



SamHop Microelectronics Corp.

**STM8820**

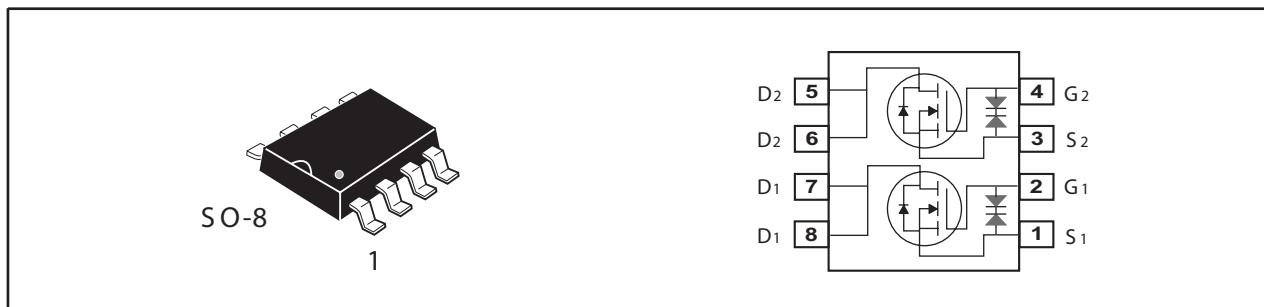
Ver 1.0

## Dual N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
VDSS	ID	RDS(ON) (mΩ) Max
80V	1.4A	587 @ VGS=10V
		756 @ VGS=4.5V

### FEATURES

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



### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Limit	Units
$V_{DS}$	Drain-Source Voltage	80	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current-Continuous <sup>a</sup>	$1.4$	A
		$1.1$	A
$I_{DM}$	-Pulsed <sup>b</sup>	5	A
$E_{AS}$	Single Pulse Avalanche Energy <sup>d</sup>	5.5	mJ
$P_D$	Maximum Power Dissipation <sup>a</sup>	2	W
		1.28	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient <sup>a</sup>	62.5	$^\circ\text{C/W}$
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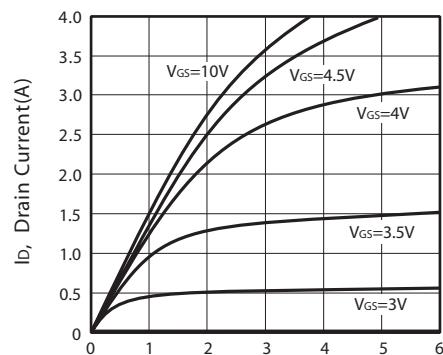
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## ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ C$ unless otherwise noted)

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	80			V
I <sub>DS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =64V , 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			±10	uA
<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	1.8	3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V , I <sub>D</sub> =0.7A		470	587	m ohm
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =0.65A		560	756	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V , I <sub>D</sub> =0.7A		1.5		S
<b>DYNAMIC CHARACTERISTICS</b> <sup>c</sup>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V,V <sub>GS</sub> =0V f=1.0MHz		140		pF
C <sub>oss</sub>	Output Capacitance			20		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			12		pF
<b>SWITCHING CHARACTERISTICS</b> <sup>c</sup>						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =40V I <sub>D</sub> =0.7A V <sub>GS</sub> =10V R <sub>GEN</sub> = 6 ohm		13.2		ns
t <sub>r</sub>	Rise Time			13		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			123		ns
t <sub>f</sub>	Fall Time			36		ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =40V,I <sub>D</sub> =0.7A,V <sub>GS</sub> =10V		2.7		nC
		V <sub>DS</sub> =40V,I <sub>D</sub> =0.7A,V <sub>GS</sub> =4.5V		1.66		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =40V,I <sub>D</sub> =0.7A, V <sub>GS</sub> =10V		0.66		nC
Q <sub>gd</sub>	Gate-Drain Charge			0.86		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> =0.7A		0.83	1.3	V
<b>Notes</b>						
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.						
d.Starting T <sub>J</sub> =25°C,L=0.5mH,V <sub>DD</sub> = 40V.(See Figure13)						

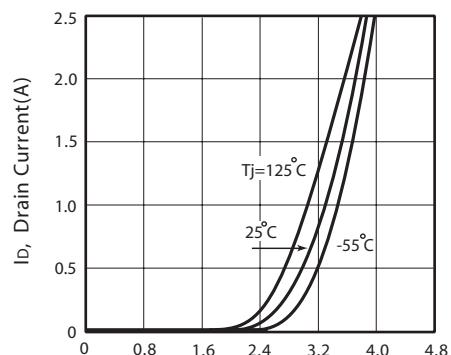
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V<sub>DS</sub>, Drain-to-Source Voltage(V)

Figure 1. Output Characteristics



V<sub>Gs</sub>, Gate-to-Source Voltage(V)

Figure 2. Transfer Characteristics

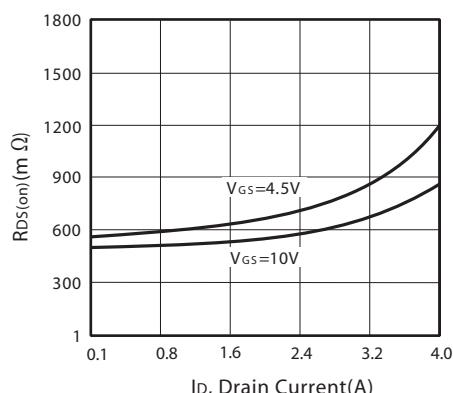


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

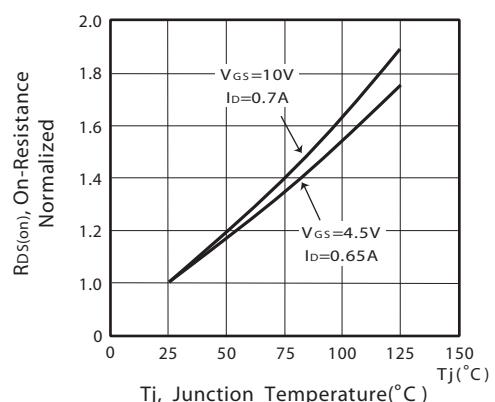


Figure 4. On-Resistance Variation with Drain Current and Temperature

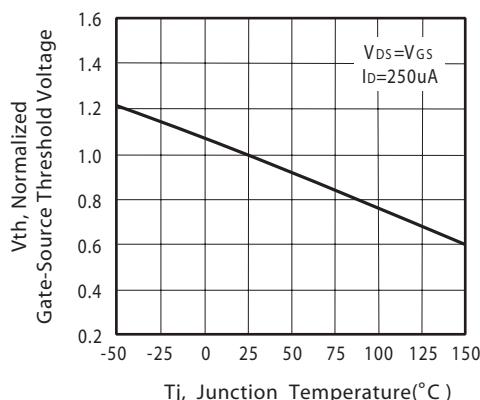


Figure 5. Gate Threshold Variation with Temperature

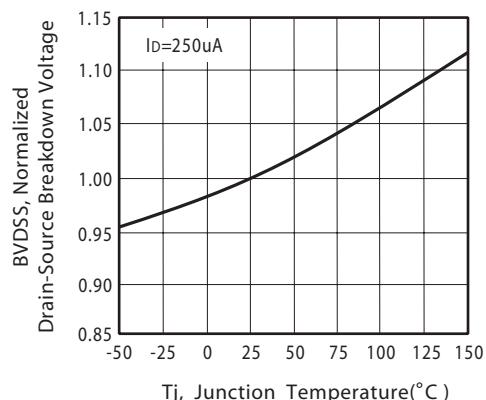
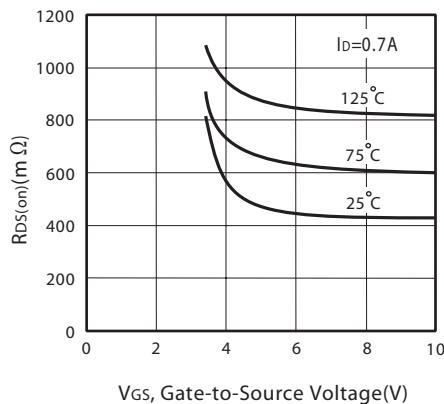


Figure 6. Breakdown Voltage Variation with Temperature

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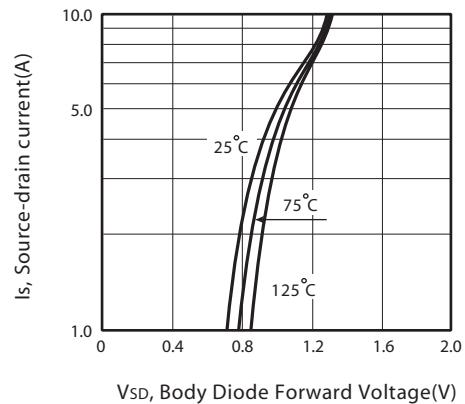
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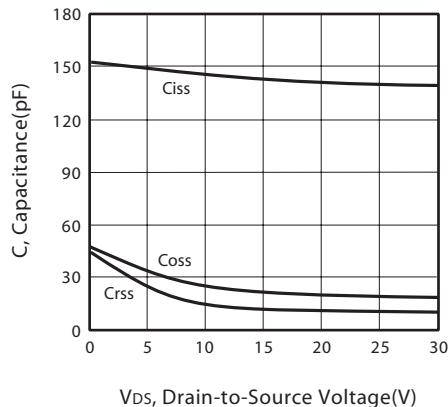
V<sub>GS</sub>, Gate-to-Source Voltage(V)

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



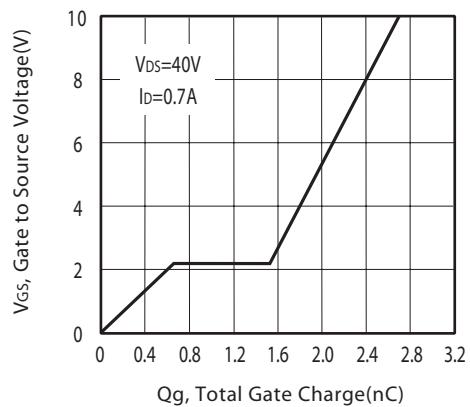
V<sub>SD</sub>, Body Diode Forward Voltage(V)

Figure 8. Body Diode Forward Voltage Variation with Source Current



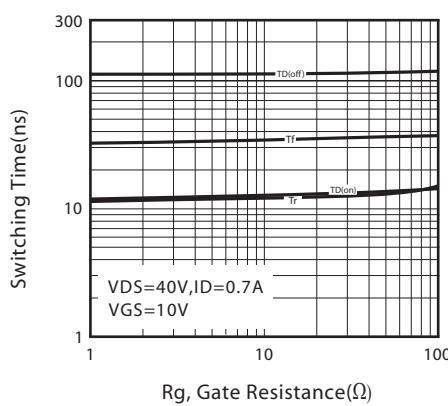
V<sub>DS</sub>, Drain-to-Source Voltage(V)

Figure 9. Capacitance



Q<sub>g</sub>, Total Gate Charge(nC)

Figure 10. Gate Charge



R<sub>g</sub>, Gate Resistance(Ω)

Figure 11. switching characteristics

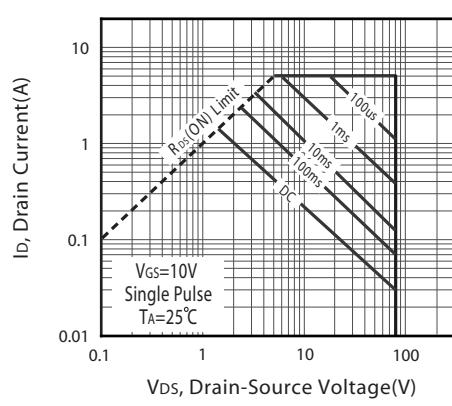
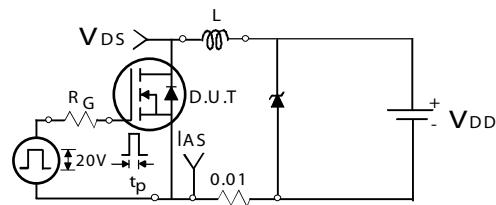


Figure 12. Maximum Safe Operating Area

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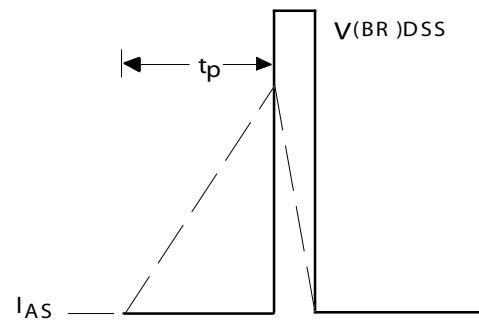
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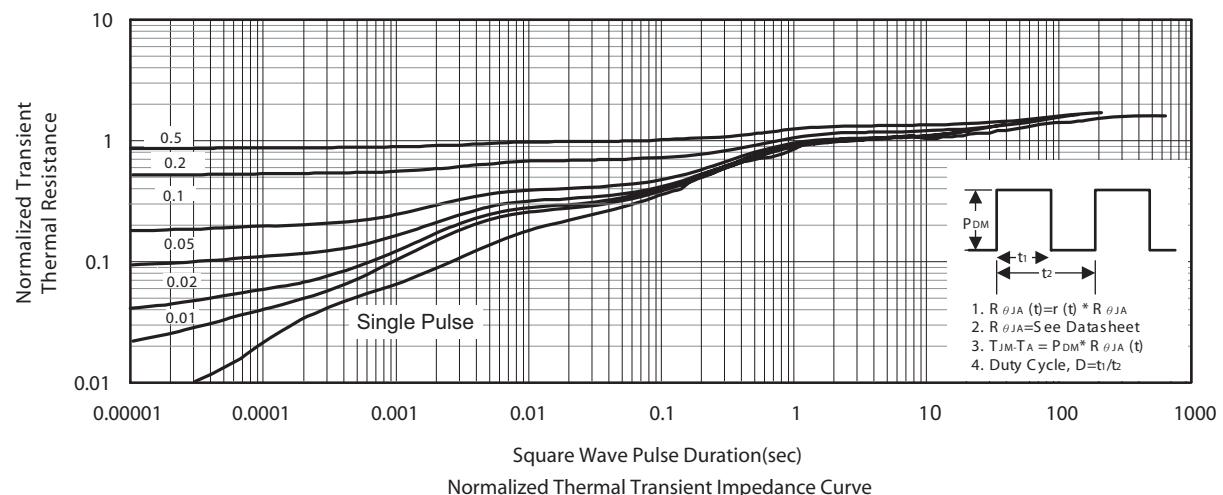
Unclamped Inductive Test Circuit

Figure 13a.



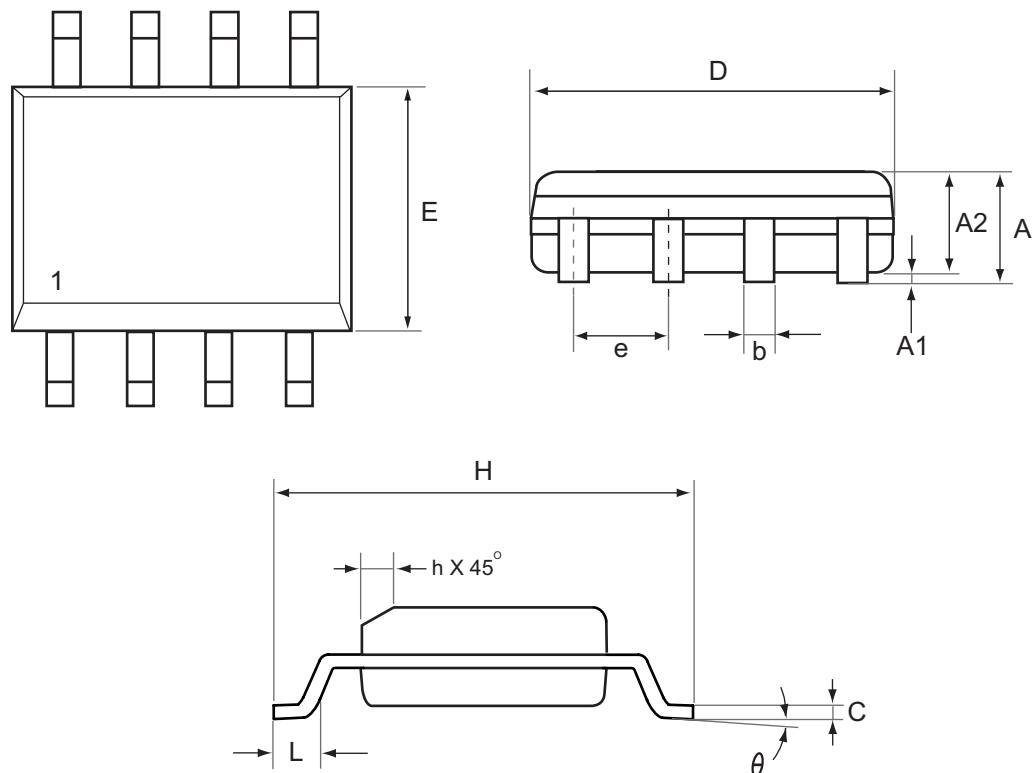
Unclamped Inductive Waveforms

Figure 13b.



## PACKAGE OUTLINE DIMENSIONS

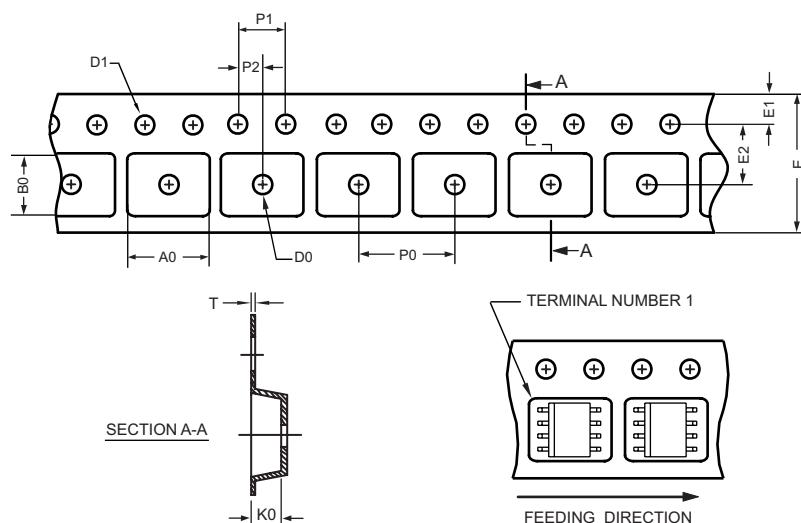
**SO-8**



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
$\theta$	$0^\circ$	$8^\circ$	$0^\circ$	$8^\circ$
h	0.25	0.50	0.010	0.020

## SO-8 Tape and Reel Data

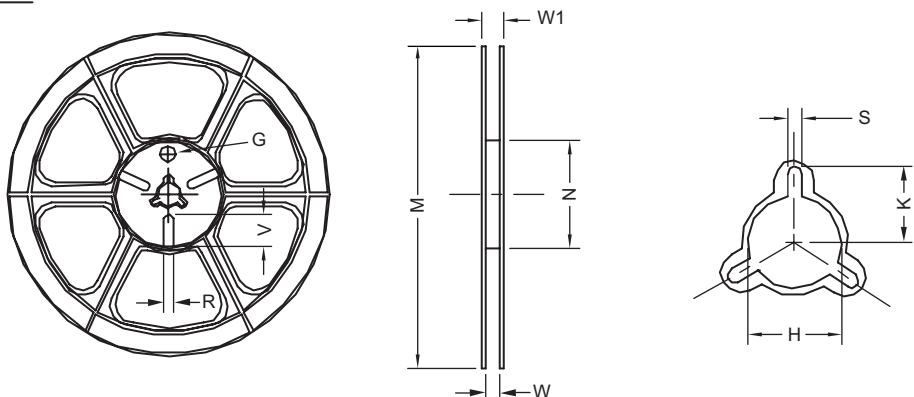
### SO-8 Carrier Tape



unit:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N 150mil	6.50 $\pm 0.15$	5.25 $\pm 0.10$	2.10 $\pm 0.10$	$\phi 1.5$ (MIN)	$\phi 1.55$ $\pm 0.10$	12.0 $+0.3$ $-0.1$	1.75 $\pm 0.10$	5.5 $\pm 0.10$	8.0 $\pm 0.10$	4.0 $\pm 0.10$	2.0 $\pm 0.10$	0.30 $\pm 0.013$

### 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 $\pm 0.15$	---	---	---