



STM4550

SamHop Microelectronics Corp.

Apr. 19. 2006

N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V _{DS}	I _D	R _{DS(ON)} (mΩ) Max
55V	5 A	50 @ V _{GS} = 10V
		70 @ V _{GS} = 4.5V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- Surface Mount Package.



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage Rating	V _{spike} ^d	60	V
Drain-Source Voltage	V _{DS}	55	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous @ T _J =25°C -Pulsed ^a	I _D	5	A
	I _{DM}	20	A
Drain-Source Diode Forward Current ^b	I _S	1.7	A
Maximum Power Dissipation ^b	P _D	2.5	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R _{θJA}	50	°C/W
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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 =250uA	55			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =44V, V _{GS} =0V			1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ± 20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS ^a						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = 250uA	1	1.8	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D = 5A		40	50	m ohm
		V _{GS} =4.5V, I _D = 3A		50	70	m ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = 10V, V _{GS} = 10V	20			A
Forward Transconductance	g _{FS}	V _{DS} = 10V, I _D =5A		22		S
DYNAMIC CHARACTERISTICS ^b						
Input Capacitance	C _{ISS}	V _{DS} =20V, V _{GS} = 0V f=1.0MHz		689		pF
Output Capacitance	C _{OSS}			92		pF
Reverse Transfer Capacitance	C _{RSS}			55		pF
SWITCHING CHARACTERISTICS ^b						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 30V I _D = 1A V _{GS} = 10V R _{GEN} = 6 ohm		11		ns
Rise Time	t _r			10.9		ns
Turn-Off Delay Time	t _{D(OFF)}			23		ns
Fall Time	t _f			5		ns
Total Gate Charge	Q _g	V _{DS} =15V, I _D = 5A, V _{GS} =10V		13.3		nC
		V _{DS} =15V, I _D = 5A, V _{GS} =4.5V		6.2		nC
Gate-Source Charge	Q _{gs}	V _{DS} =15V, I _D = 5A		1.7		nC
Gate-Drain Charge	Q _{gd}	V _{GS} =10V		2.8		nC

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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}	$V_{GS} = 0V, I_s = 1.7A$		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.
- d. Guaranteed when external $R_g = 6\ \text{ohm}$ and $t_f < t_f \text{ max}$.

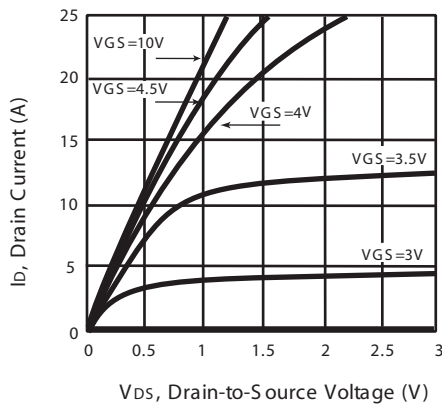


Figure 1. Output Characteristics

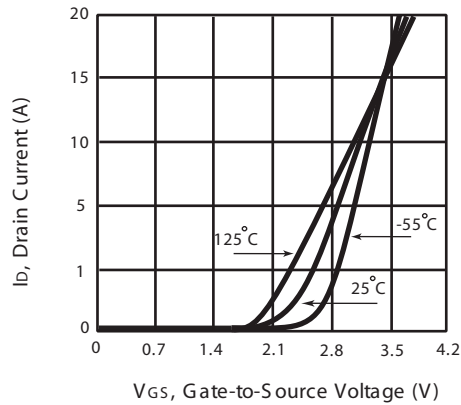


Figure 2. Transfer Characteristics

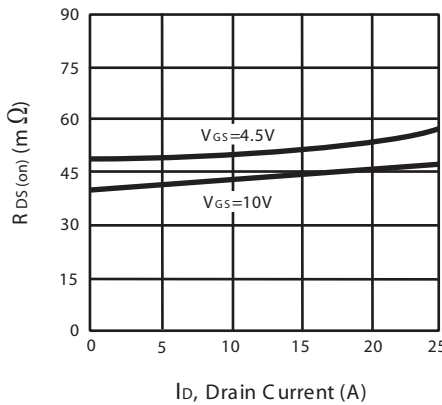


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

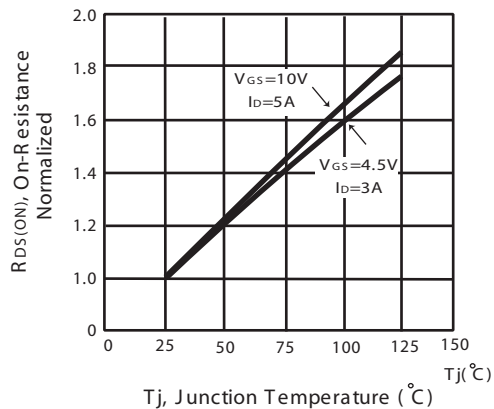
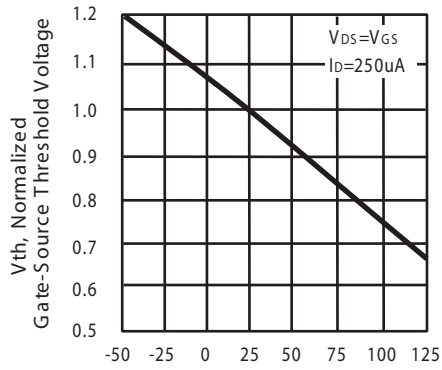


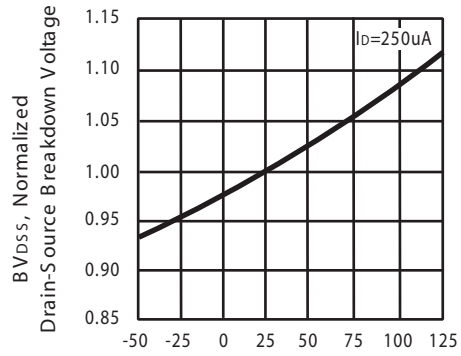
Figure 4. On-Resistance Variation with Drain Current and Temperature

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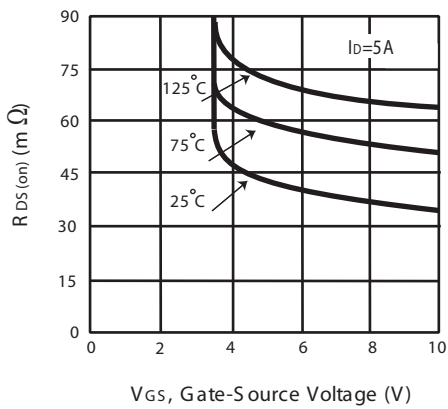
Tj, Junction Temperature (°C)

Figure 5. Gate Threshold Variation with Temperature



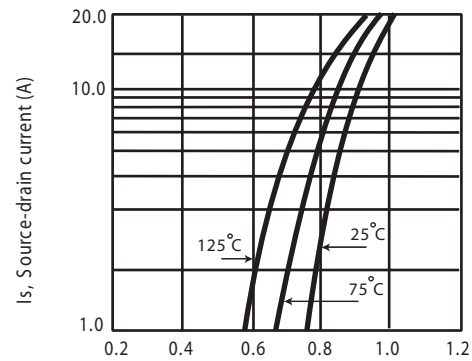
Tj, Junction Temperature (°C)

Figure 6. Breakdown Voltage Variation with Temperature



VGS, Gate-Source Voltage (V)

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



VSD, Body Diode Forward Voltage (V)

Figure 8. Body Diode Forward Voltage Variation with Source Current

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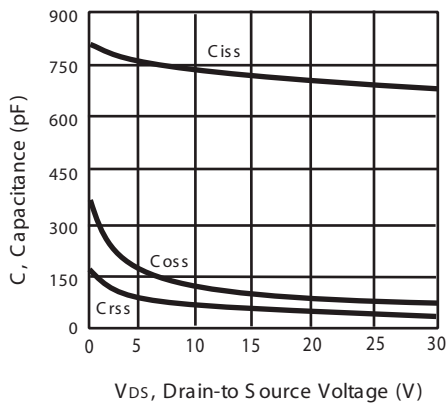


Figure 9. Capacitance

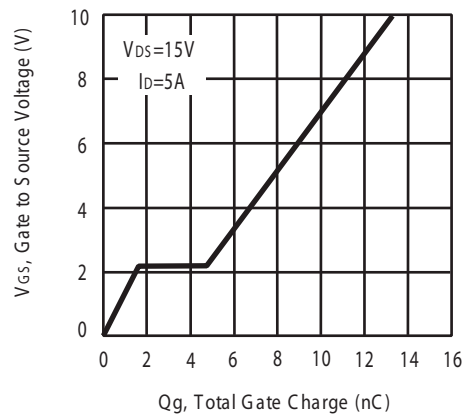


Figure 10. Gate Charge

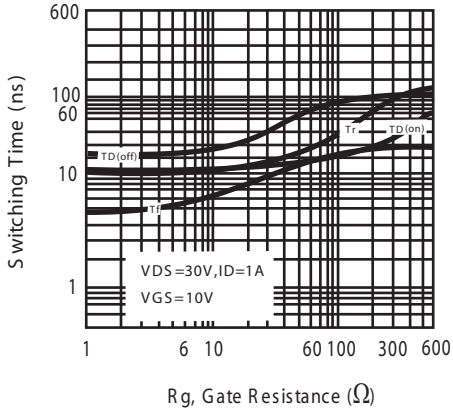


Figure 11. switching characteristics

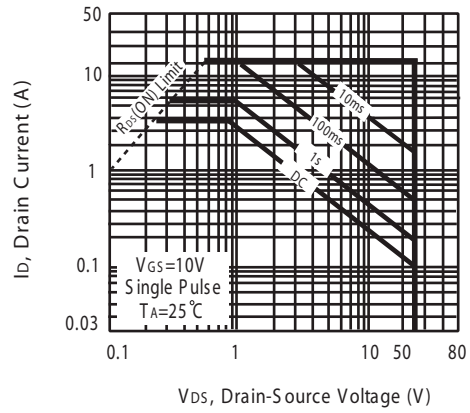


Figure 12. Maximum Safe Operating Area

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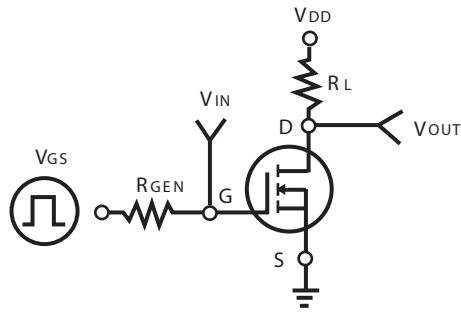


Figure 13. S Switching Test Circuit

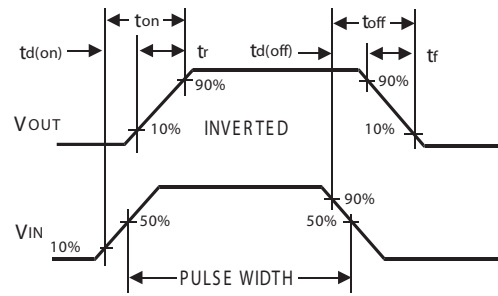


Figure 14. Switching Waveforms

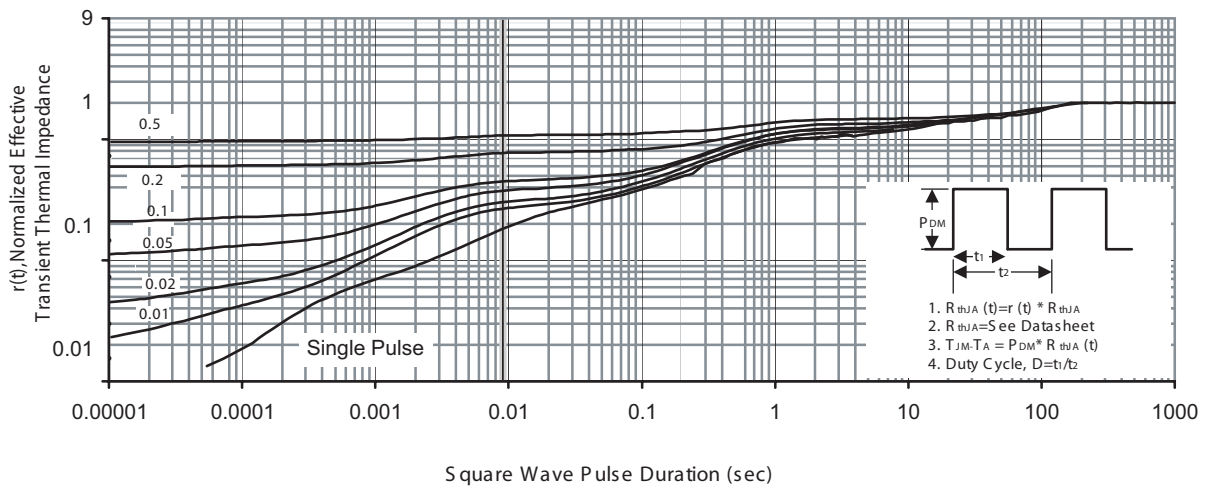
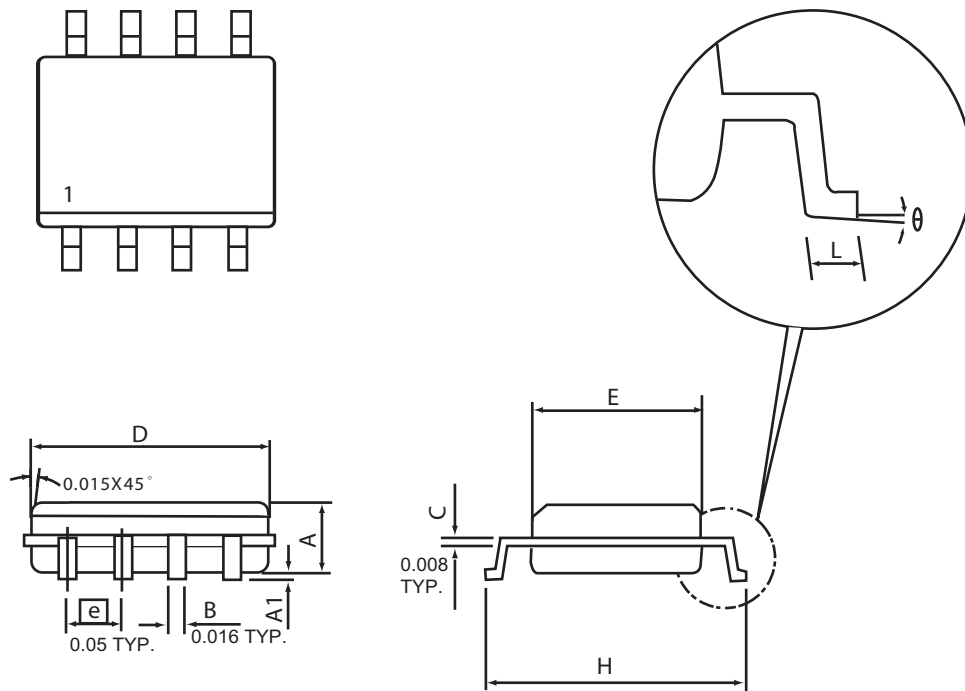


Figure 15. Normalized Thermal Transient Impedance Curve

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PACKAGE OUTLINE DIMENSIONS

SO-8

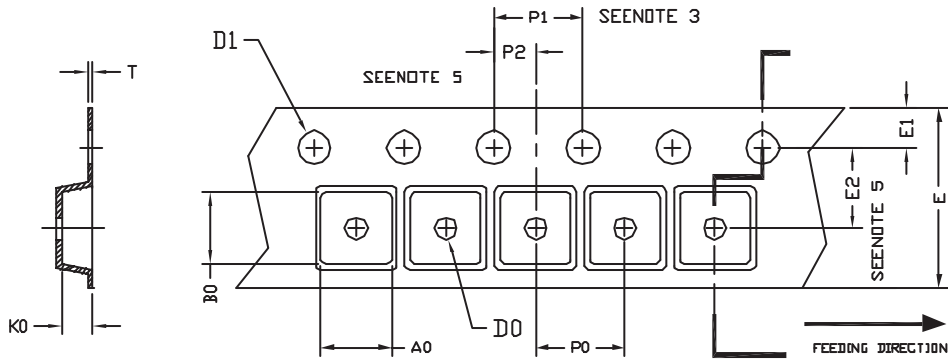


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

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SO-8 Tape and Reel Data

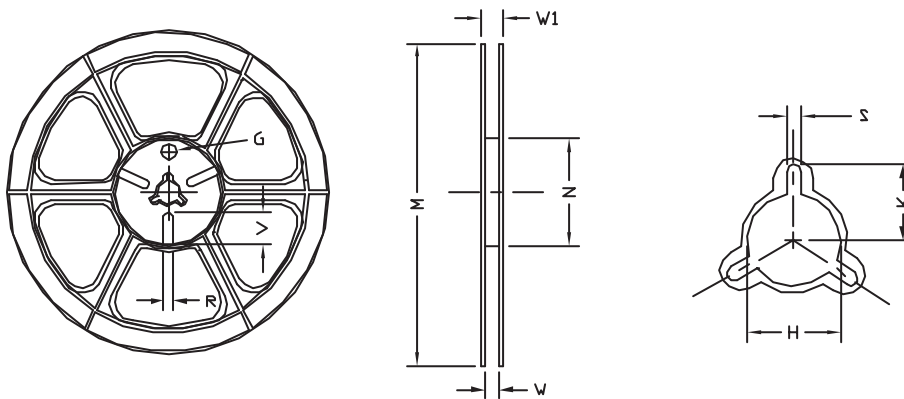
SO-8 Carrier Tape



unit:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N 150mil	6.40	5.20	2.10	$\phi 1.5$ (MIN)	$\phi 1.5$ + 0.1 - 0.0	12.0 ± 0.3	1.75	5.5 ± 0.05	8.0	4.0	2.0 ± 0.05	0.3 ± 0.05

SO-8 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	$\phi 330$	330 ± 1	62 ± 1.5	12.4 + 0.2	16.8 - 0.4	$\phi 12.75$ + 0.15	---	2.0 ± 0.15	---	---	---