



## N-Channel Logic Level Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

VDSS	ID	RDS(ON) (mΩ) Max
60V	10A	12.5 @ VGS=10V
		16 @ VGS=4.5V

### FEATURES

- Super high dense cell design for low RDS(ON).
- Rugged and reliable.
- Surface Mount Package.



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

Symbol	Parameter	Limit	Units	
VDS	Drain-Source Voltage	60	V	
VGS	Gate-Source Voltage	±20	V	
ID	Drain Current-Continuous <sup>c</sup>	TC=25°C	10	A
		TC=70°C	8	A
IDM	-Pulsed <sup>a,c</sup>	50	A	
EAS	Single Pulse Avalanche Energy <sup>d</sup>	121	mJ	
PD	Maximum Power Dissipation	TC=25°C	2.5	W
		TC=70°C	1.6	W
TJ, TSTG	Operating Junction and Storage Temperature Range	-55 to 150	°C	

### THERMAL CHARACTERISTICS

RθJA	Thermal Resistance, Junction-to-Ambient	50	°C/W
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# STM6716

Ver 1.0

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V			1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±100	nA
<b>ON CHARACTERISTICS</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	1.6	3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =5A		10	12.5	m ohm
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.5A		12	16	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =5A		26		S
<b>DYNAMIC CHARACTERISTICS <sup>b</sup></b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V f=1.0MHz		2578		pF
C <sub>OSS</sub>	Output Capacitance			163		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			128		pF
<b>SWITCHING CHARACTERISTICS <sup>b</sup></b>						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V I <sub>D</sub> =1A V <sub>GS</sub> =10V R <sub>GEN</sub> = 6 ohm		39		ns
t <sub>r</sub>	Rise Time			30		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			77		ns
t <sub>f</sub>	Fall Time			32		ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =5A, V <sub>GS</sub> =10V		31.6		nC
		V <sub>DS</sub> =30V, I <sub>D</sub> =5A, V <sub>GS</sub> =4.5V		15		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =5A,		3.4		nC
Q <sub>gd</sub>	Gate-Drain Charge	V <sub>GS</sub> =10V		7.4		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =5A		0.77	1.3	V

### Notes

- Pulse Test: Pulse Width ≤ 10us, Duty Cycle ≤ 1%.
- Guaranteed by design, not subject to production testing.
- Drain current limited by maximum junction temperature.
- Starting T<sub>J</sub>=25°C, L=0.5mH, V<sub>DD</sub> = 30V. (See Figure13)
- Mounted on FR4 Board of 1 inch<sup>2</sup>, 2oz.

Dec,19,2014

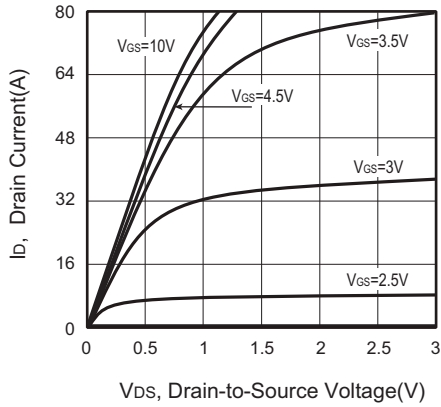


Figure 1. Output Characteristics

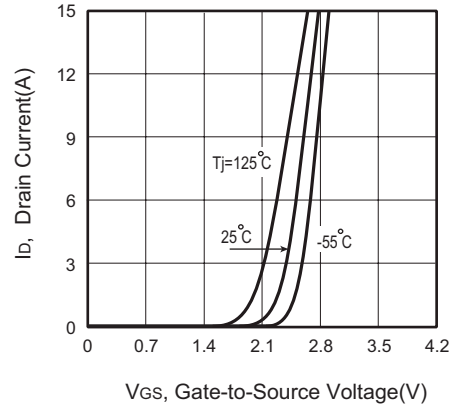


Figure 2. Transfer Characteristics

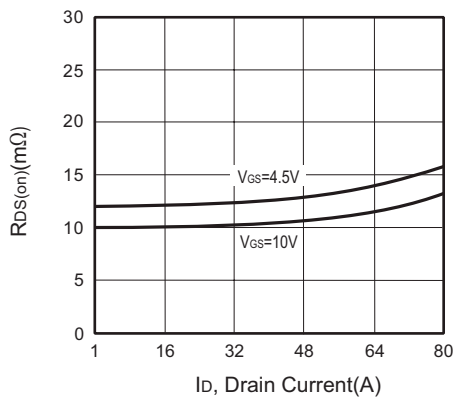


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

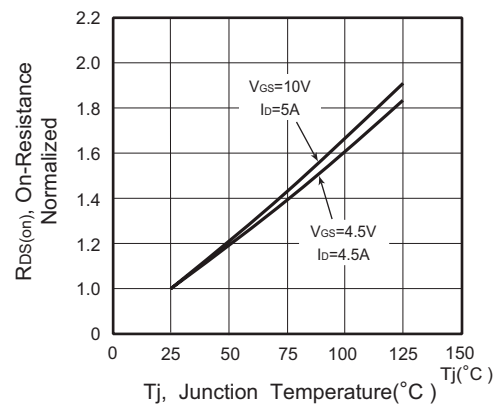


Figure 4. On-Resistance Variation with Drain Current and Temperature

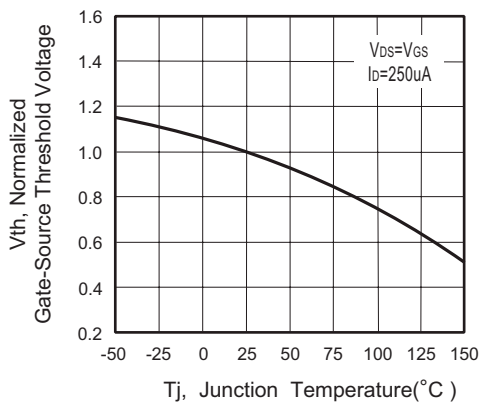


Figure 5. Gate Threshold Variation with Temperature

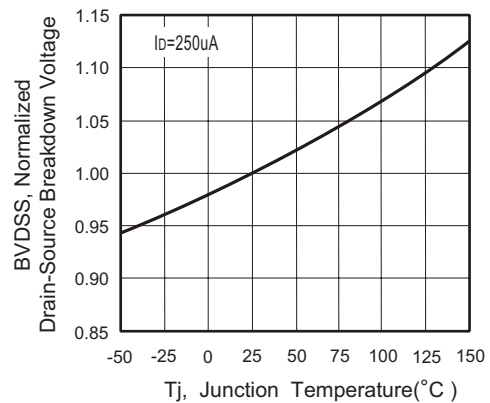


Figure 6. Breakdown Voltage Variation with Temperature

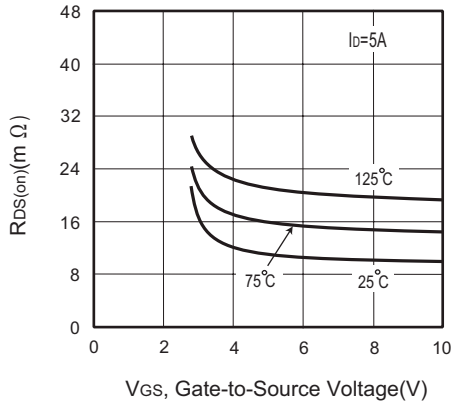


Figure 7. On-Resistance vs. Gate-Source Voltage

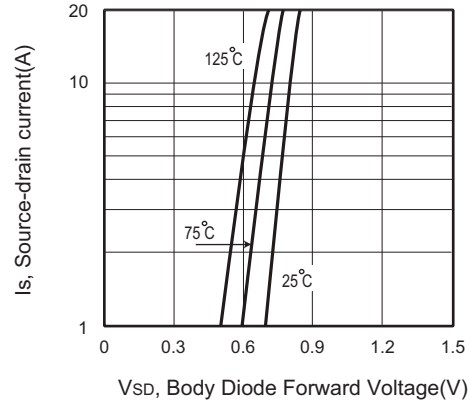


Figure 8. Body Diode Forward Voltage Variation with Source Current

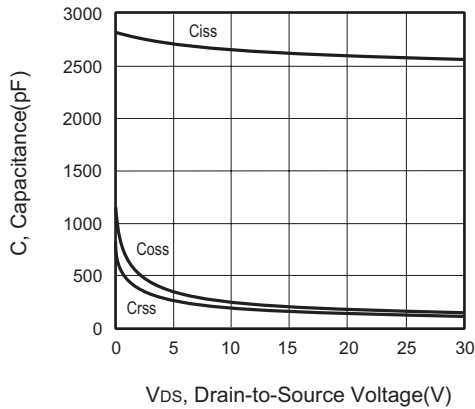


Figure 9. Capacitance

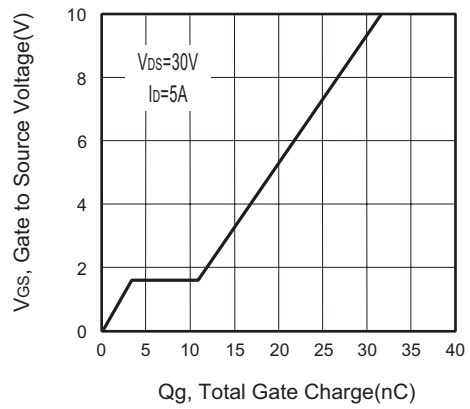


Figure 10. Gate Charge

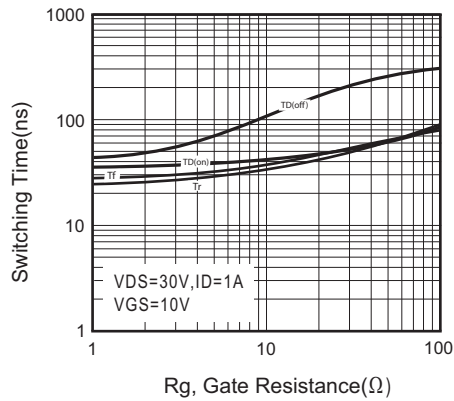


Figure 11. switching characteristics

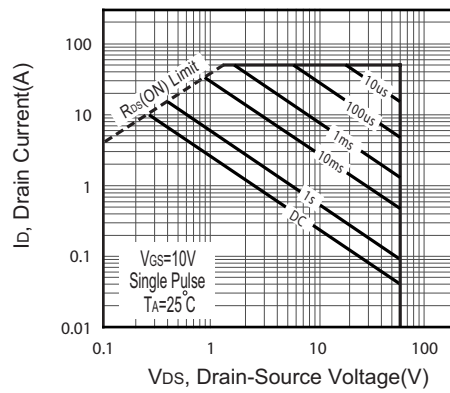
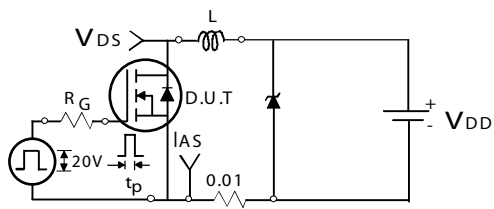
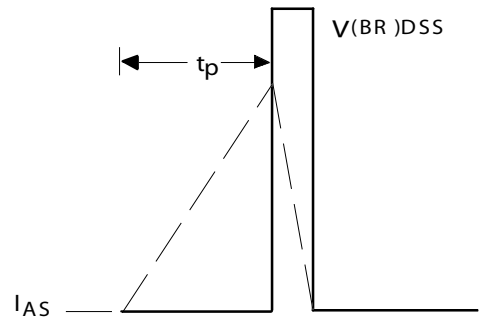


Figure 12. Maximum Safe Operating Area



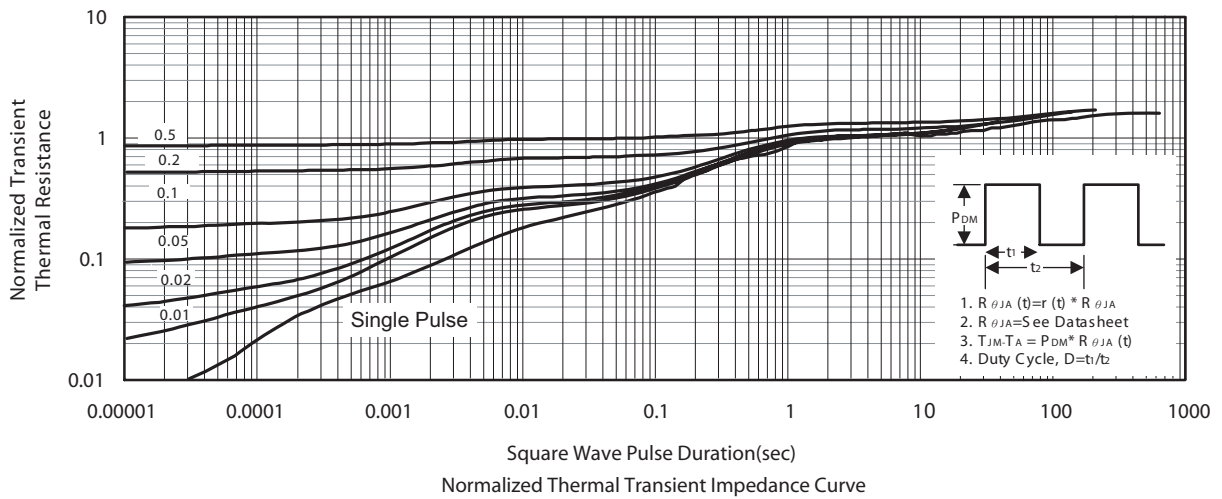
Unclamped Inductive Test Circuit

Figure 13a.



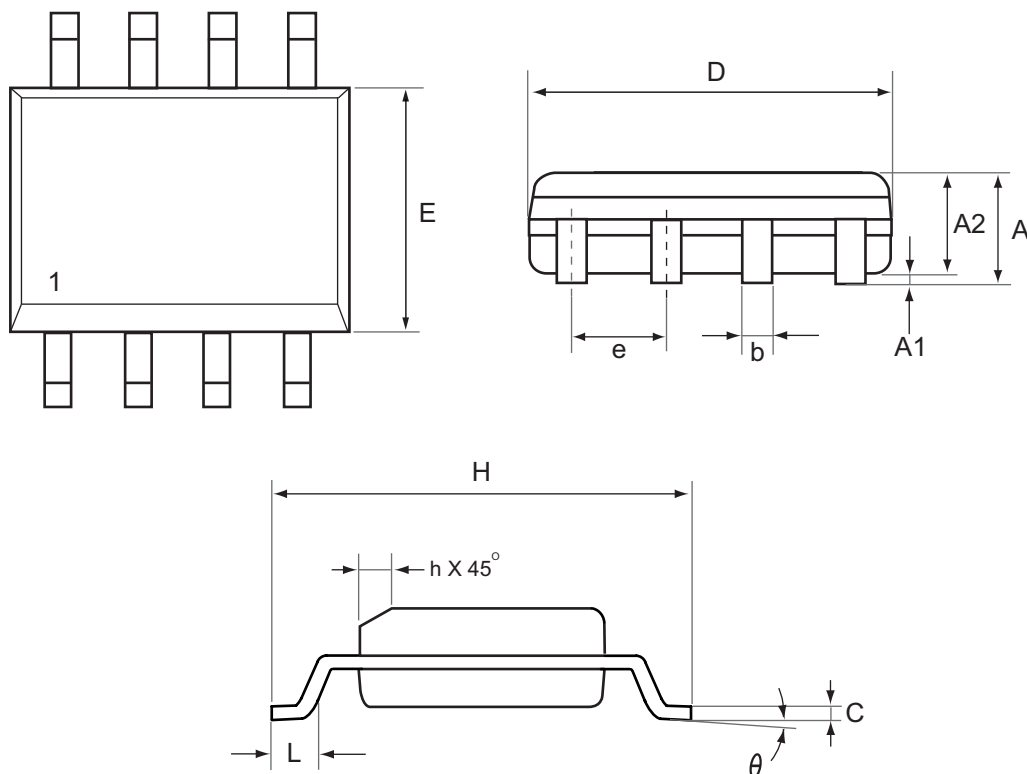
Unclamped Inductive Waveforms

Figure 13b.



## PACKAGE OUTLINE DIMENSIONS

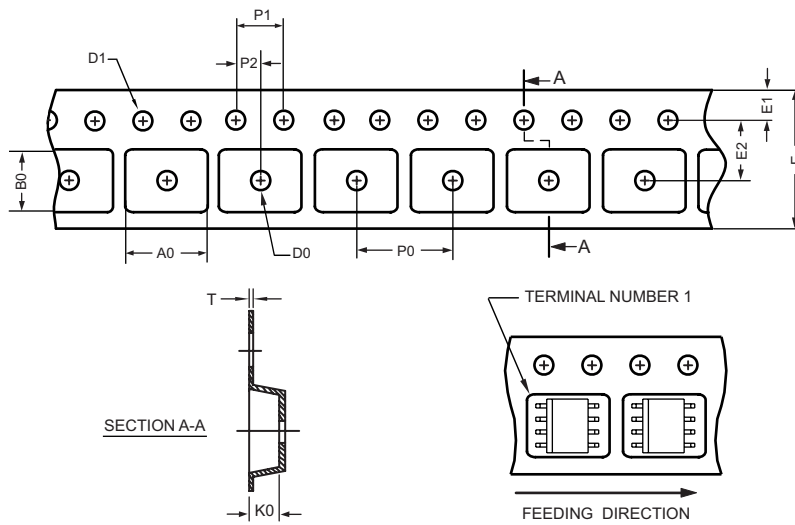
SO-8



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
A2	1.25	1.63	0.049	0.064
b	0.31	0.51	0.012	0.020
C	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	3.70	4.00	0.146	0.157
e	1.27 REF.		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°
h	0.25	0.50	0.010	0.020

## SO-8 Tape and Reel Data

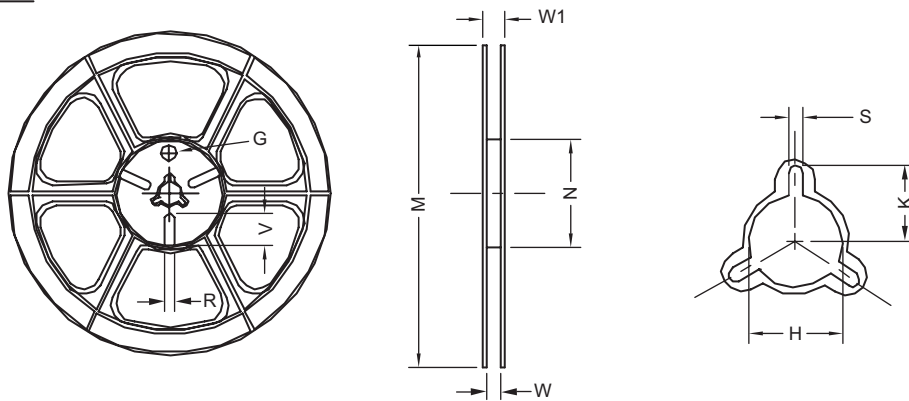
### SO-8 Carrier Tape



unit: mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N	6.50	5.25	2.10	φ.5	φ.55	12.0	1.75	5.5	8.0	4.0	2.0	0.30
150mil	±0.15	±0.10	±0.10	(MIN)	±0.10	+0.3 -0.1	±0.10	±0.10	±0.10	±0.10	±0.10	±0.013

### SO-8 Reel



UNIT: mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	φ30	330 ± 1	62 ±1.5	12.4 + 0.2	16.8 - 0.4	φ2.75 + 0.15	---	2.0 ±0.15	---	---	---

## TOP MARKING DEFINITION

