



SamHop Microelectronics Corp.

# STM8020

Mar. 30 2007

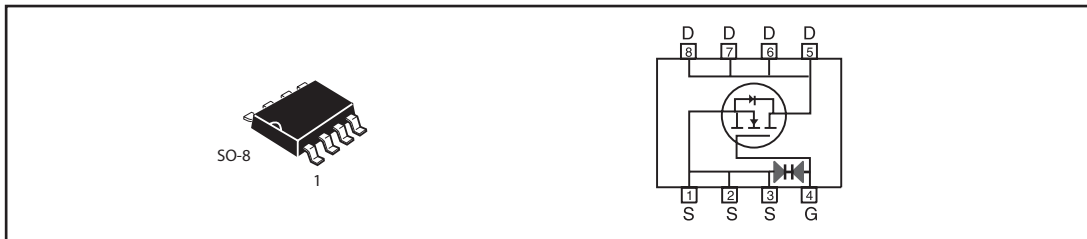
## N-Channel Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Max
35V	12A	9 @ V <sub>GS</sub> = 10V
		13 @ V <sub>GS</sub> = 4.5V

### FEATURES

- Super high dense cell design for low R<sub>DS(ON)</sub>.
- Rugged and reliable.
- Surface Mount Package.
- ESD Protected.



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V <sub>DS</sub>	35	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Drain Current-Continuous <sup>a</sup> @ T <sub>a</sub>	25°C	I <sub>D</sub>	12	A
	70°C		9.6	A
-Pulsed <sup>b</sup>		I <sub>DM</sub>	48	A
Drain-Source Diode Forward Current <sup>a</sup>		I <sub>S</sub>	1.7	A
Maximum Power Dissipation <sup>a</sup>	T <sub>a</sub> =25°C	P <sub>D</sub>	2.5	W
	T <sub>a</sub> =70°C		1.6	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient <sup>a</sup>	R <sub>θJA</sub>	50	°C/W
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ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	35			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 28V, V <sub>GS</sub> = 0V			1	uA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±10	uA
<b>ON CHARACTERISTICS<sup>b</sup></b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	1	1.4	3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A		7.2	9	m ohm
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A		9.5	13	m ohm
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 10V	20			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 10A		25		S
<b>DYNAMIC CHARACTERISTICS<sup>c</sup></b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V f = 1.0MHz		1400		pF
Output Capacitance	C <sub>OSS</sub>			255		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			145		pF
<b>SWITCHING CHARACTERISTICS<sup>c</sup></b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> = 15V I <sub>D</sub> = 1A V <sub>GS</sub> = 10V R <sub>GEN</sub> = 6 ohm		19		ns
Rise Time	t			20		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			77		ns
Fall Time	t			40		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 10A, V <sub>GS</sub> = 10V		24		nC
		V <sub>DS</sub> = 15V, I <sub>D</sub> = 10A, V <sub>GS</sub> = 4.5V		11		nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 10A V <sub>GS</sub> = 10V		2.5		nC
Gate-Drain Charge	Q <sub>gd</sub>			5.5		nC

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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
<b>DRAIN-SOURCE DIODE CHARACTERISTICS<sup>b</sup></b>						
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.7A		0.73	1.2	V

### Notes

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

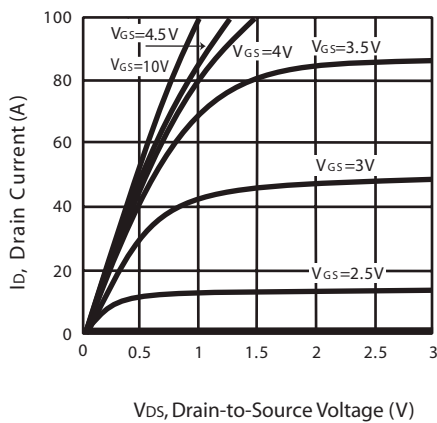


Figure 1. Output Characteristics

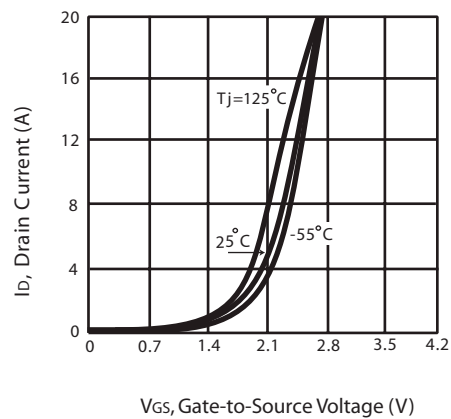


Figure 2. Transfer Characteristics

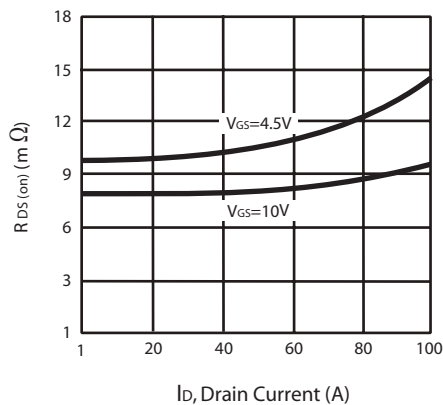


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

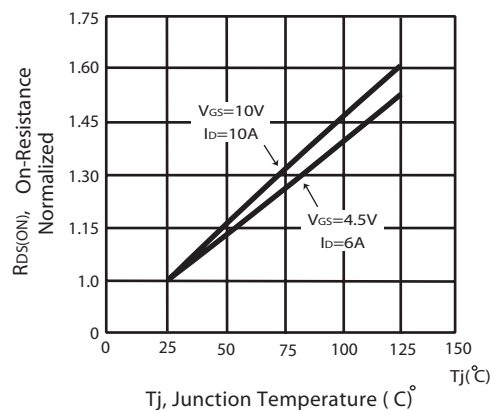


Figure 4. On-Resistance Variation with Drain Current and Temperature

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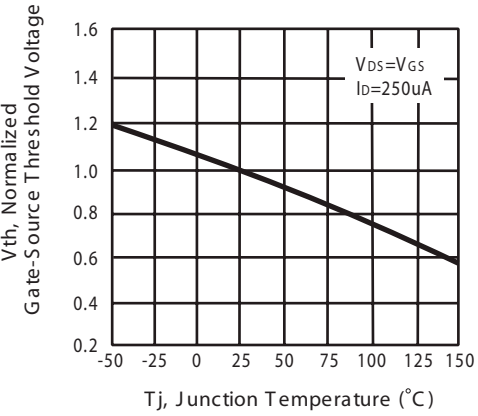


Figure 5. Gate Threshold Variation with Temperature

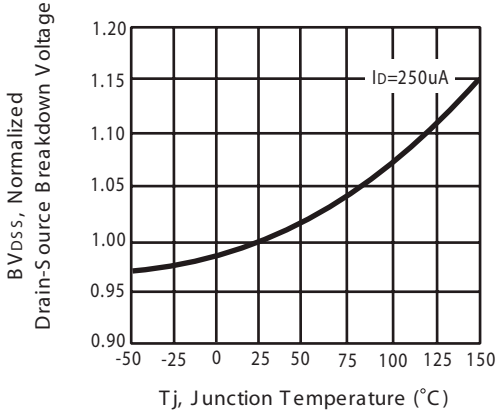


Figure 6. Breakdown Voltage Variation with Temperature

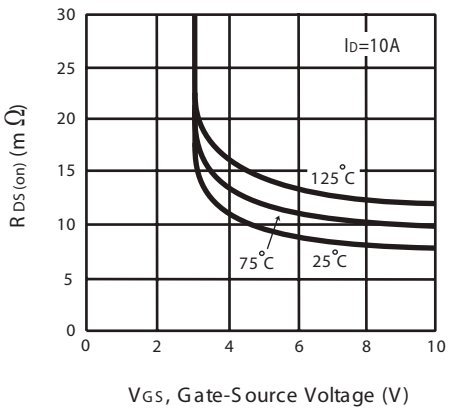


Figure 7. On-Resistance vs. Gate-Source Voltage

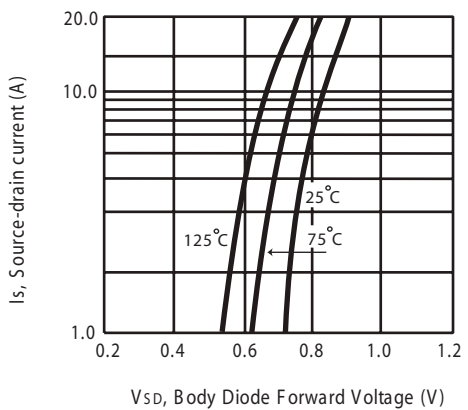


Figure 8. Body Diode Forward Voltage Variation with Source Current

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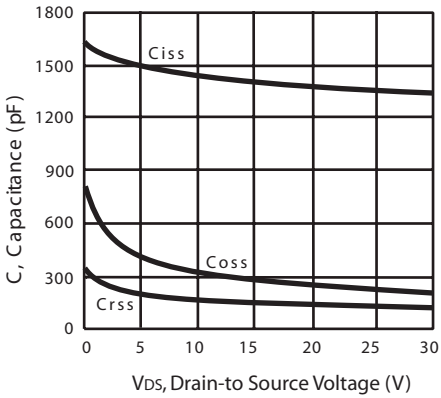


Figure 9. Capacitance

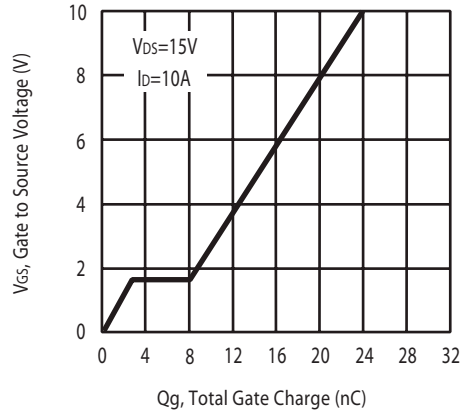


Figure 10. Gate Charge

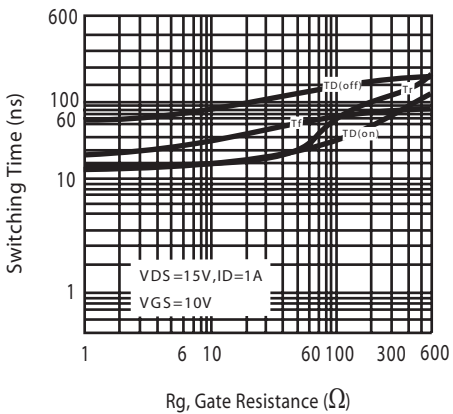


Figure 11. switching characteristics

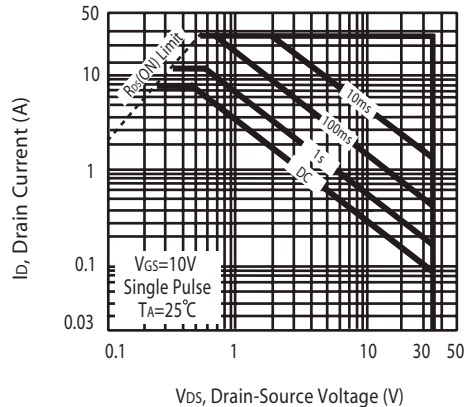
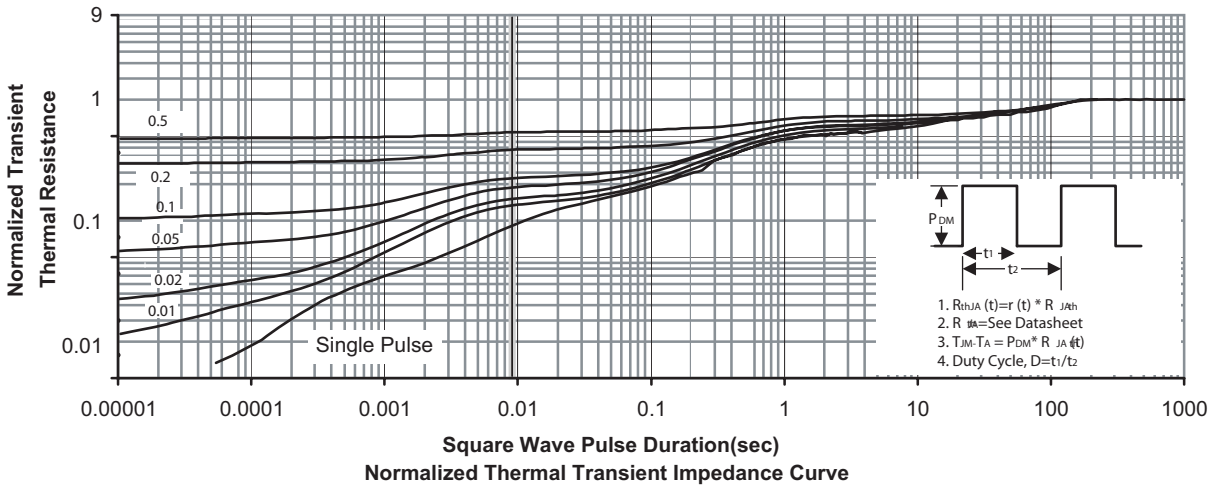


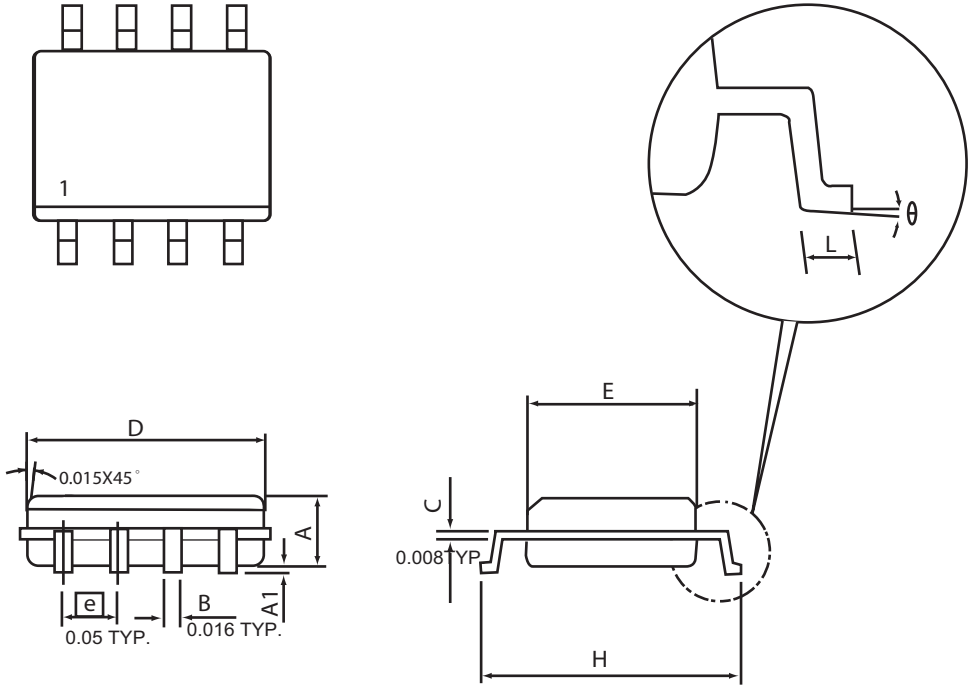
Figure 12. Maximum Safe Operating Area



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## PACKAGE OUTLINE DIMENSIONS

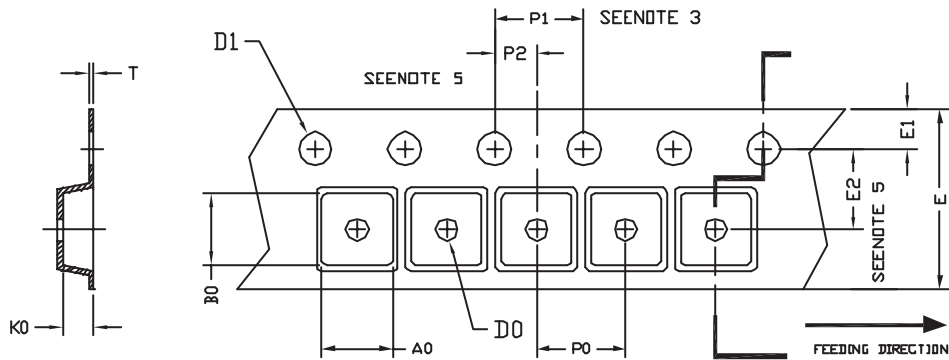
SO-8



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°

## SO-8 Tape and Reel Data

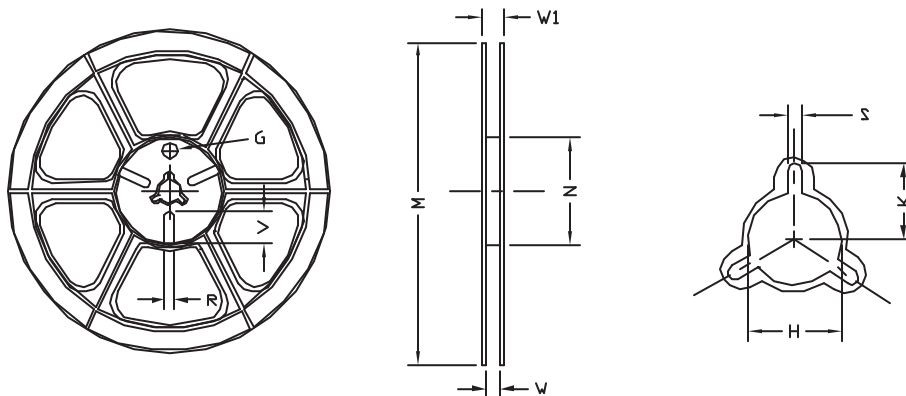
### SO-8 Carrier Tape



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 $\pm 0.3$	1.75	5.5 $\pm 0.05$	8.0	4.0	2.0 $\pm 0.05$	0.3 $\pm 0.05$

### SO-8 Reel



UNIT:mm

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