

TOSHIBA IGBT MODULE SILICON N CHANNEL IGBT

# MG400V2YS60A

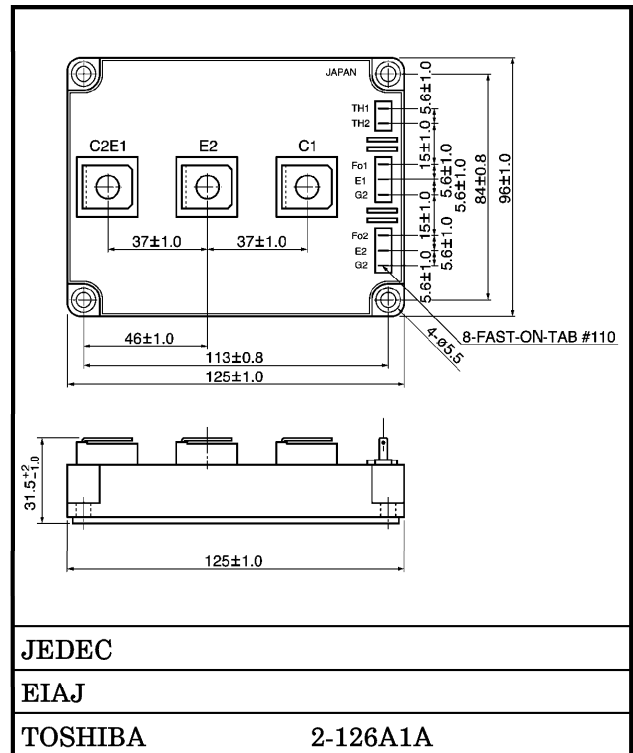
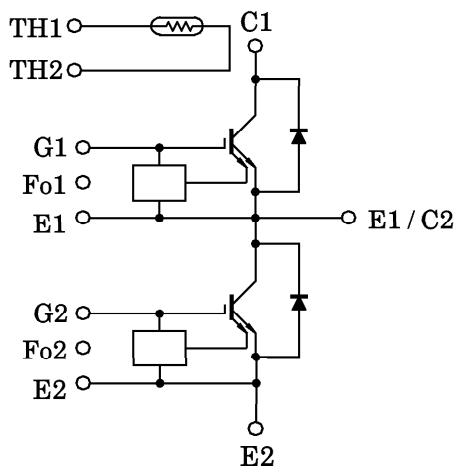
HIGH POWER SWITCHING APPLICATIONS

Unit in mm

MOTOR CONTROL APPLICATIONS

- The Electrodes are Isolated from Case.
- Enhancement-Mode
- Thermal Output Terminal (TH)

EQUIVALENT CIRCUIT



Weight : 680 g

000707EAA1

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## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V <sub>CE</sub>	1700	V
Gate-Emitter Voltage		V <sub>GE</sub>	±20	V
Collector Current	DC	I <sub>C</sub>	400	A
Forward Current	DC	I <sub>F</sub>	400	A
Collector Power Dissipation (T <sub>c</sub> = 25°C)		P <sub>C</sub>	4300	W
Junction Temperature		T <sub>j</sub>	150	°C
Storage Temperature Range		T <sub>stg</sub>	-40~125	°C
Isolation Voltage		V <sub>Isol</sub>	4000 (AC 1 min)	V
Screw Torque	Terminal : M8	—	10	N·m
	Mounting : M5	—	3	N·m

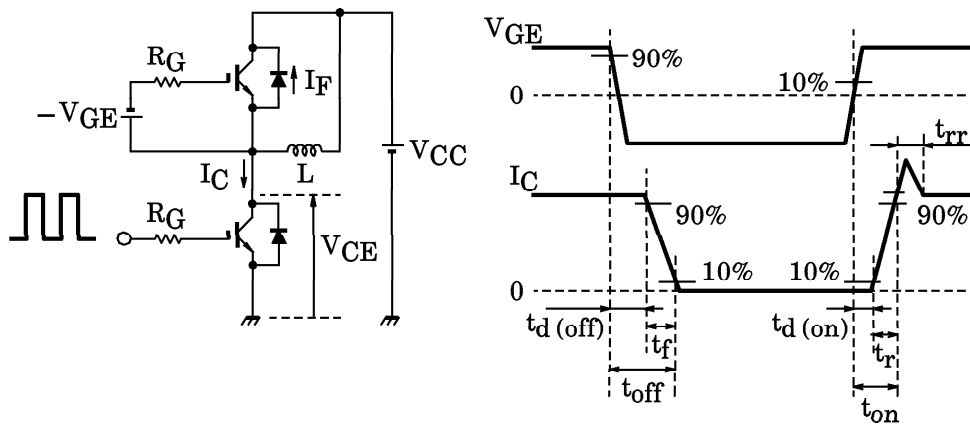
## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

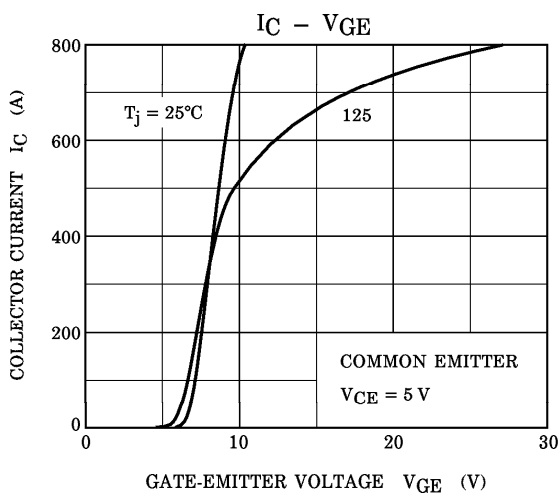
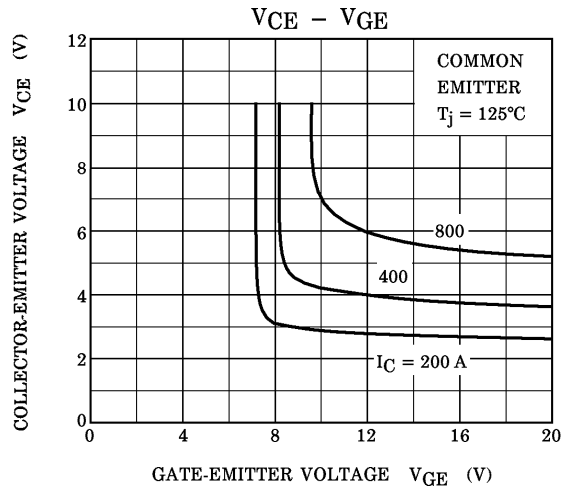
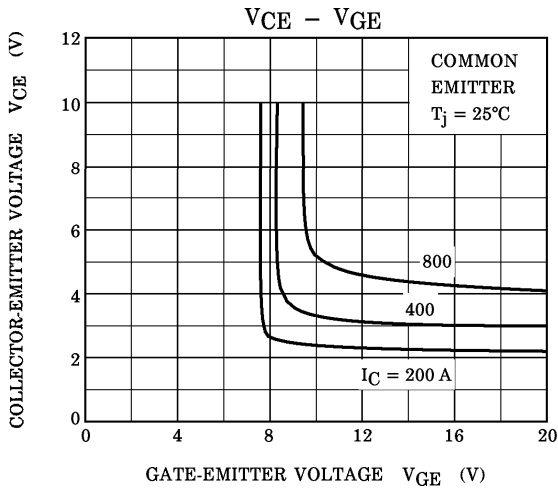
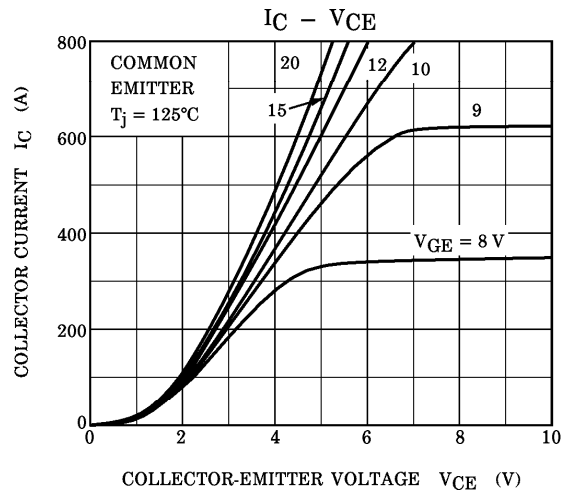
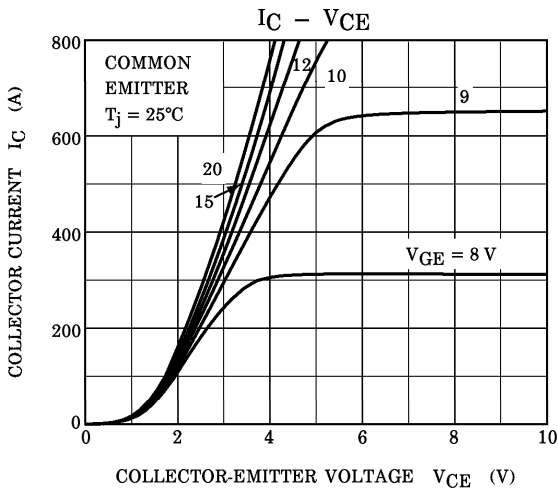
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current		I <sub>GES</sub>	V <sub>GE</sub> = ±20 V, V <sub>CE</sub> = 0 V	—	—	±10	μA	
Collector Cut-Off Current		I <sub>CES</sub>	V <sub>CE</sub> = 1700 V, V <sub>GE</sub> = 0 V	—	—	1	mA	
Gate-Emitter Cut-Off Voltage		V <sub>GE (off)</sub>	I <sub>C</sub> = 400 mA, V <sub>CE</sub> = 5 V	—	5.5	—	V	
Collector-Emitter Saturation Voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 400 A, V <sub>GE</sub> = 15 V	T <sub>j</sub> = 25°C	—	3.0	3.4	V
				T <sub>j</sub> = 125°C	—	3.8	4.2	
Input Capacitance		C <sub>ies</sub>	V <sub>CE</sub> = 10 V, V <sub>GE</sub> = 0 V, f = 1 MHz	—	45000	—	pF	
Gate-Emitter Voltage		V <sub>GE</sub>	—	13	15	17	V	
Gate Resistance		R <sub>G</sub>	—	8.2	—	15	Ω	
Switching Time	Turn-On Delay Time	t <sub>d (on)</sub>	Inductive Load V <sub>CC</sub> = 900 V I <sub>C</sub> = 400 A V <sub>GE</sub> = ±15 V R <sub>G</sub> = 8.2 Ω  (Note)	—	0.35	—	μs	
	Rise Time	t <sub>r</sub>		—	0.2	—		
	Turn-On Time	t <sub>on</sub>		—	0.55	—		
	Turn-Off Delay Time	t <sub>d (off)</sub>		—	0.9	—		
	Fall Time	t <sub>f</sub>		—	0.4	0.6		
	Turn-Off Time	t <sub>off</sub>		—	1.3	—		
Forward Voltage		V <sub>F</sub>	I <sub>F</sub> = 400 A, V <sub>GE</sub> = 0 V	T <sub>j</sub> = 25°C	—	3.2	4.2	V
				T <sub>j</sub> = 125°C	—	2.4	—	
Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> = 400 A, V <sub>GE</sub> = -15 V di / dt = 2000 A / μs	—	0.20	0.40	μs	
Thermal Resistance		R <sub>th (j-c)</sub>	Transistor Stage	—	—	0.029	°C / W	
			Diode Stage	—	—	0.056		
RTC Operating Current		I <sub>rtc</sub>	T <sub>j</sub> = 25°C	800	—	—	A	

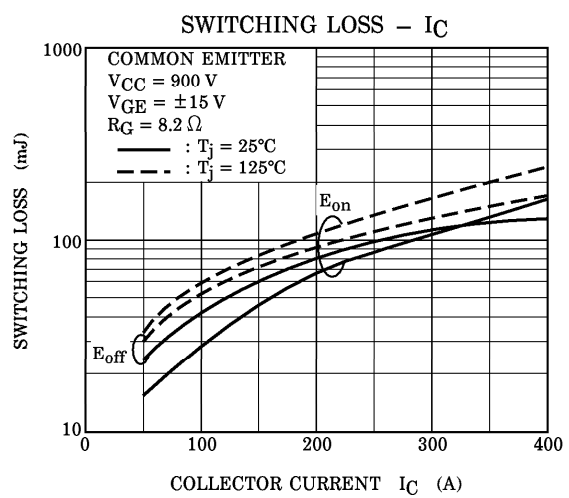
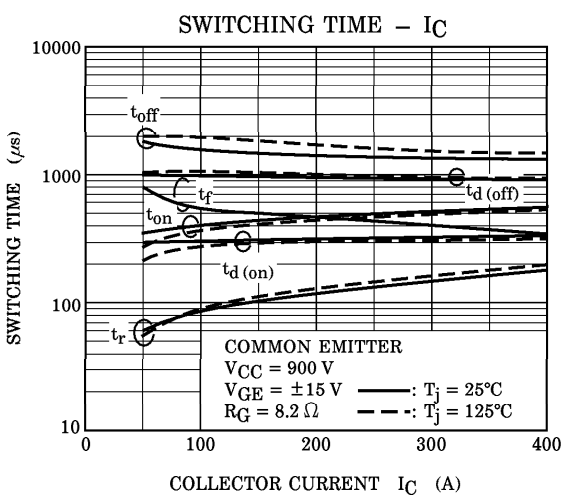
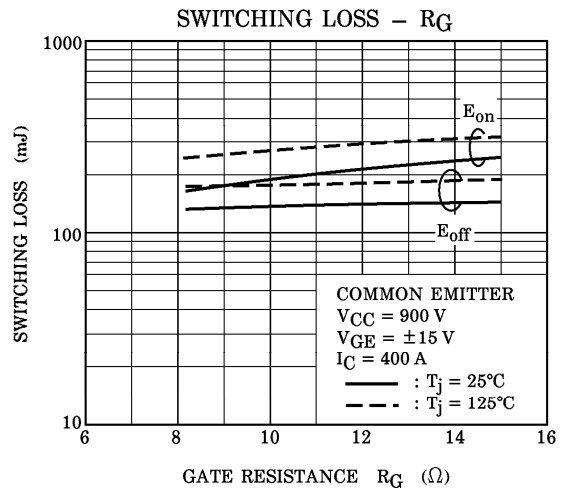
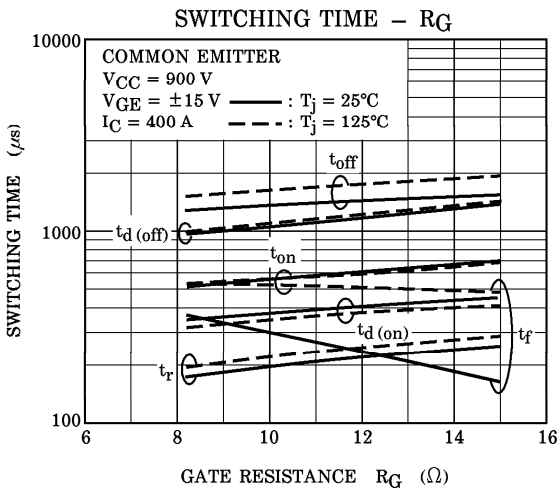
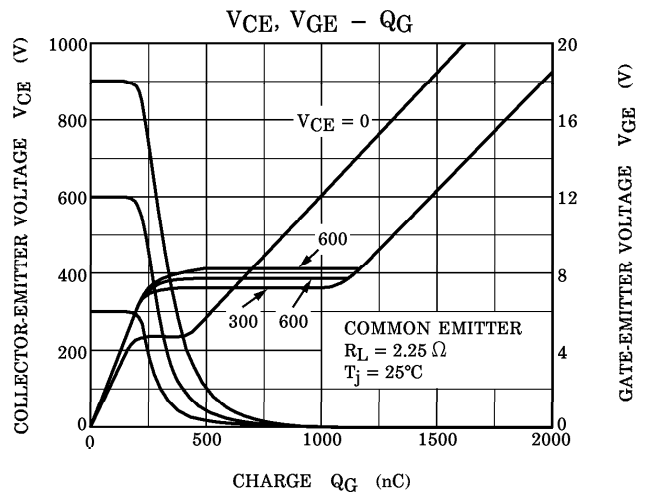
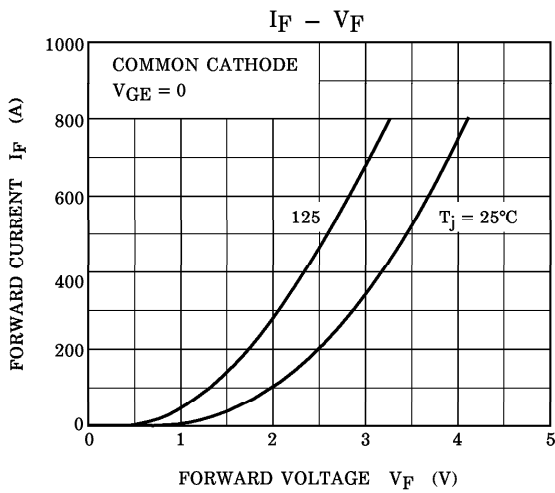
THERMISTOR

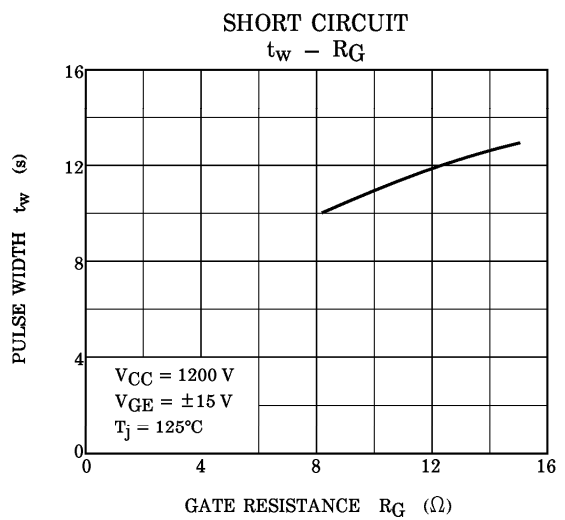
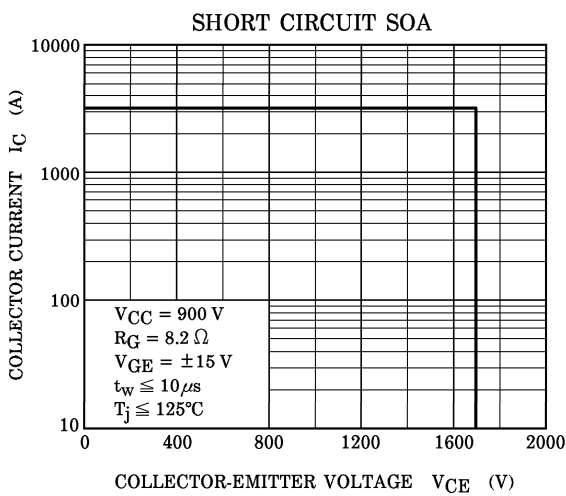
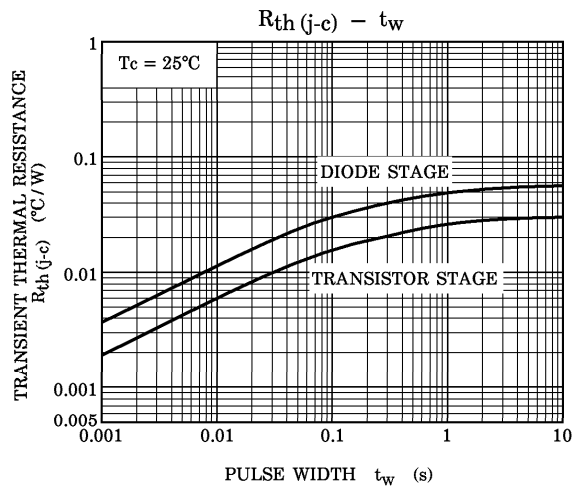
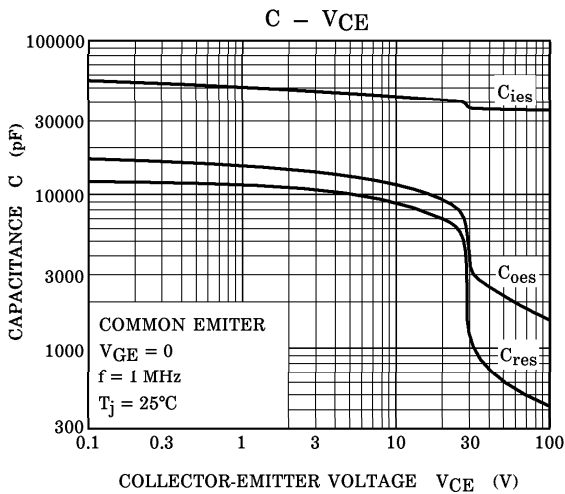
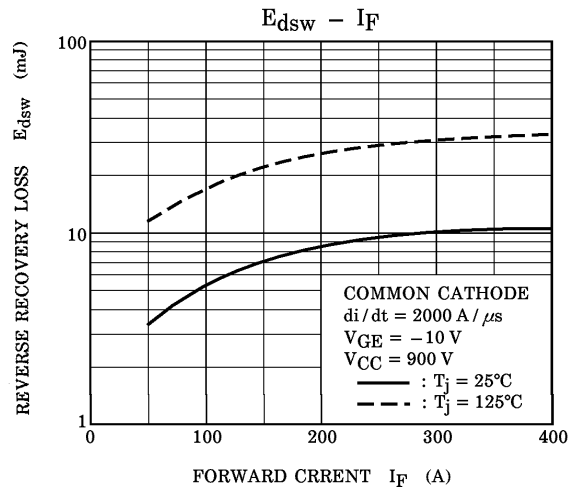
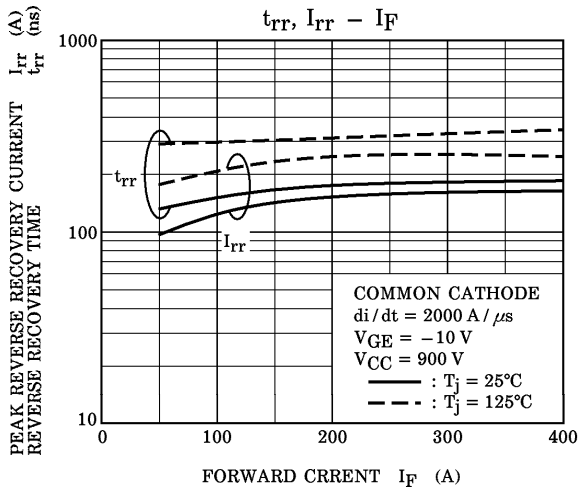
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Zero Power Resistance	R25	Tc = 25°C	—	100	—	kΩ
B Value	B25 / 85	Tc = 25°C / Tc = 85°C	—	4390	—	K
Isolation Voltage		Tc = 25°C	2500	—	—	Vrms

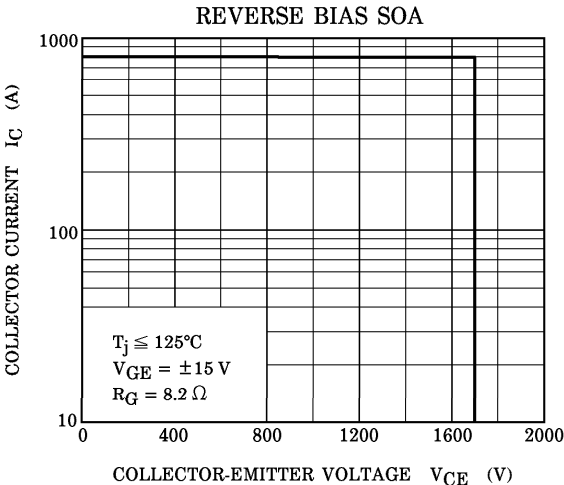
(Note) : Switching time measurement circuit and input/output waveforms











<V<sub>CE</sub> (sat) RANK>  
V<sub>CE</sub> (sat)

RANK SYMBOL	MIN.	MAX.
29	2.6	2.9
30	2.7	3.0
31	2.8	3.1
32	2.9	3.2
33	3.0	3.3
34	3.1	3.4

<V<sub>F</sub> RANK>  
V<sub>F</sub>

RANK SYMBOL	MIN.	MAX.
G	2.5	2.8
H	2.7	3.0
I	2.9	3.2
J	3.1	3.4
K	3.3	3.6
L	3.5	3.8
M	3.7	4.0
N	3.9	4.2

<MARK POSITION>

