current (A)

Figure 7. Transconductance Variation with Drain Current

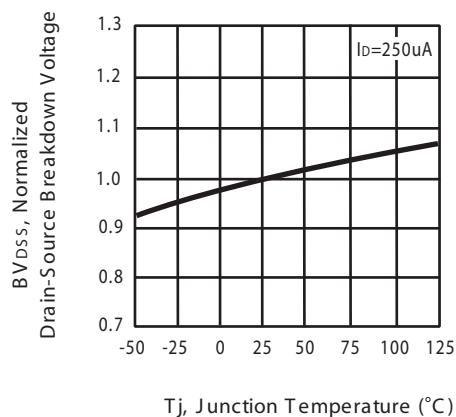
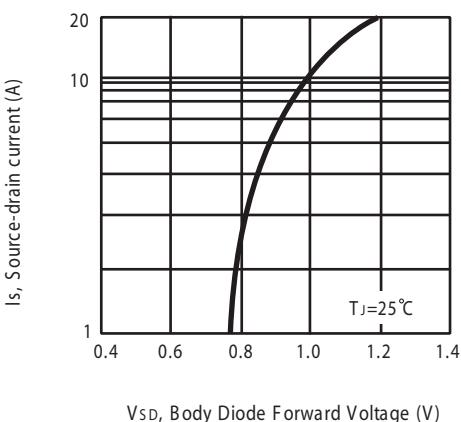
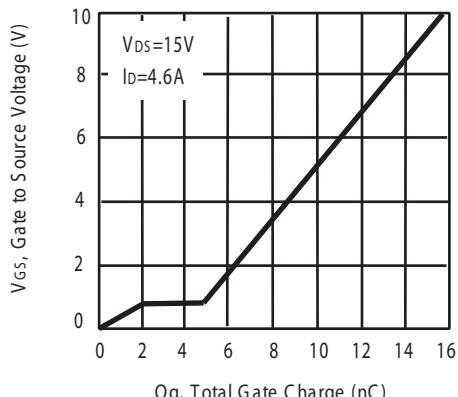


Figure 6. Breakdown Voltage Variation with Temperature



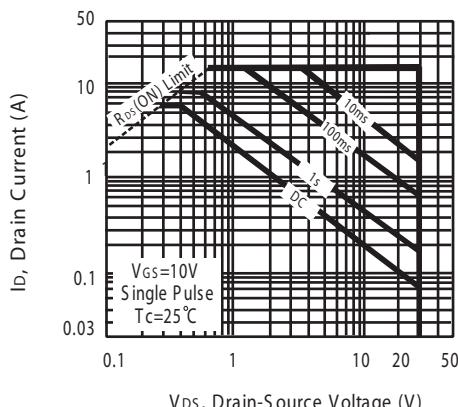
V_{SD} , Body Diode Forward Voltage (V)

Figure 8. Body Diode Forward Voltage Variation with Source Current



Q_g , Total Gate Charge (nC)

Figure 9. Gate Charge



V_{DS} , Drain-Source Voltage (V)

Figure 10. Maximum Safe Operating Area

STS3402

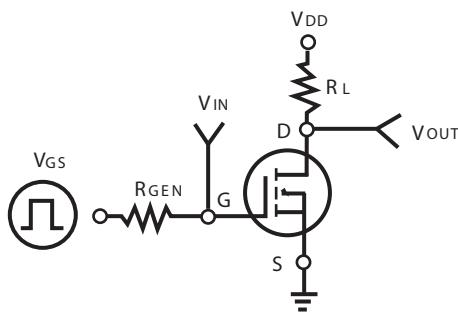


Figure 11. Switching Test Circuit

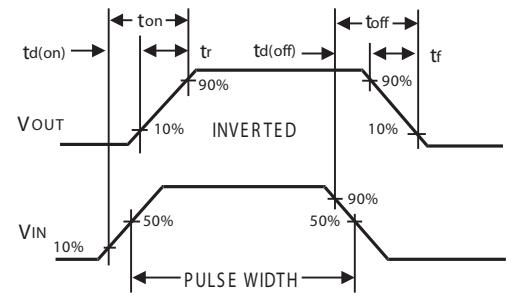
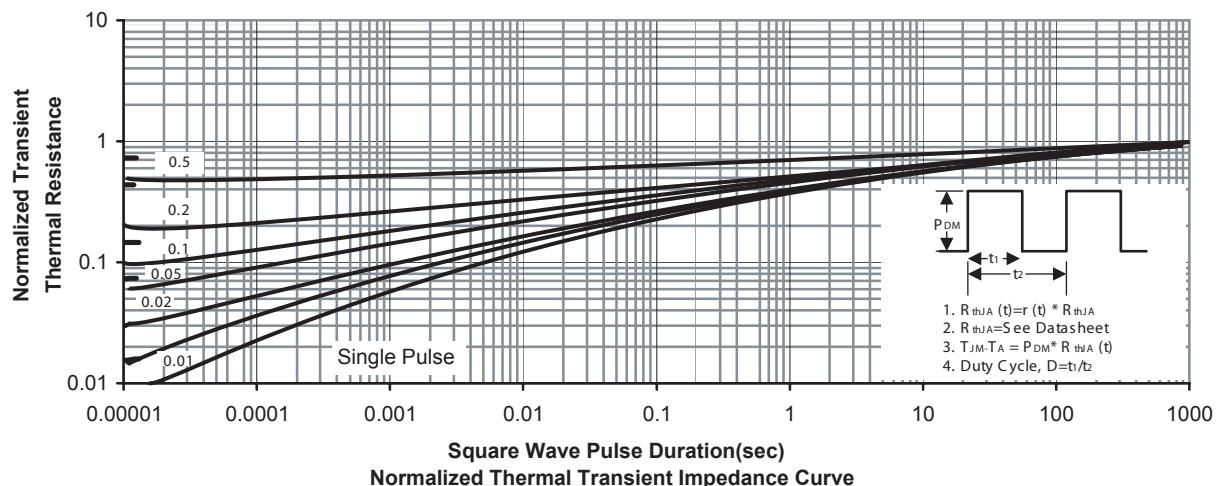


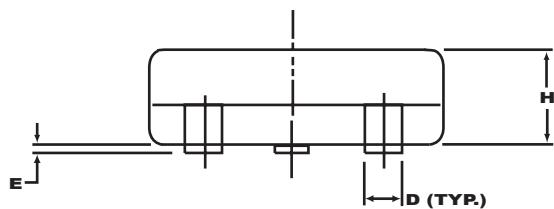
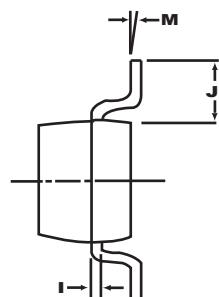
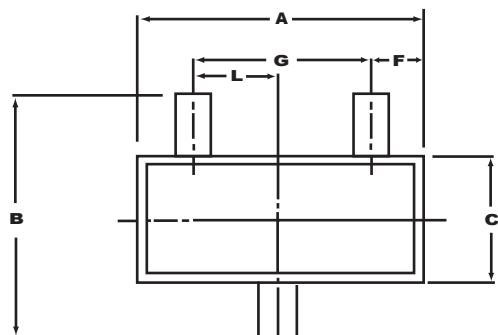
Figure 12. Switching Waveforms



STS 3402

PACKAGE OUTLINE DIMENSIONS

SOT-23

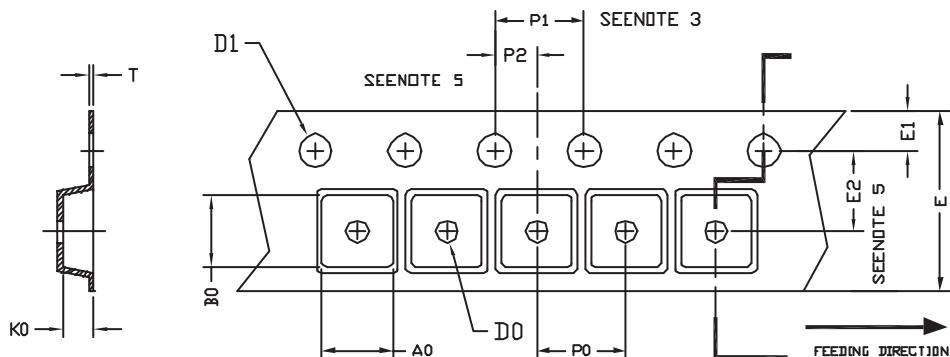


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.70	3.10	0.106	0.122
B	2.40	2.80	0.094	0.110
C	1.40	1.60	0.055	0.063
D	0.35	0.50	0.014	0.020
E	0	0.10	0	0.004
F	0.45	0.55	0.018	0.022
G	1.90 REF.		0.075 REF.	
H	1.00	1.30	0.039	0.051
I	0.10	0.20	0.004	0.008
J	0.40	-	0.016	-
L	0.45	1.15	0.033	0.045
M	0°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

STS 3402

SOT-23 Tape and Reel Data

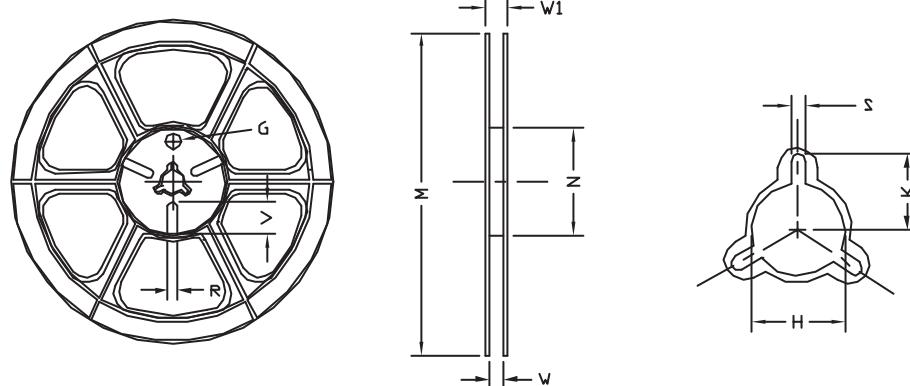
SOT-23 Carrier Tape



UNIT:mm

PACKAGE	A_0	B_0	K_0	D_0	D_1	E	E_1	E_2	P_0	P_1	P_2	T
SOT-23	3.20 ± 0.10	3.00 ± 0.10	1.33 ± 0.10	$\frac{1}{2} 1.00$ $+0.25$	$\frac{1}{2} 1.50$ $+0.10$	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	W_1	H	K	S	G	R	V
8mm	$\frac{1}{2} 178$ ± 1	$\frac{1}{2} 178$ ± 1	$\frac{1}{2} 60$ ± 1	9.00 ± 0.5	12.00 ± 0.5	$\frac{1}{2} 13.5$ ± 0.5	10.5	2.00 ± 0.5	$\frac{1}{2} 10.0$	5.00	18.00