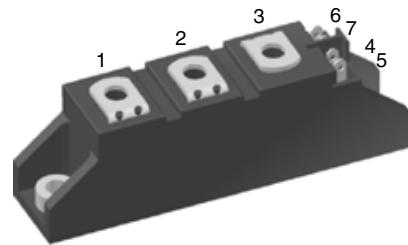


Thyristor Modules

Thyristor/Diode Modules

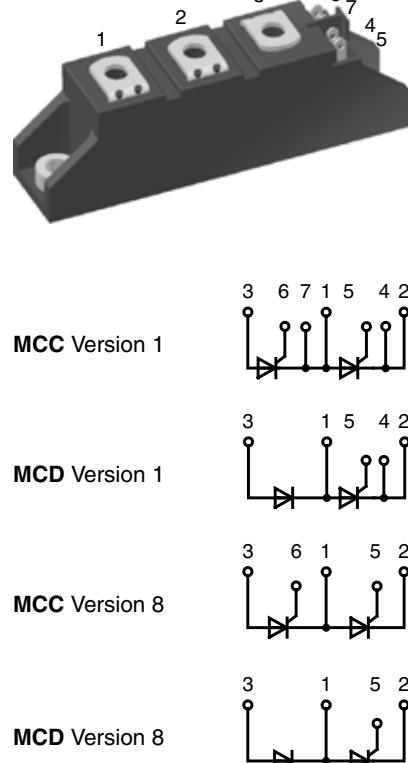
I_{TRMS} = 2x 180 A
I_{TAVM} = 2x 116 A
V_{RRM} = 800-1800 V

V_{RSM} V_{DSM}	V_{RRM} V_{DRM}	Type							
		V	V	Version	1B	8B	Version	1B	8B
900	800	MCC 95-08	io1B / io8B				MCD 95-08	io1B / io8B	
1300	1200	MCC 95-12	io1B / io8B				MCD 95-12	io1B / io8B	
1500	1400	MCC 95-14	io1B / io8B				MCD 95-14	io1B / io8B	
1700	1600	MCC 95-16	io1B / io8B				MCD 95-16	io1B / io8B	
1900	1800	MCC 95-18	io1B / io8B				MCD 95-18	io1B / io8B	



Symbol	Conditions		Maximum Ratings		
I _{TRMS} , I _{FRMS}	T _{VJ} = T _{VJM}			180	A
I _{TAVM} , I _{FAVM}	T _C = 85°C; 180° sine			116	A
I _{TSM} , I _{FSM}	T _{VJ} = 45°C V _R = 0	t = 10 ms (50 Hz) t = 8.3 ms (60 Hz)	2250	A	
	T _{VJ} = T _{VJM} V _R = 0	t = 10 ms (50 Hz) t = 8.3 ms (60 Hz)	2000	A	
			2150	A	
I ² t	T _{VJ} = 45°C V _R = 0	t = 10 ms (50 Hz) t = 8.3 ms (60 Hz)	25 300	A ² s	
	T _{VJ} = T _{VJM} V _R = 0	t = 10 ms (50 Hz) t = 8.3 ms (60 Hz)	23 900	A ² s	
			20 000	A ² s	
			19 100	A ² s	
(di/dt) _{cr}	T _{VJ} = T _{VJM} f = 50 Hz; t _p = 200 µs;	repetitive, I _T = 250 A	150	A/µs	
	V _D = 2/3 V _{DRM} I _G = 0.45 A di _G /dt = 0.45 A/µs	non repetitive, I _T = I _{TAVM}	500	A/µs	
(dv/dt) _{cr}	T _{VJ} = T _{VJM} ; V _D = 2/3 V _{DRM} R _{JK} = ∞; method 1 (linear voltage rise)		1000	V/µs	
P _{GM}	T _{VJ} = T _{VJM} ; t _p = 30 µs I _T = I _{TAVM} ; t _p = 500 µs		10	W	
			5	W	
P _{GAV}			0.5	W	
V _{RGM}			10	V	
T _{VJ}			-40...+125	°C	
T _{VJM}			125	°C	
T _{stg}			-40...+125	°C	
V _{ISOL}	50/60 Hz, RMS I _{ISOL} ≤ 1 mA	t = 1 min t = 1 s	3000 3600	V~	
M _d	Mounting torque (M5) Terminal connection torque (M5)		2.5 - 4 2.5 - 4	Nm	
Weight	Typical including screws		85	g	

Data according to IEC 60747 and refer to a single diode unless otherwise stated.



Features

- International standard package, JEDEC TO-240 AA
- Direct copper bonded Al₂O₃ -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Gate-cathode twin pins for version 1

Applications

- DC Motor control
- Softstart AC motor controller
- Light, heat and temperature control

Advantages

- Space and weight savings
- Simple mounting with two screws
- Improved temperature & power cycling
- Reduced protection circuits

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Symbol	Conditions	Characteristic Values	
		typ.	max.
I_{RRM}, I_{DRM}	$V_R / V_D = V_{RRM} / V_{DRM}$	$T_{VJ} = T_{VJM}$	5 mA
V_T, V_F	$I_T / I_F = 300 \text{ A}$	$T_{VJ} = 25^\circ\text{C}$	1.5 V
V_{TO}	For power-loss calculations only		0.8 V
r_t		$T_{VJ} = T_{VJM}$	2.4 mΩ
V_{GT}	$V_D = 6 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$	2.5 V
		$T_{VJ} = -40^\circ\text{C}$	2.6 V
I_{GT}	$V_D = 6 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$	150 mA
		$T_{VJ} = -40^\circ\text{C}$	200 mA
V_{GD}	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = T_{VJM}$	0.2 V
I_{GD}			10 mA
I_L	$t_p = 10 \mu\text{s}; V_D = 6 \text{ V}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$	450 mA
I_H	$V_D = 6 \text{ V}; R_{GK} = \infty$	$T_{VJ} = 25^\circ\text{C}$	200 mA
t_{gd}	$V_D = \frac{1}{2} V_{DRM}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$	2 μs
t_q	$V_D = \frac{2}{3} V_{DRM}$ $dv/dt = 20 \text{ V}/\mu\text{s}; -di/dt = 10 \text{ A}/\mu\text{s}$ $I_T = 150 \text{ A}; V_R = 100 \text{ V}; t_p = 200 \mu\text{s}$	$T_{VJ} = T_{VJM}$	185 μs
Q_s	$I_T / I_F = 50 \text{ A}; -di/dt = 6 \text{ A}/\mu\text{s}$	$T_{VJ} = T_{VJM}$	170 μC
I_{RM}			45 A
R_{thJC}	per thyristor; DC current		0.22 K/W
	per module		0.11 K/W
R_{thJK}	per thyristor; DC current		0.42 K/W
	per module		0.21 K/W
d_s	Creeping distance on surface		12.7 mm
d_A	Creepage distance in air		9.6 mm
a	Maximum allowable acceleration		50 m/s ²

Optional accessories for modules

Coded gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red

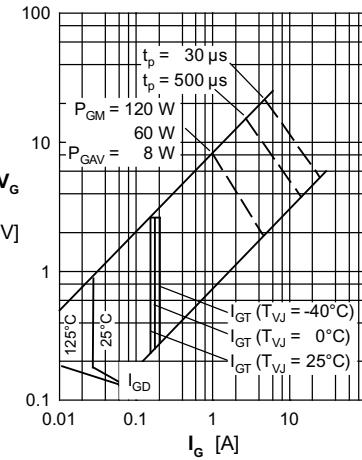
Type **ZY 200L** (L = Left for pin pair 4/5) UL 758, style 1385,
Type **ZY 200R** (R = Right for pin pair 6/7) CSA class 5851, guide 460-1-1

Fig. 1 Gate trigger characteristics

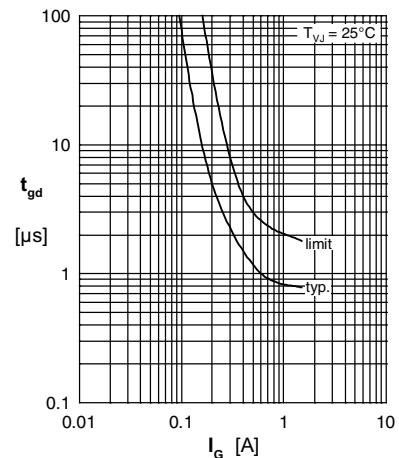
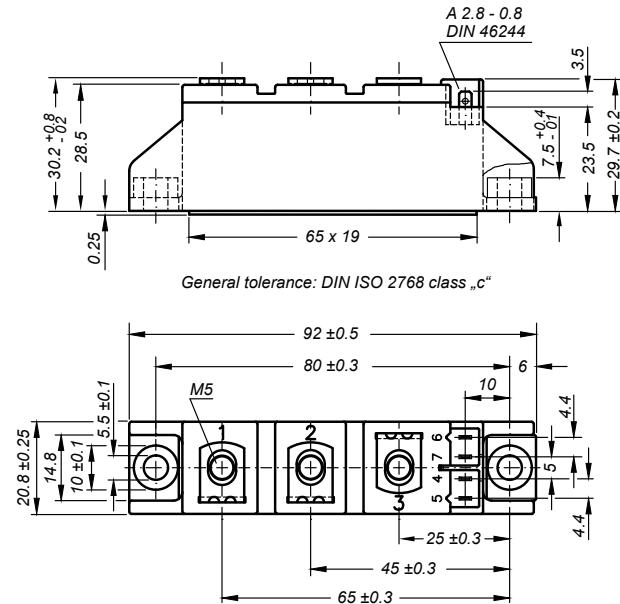


Fig. 2 Gate trigger delay time

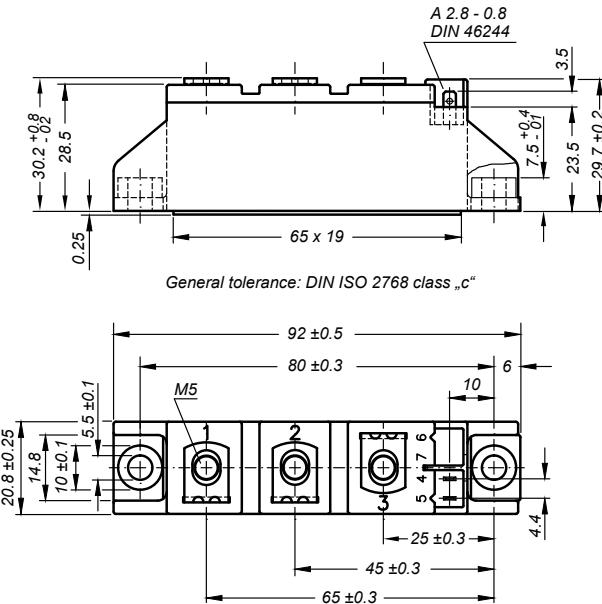
Dimensions in mm (1 mm = 0.0394")

MCC... Version 1B



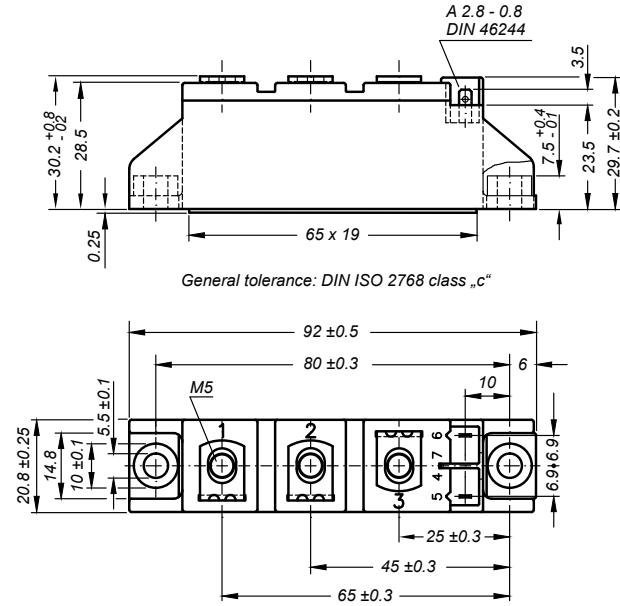
Optional accessories: Keyed gate/cathode twin plugs
 Wire length: 350 mm, gate = yellow, cathode = red
 UL 758, style 1385, CSA class 5851, guide 460-1-1
 Type ZY 200L (L = Left for pin pair 4/5)
 Type ZY 200R (R = Right for pin pair 6/7)

MCD... Version 1B

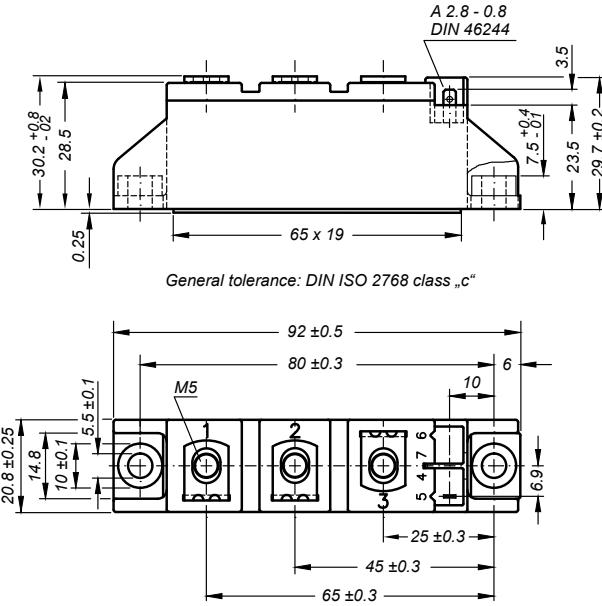


Optional accessories: Keyed gate/cathode twin plugs
 Wire length: 350 mm, gate = yellow, cathode = red
 UL 758, style 1385, CSA class 5851, guide 460-1-1
 Type ZY 200L (L = Left for pin pair 4/5)

MCC... Version 8B



MCD... Version 8B



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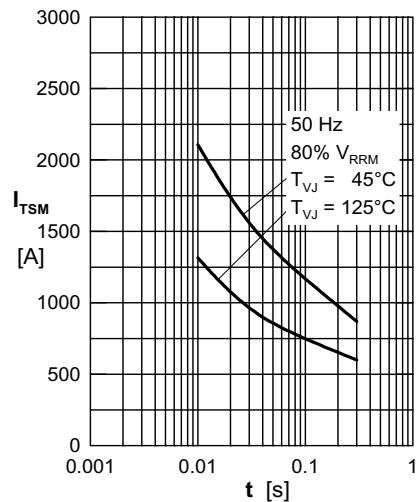


Fig. 3 Surge overload current I_{TSM} ,
 I_{FSM} : Crest value, t : duration

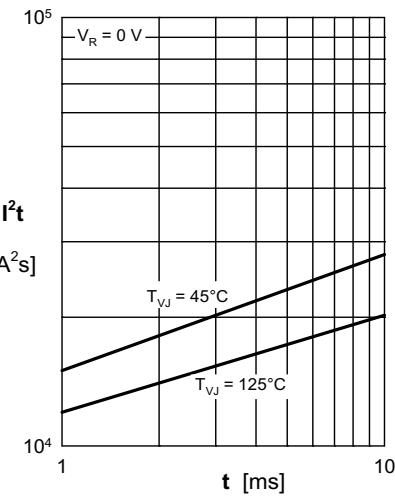


Fig. 4 I^2t versus time (1-10 ms)

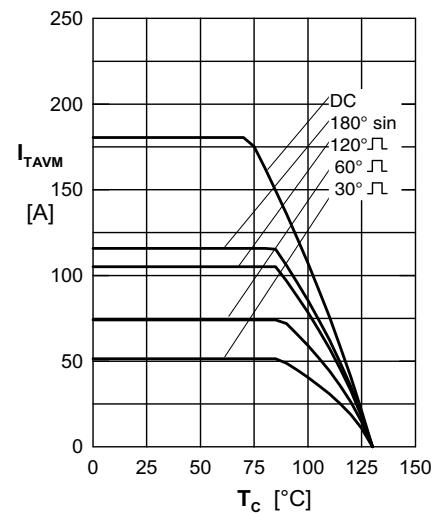


Fig. 4a Maximum forward current at case temperature

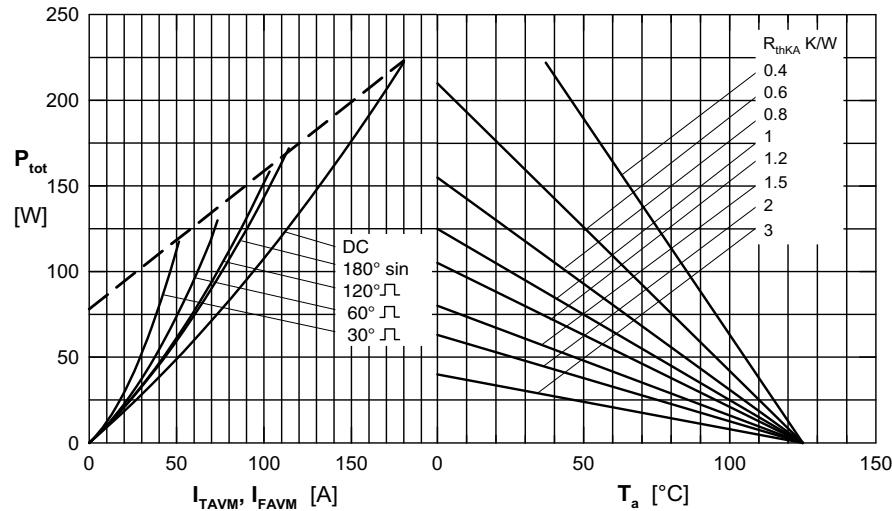


Fig. 5 Power dissipation versus on-state current & ambient temperature (per thyristor or diode)

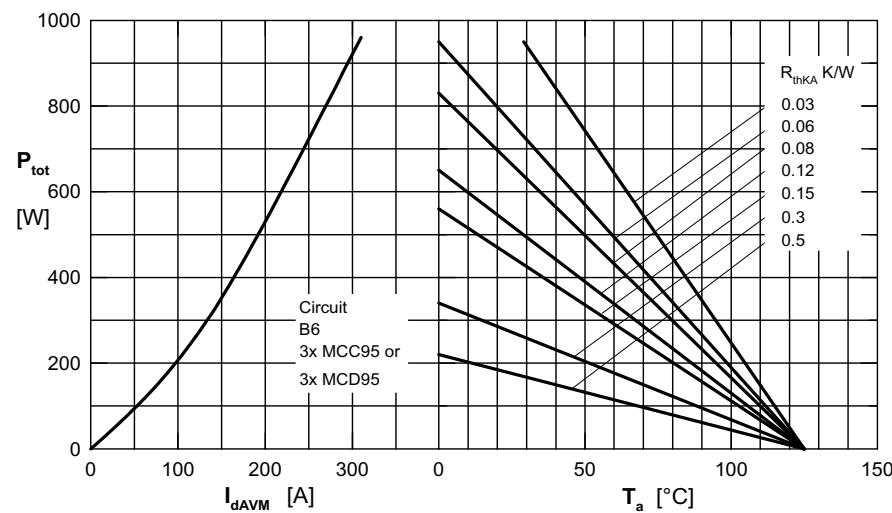


Fig. 6 Three phase rectifier bridge:
Power dissipation vs. direct output current and ambient temperature

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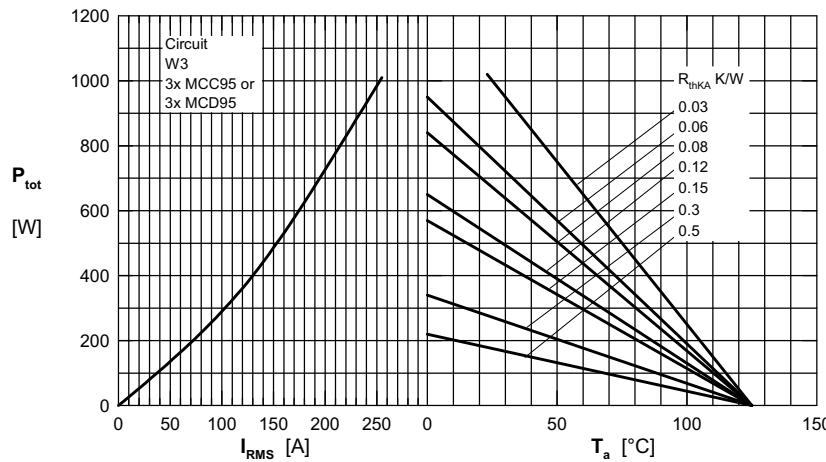


Fig. 7 Three phase AC-controller:
Power dissipation versus RMS output current and ambient temperature

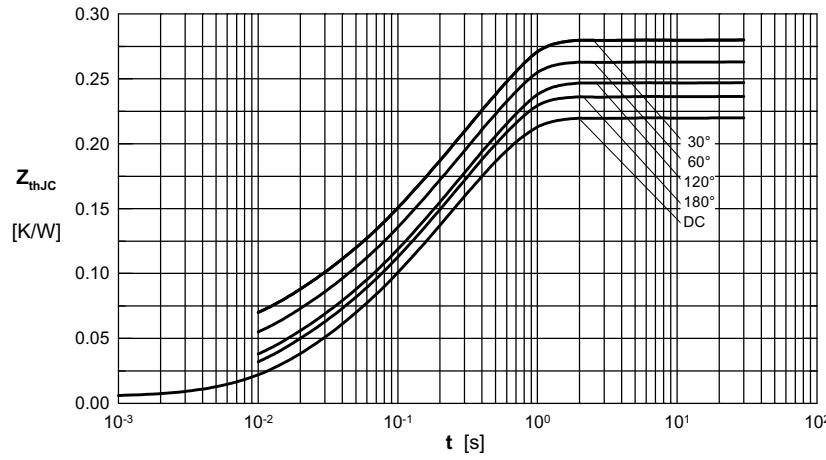


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.22
180°	0.23
120°	0.25
60°	0.27
30°	0.28

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344

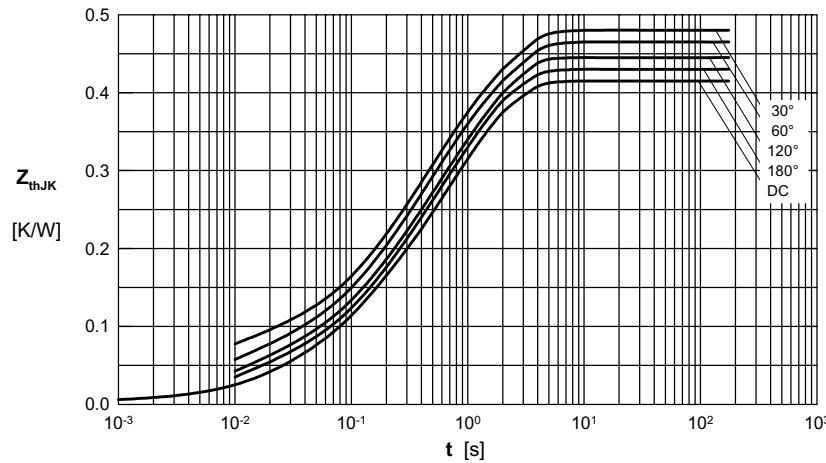


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.42
180°	0.43
120°	0.45
60°	0.47
30°	0.48

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344
4	0.2	1.32