SamHop Microelectronics Corp.

STU/D320S

Ver 1.0

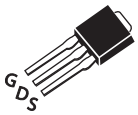
N-Channel Logic Level Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
30V	30A	20 @ VGS=10V
		29 @ VGS=4.5V

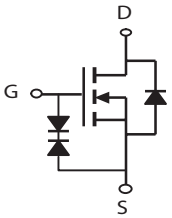
FEATURES

- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- TO-252 and TO-251 Package.
- ESD Protected.

STU SERIES
TO-252AA(D-PAK)



STD SERIES
TO-251(I-PAK)



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

Symbol	Parameter		Limit	Units
V_{DS}	Drain-Source Voltage		30	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current-Continuous [a]	T_C=25°C	30 [e]	A
		T_C=70°C	24	A
I_{DM}	-Pulsed [b]		120	A
E_{AS}	Avalanche Energy [d]		15	mJ
P_D	Maximum Power Dissipation [a]	T_C=25°C	32	W
		T_C=70°C	20	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C

THERMAL CHARACTERISTICS

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case [a]	4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [a]	50	°C/W

ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V , V_{GS}=0V			1	A
I_{GSS}	Gate-Body leakage current	V_{GS}= ±20V , V_{DS}=0V			±10	uA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	1	1.8	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=15A		16	20	m ohm
		V_{GS}=4.5V , I_D=12.5A		22	29	m ohm
g_{FS}	Forward Transconductance	V_{DS}=10V , I_D=15A		12		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=15V,V_{GS}=0V f=1.0MHz		430		pF
C_{OSS}	Output Capacitance			140		pF
C_{RSS}	Reverse Transfer Capacitance			88		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On DelayTime	V_{DD}=15V I_D=1A V_{GS}=10V R_{GEN}=6 ohm		8		ns
t_r	Rise Time			13		ns
$t_{D(OFF)}$	Turn-Off DelayTime			16		ns
t_f	Fall Time			30		ns
Q_g	Total Gate Charge	V_{DS}=15V,I_D=15A,V_{GS}=10V		8		nC
		V_{DS}=15V,I_D=15A,V_{GS}=4.5V		4		nC
Q_{gs}	Gate-Source Charge	V_{DS}=15V,I_D=15A, V_{GS}=10V		0.9		nC
Q_{gd}	Gate-Drain Charge			2.5		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				2.2	A
V_{SD}	Diode Forward Voltage [b]	V_{GS}=0V,I_S=2.2A		0.8	1.3	V

Notes

a.Surface Mounted on FR4 Board,t≤10 sec.
b.Pulse Test:Pulse Width ≤ 300us, Duty Ctcle ≤ 2%.
c.Guaranteed by design, not subject to production testing.
d.Starting T_J=25°C,L=0.5mH,R_G=25Ω,V_{DD}=30V,V_{GS}=10V .(See Figure13)
e.Package current limitation is 20A.

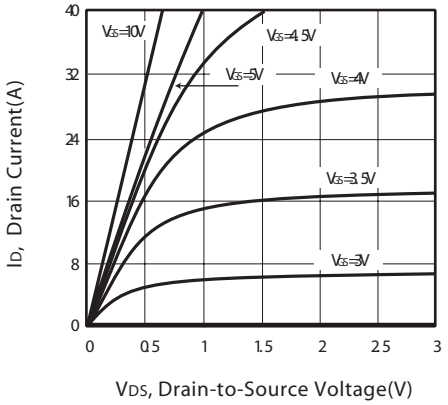


Figure 1. Output Characteristics

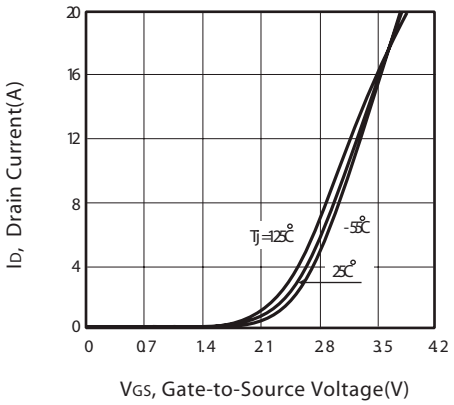


Figure 2. Transfer Characteristics

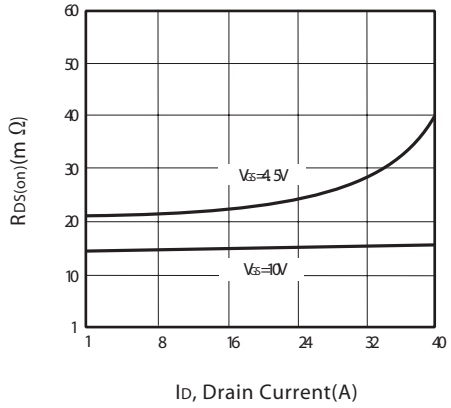


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

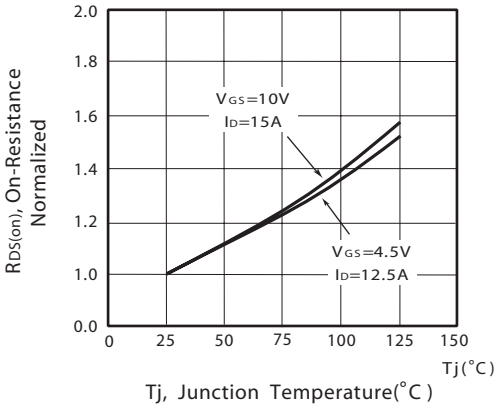


Figure 4. On-Resistance Variation with Drain Current and Temperature

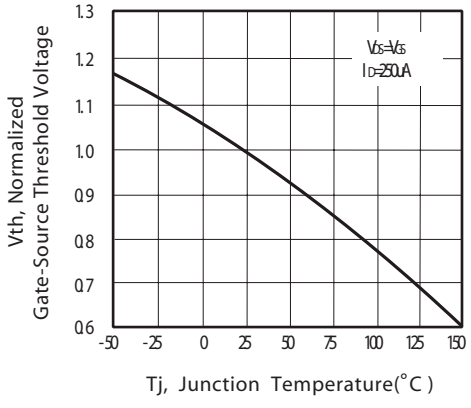


Figure 5. Gate Threshold Variation with Temperature

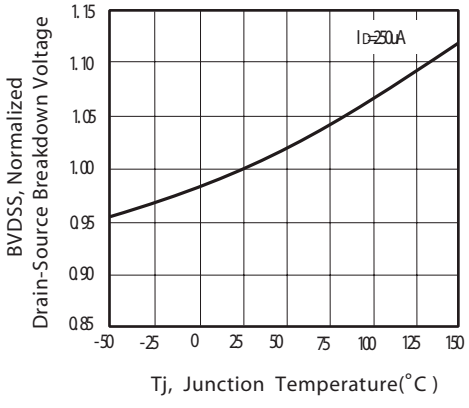


Figure 6. Breakdown Voltage Variation with Temperature

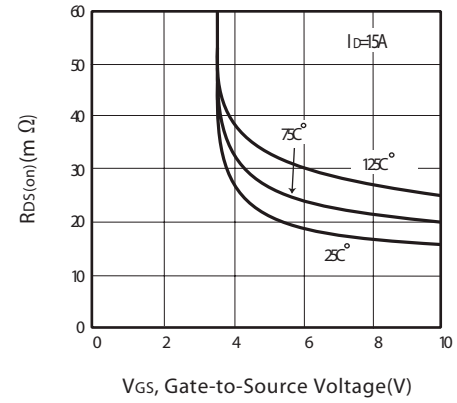


Figure 7. On-Resistance vs. Gate-Source Voltage

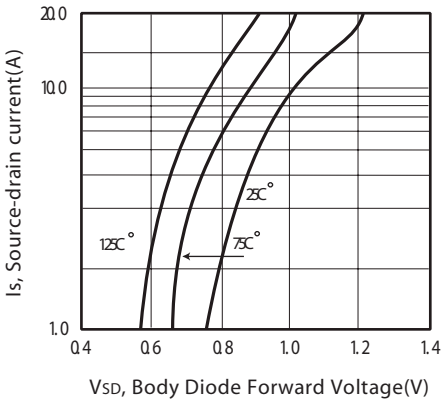


Figure 8. Body Diode Forward Voltage Variation with Source Current

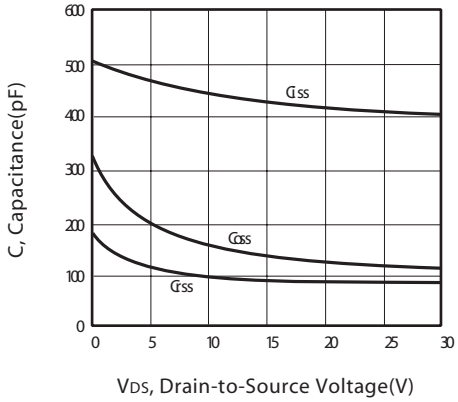


Figure 9. Capacitance

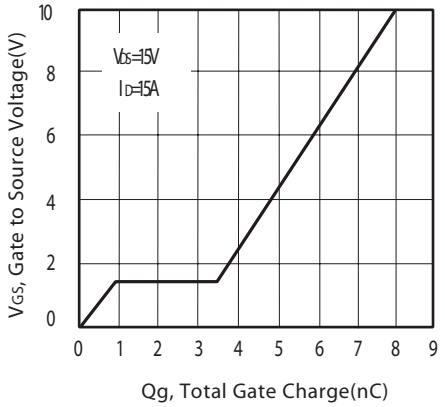


Figure 10. Gate Charge

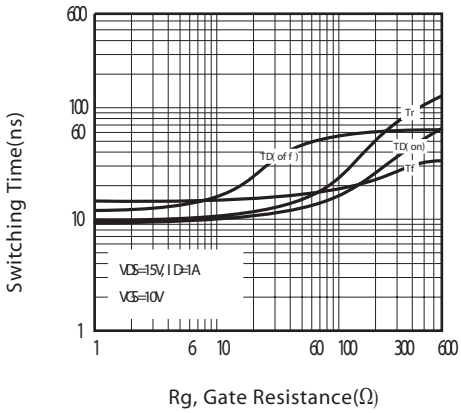


Figure 11. switching characteristics

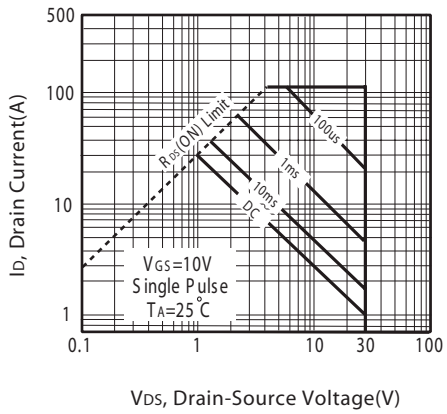
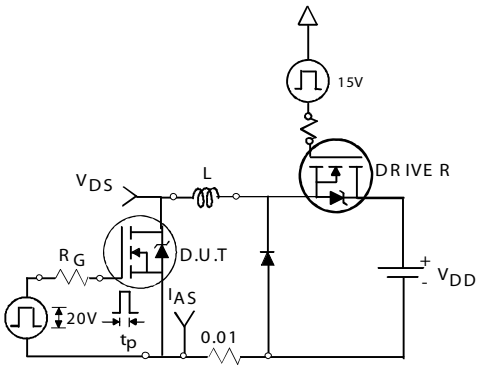
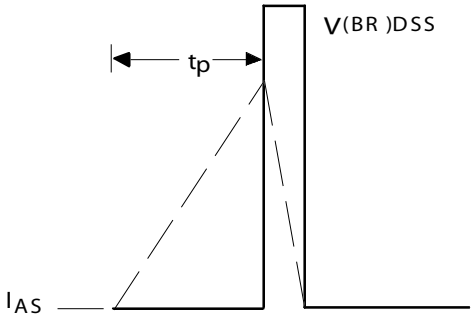


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

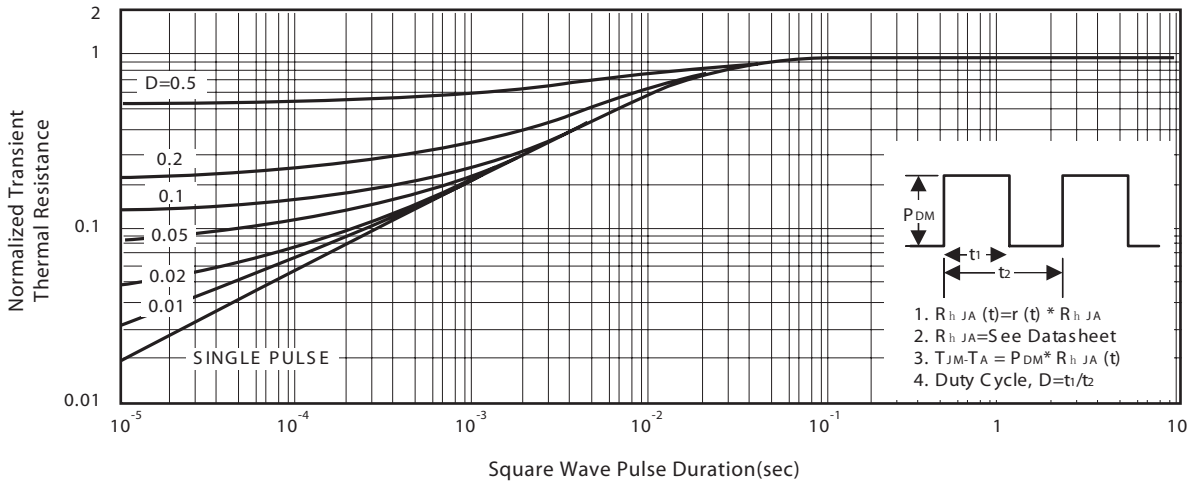
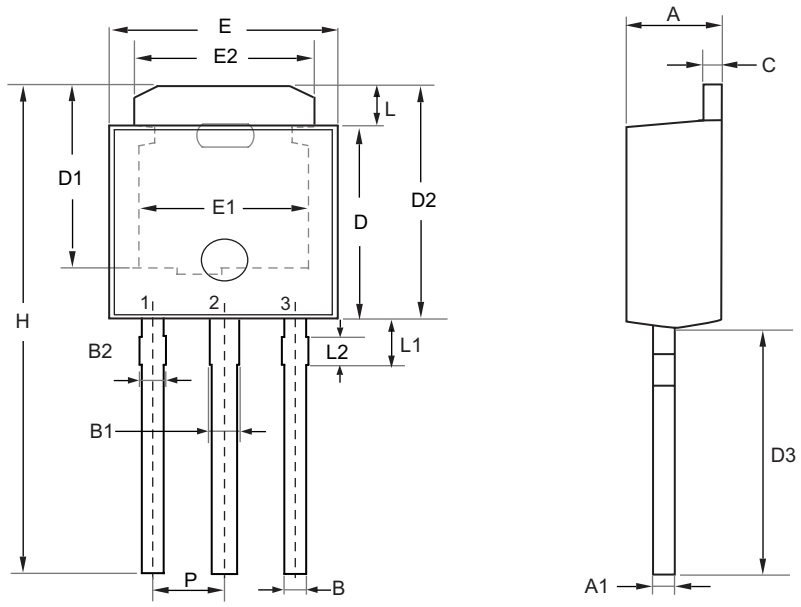


Figure 14. Normalized Thermal Transient Impedance Curve

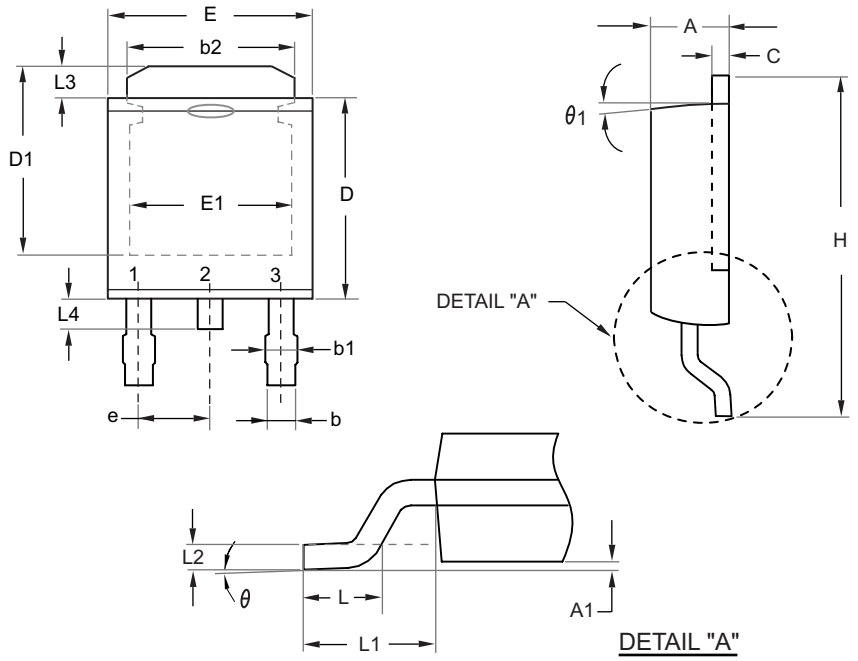
PACKAGE OUTLINE DIMENSIONS

TO-251



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.100	2.500	0.083	0.098
A1	0.350	0.650	0.014	0.026
B	0.400	0.800	0.016	0.031
B1	0.650	1.050	0.026	0.041
B2	0.500	0.900	0.020	0.035
C	0.400	0.600	0.016	0.024
D	5.300	5.700	0.209	0.224
D1	4.900	5.300	0.193	0.209
D2	6.700	7.300	0.264	0.287
D3	7.000	8.000	0.276	0.315
H	13.700	15.300	0.539	0.602
E	6.300	6.700	0.248	0.264
E1	4.600	4.900	0.181	0.193
E2	4.800	5.200	0.189	0.205
L	1.300	1.700	0.051	0.067
L1	1.400	1.800	0.055	0.071
L2	0.500	0.900	0.020	0.035
P	2.300 BSC		0.091 BSC	

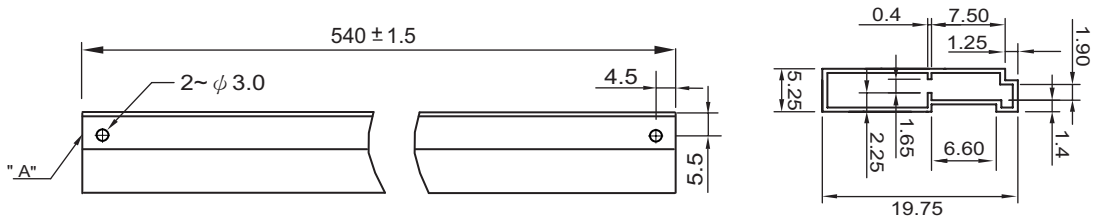
TO-252



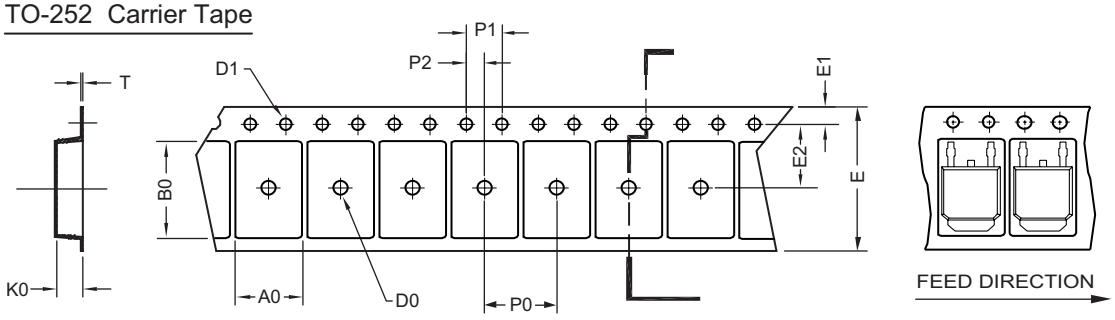
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.100	2.500	0.083	0.098
A1	0.000	0.200	0.000	0.008
b	0.400	0.889	0.016	0.035
b1	0.770	1.140	0.030	0.045
b2	4.800	5.460	0.189	0.215
C	0.400	0.600	0.016	0.024
D	5.300	6.223	0.209	0.245
D1	4.900	5.515	0.193	0.217
E	6.300	6.731	0.248	0.265
E1	4.400	5.004	0.173	0.197
e	2.290 REF		0.090 BSC	
H	8.900	10.400	0.350	0.409
L	1.397	1.770	0.055	0.070
L1	2.743 REF.		0.108 REF.	
L2	0.508 REF.		0.020 REF.	
L3	0.890	1.700	0.035	0.067
L4	0.500	1.100	0.020	0.043
θ	0°	10°	0°	10°
θ1	7° REF.		7° REF.	

TO-251 Tube/TO-252 Tape and Reel Data

TO-251 Tube



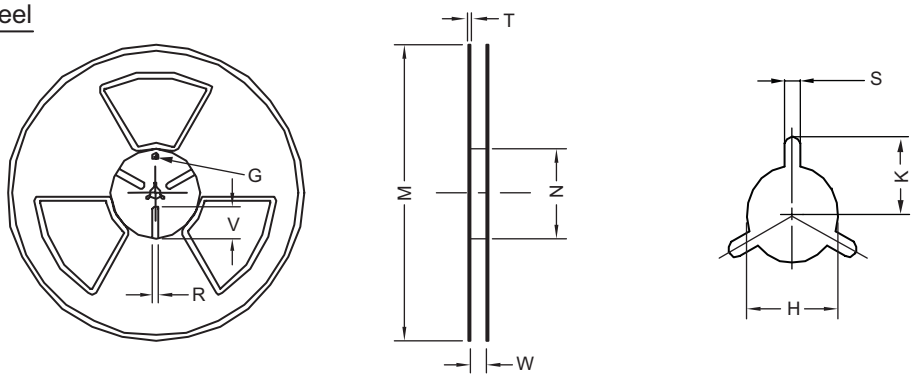
TO-252 Carrier Tape



UNIT:㎜

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 ㎜)	6.96 ±0.1	10.49 ±0.1	2.79 ±0.1	ϕ 2	ϕ 1.5 + 0.1 - 0	16.0 ±0.3	1.75 ±0.1	7.5 ±0.15	8.0 ±0.1	4.0 ±0.1	2.0 ±0.15	0.3 ±0.05

TO-252 Reel



UNIT:㎜

TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 ㎜	ϕ 330	ϕ 330 ± 0.5	ϕ 97 ± 1.0	17.0 + 1.5 - 0	2.2	ϕ 13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---