



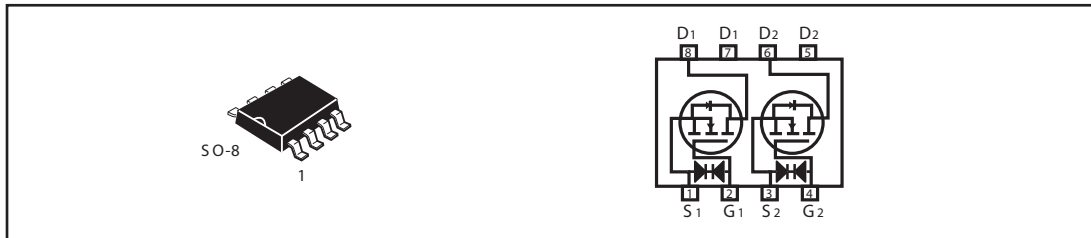
# STM6610

## Dual N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Max
30V	8.5A	19 @ V <sub>GS</sub> = 10V 28 @ 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	N-Channel	Unit
Drain-Source Voltage		V <sub>DS</sub>	30	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>	8.5	A
	70 °C		6.5	A
-Pulsed <sup>b</sup>		I <sub>DM</sub>	40	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	W
	T <sub>a</sub> = 70 °C		1.44	
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 θ <sub>JA</sub>	62.5	°C/W
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ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS<sup>b</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=8A$		15	19	m ohm
		$V_{GS}=4.5V, I_D=5A$		20	28	m ohm
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=15V, V_{GS}=10V$	20			A
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=8A$		15		S
<b>DYNAMIC CHARACTERISTICS<sup>c</sup></b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=15V, V_{GS}=0V$ $f=1.0\text{MHz}$		620		pF
Output Capacitance	$C_{OSS}$			180		pF
Reverse Transfer Capacitance	$C_{RSS}$			110		pF
<b>SWITCHING CHARACTERISTICS<sup>c</sup></b>						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=15V,$ $I_D=7A,$ $R_L=2.1\text{ ohm},$ $V_{GS}=10V,$ $R_{GEN}=6\text{ ohm}$		12		ns
Rise Time	$t_r$			15.5		ns
Turn-Off Delay Time	$t_{D(OFF)}$			42		ns
Fall Time	$t_f$			8		ns
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=8A, V_{GS}=10V$		12.5		nC
		$V_{DS}=15V, I_D=8A, V_{GS}=4.5V$		6.5		nC
Gate-Source Charge	$Q_{gs}$	$V_{DS}=15V, I_D=8A,$ $V_{GS}=10V$		1.4		nC
Gate-Drain Charge	$Q_{gd}$			3.5		nC

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

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS <sup>b</sup>						
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{V}, I_S = 1.7\text{A}$		0.8	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.

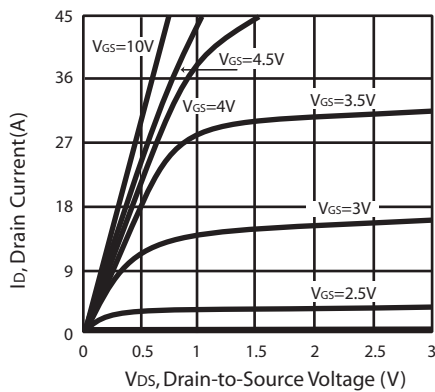


Figure 1. Output Characteristics

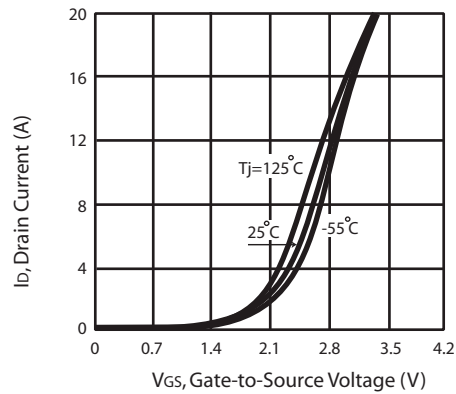


Figure 2. Transfer Characteristics

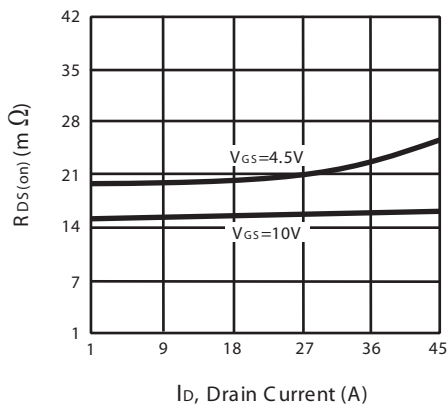


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

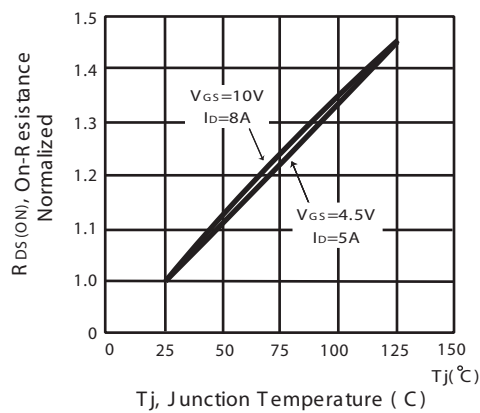


Figure 4. On-Resistance Variation with Drain Current and Temperature

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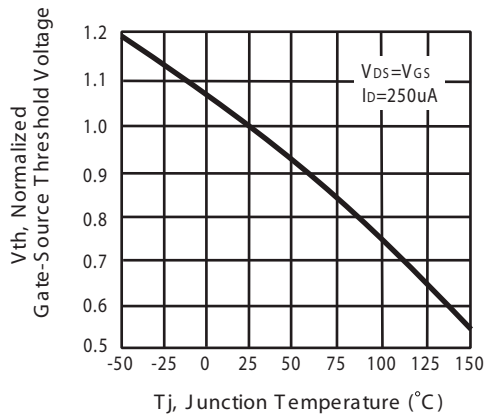


Figure 5. Gate Threshold Variation with Temperature

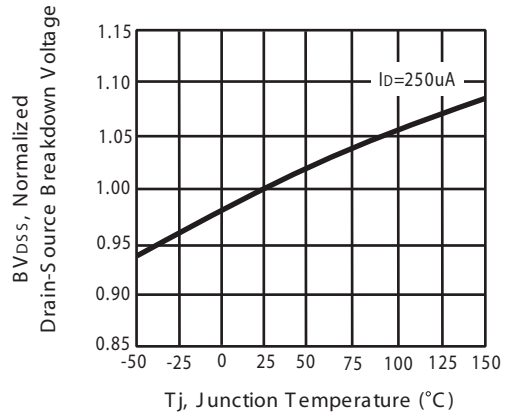


Figure 6. Breakdown Voltage Variation with Temperature

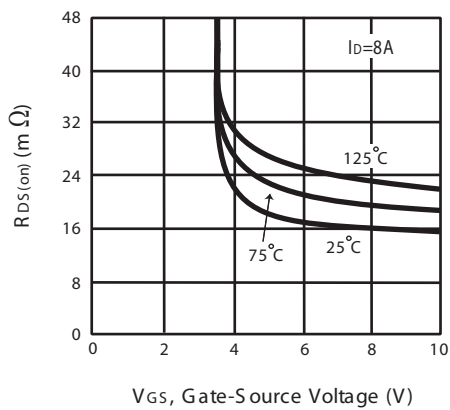


Figure 7. On-Resistance vs. Gate-Source Voltage

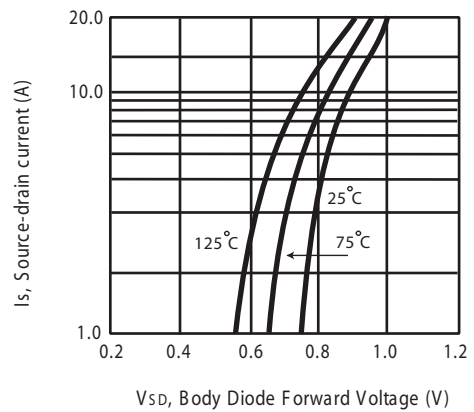


Figure 8. Body Diode Forward Voltage Variation with Source Current

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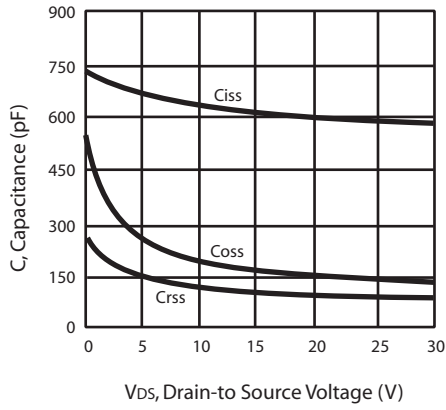


Figure 8. Capacitance

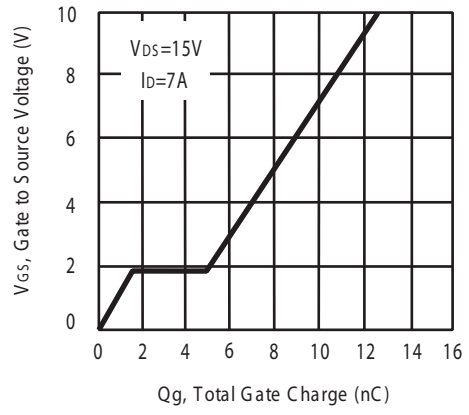


Figure 9. Gate Charge

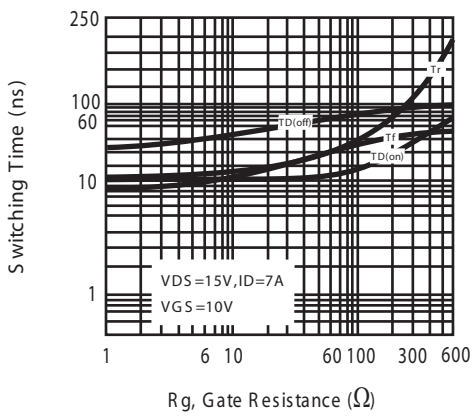


Figure 11. switching characteristics

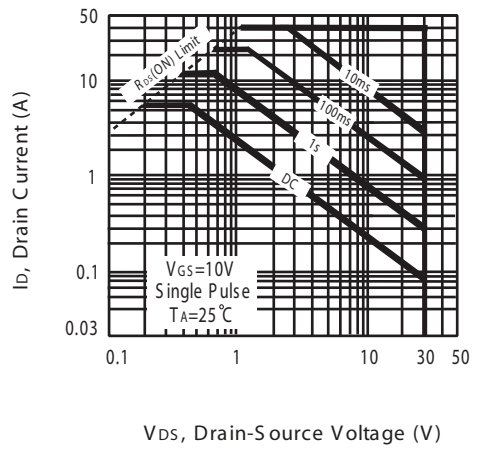
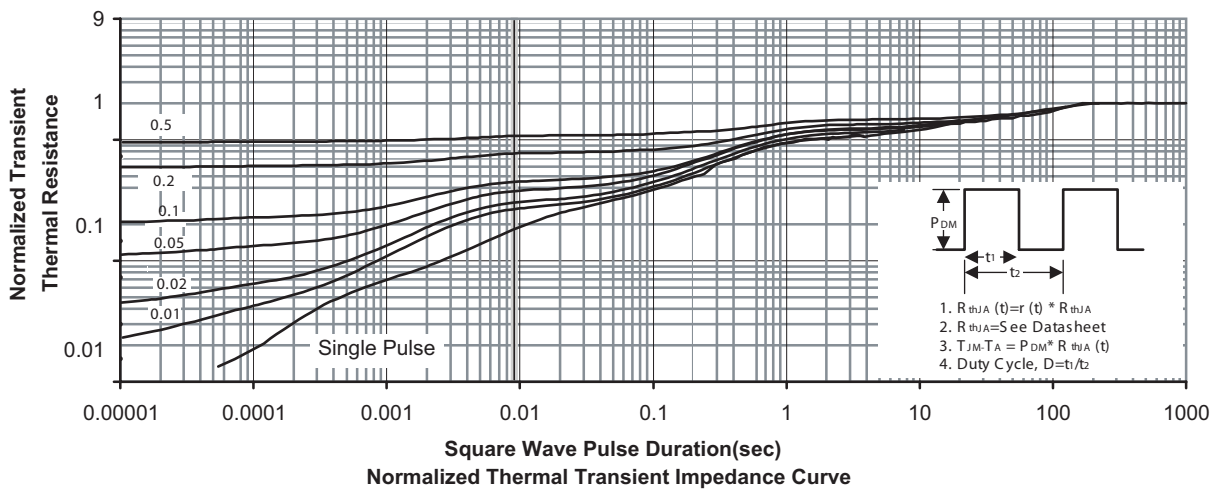


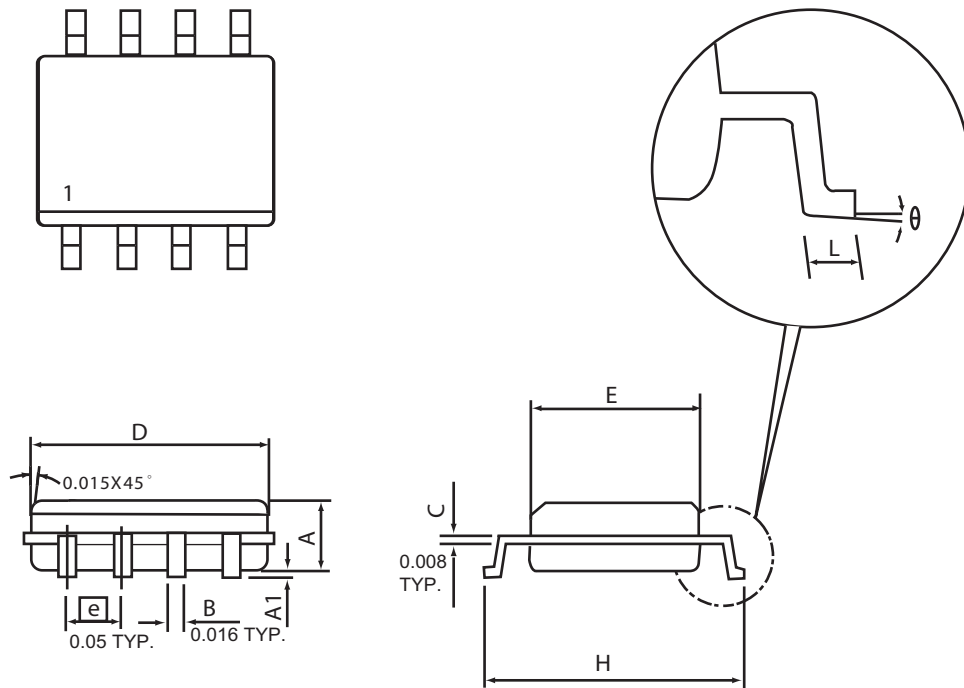
Figure 10. Maximum Safe Operating Area



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## PACKAGE OUTLINE DIMENSIONS

SO-8

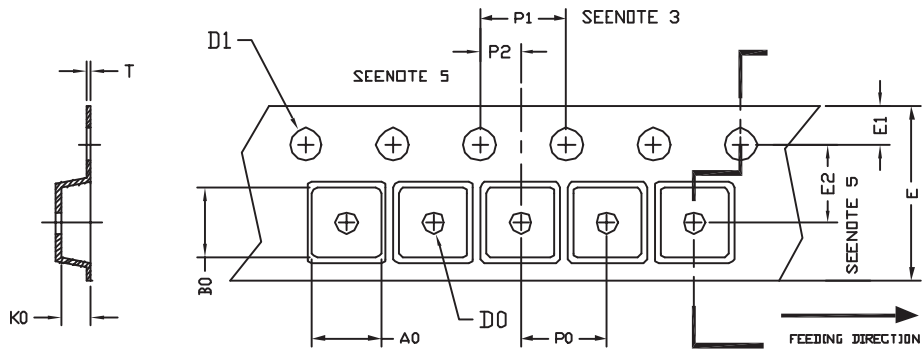


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
$\theta$	0°	8°	0°	8°

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## SO-8 Tape and Reel Data

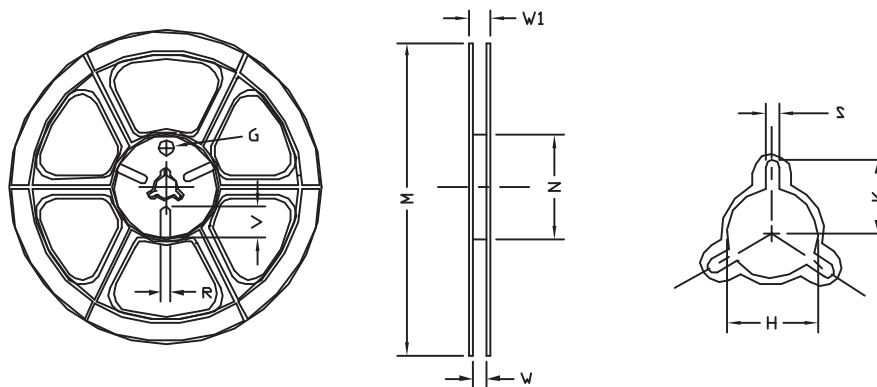
### SO-8 Carrier Tape



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 $\pm 0.3$	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 $\pm 0.15$	---	---	---