

TOSHIBA INTEGRATED IGBT MODULE SILICON N CHANNEL IGBT

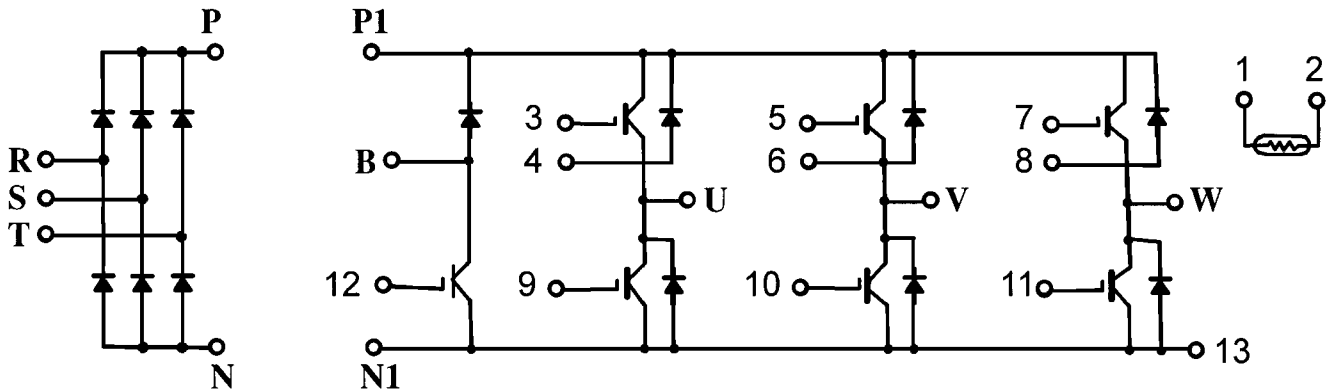
MIG30J906H, MIG30J906HA

HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

- Integrates Inverter, Converter and Brake Power Circuits and Thermistor in One Package.
- Output (Inverter Stage):
3 ϕ 30A/600V IGBT
- Input (Converter Stage):
3 ϕ 30A/800V Silicon Rectifier
- The Electrodes are Isolated from Case.
- Outline:
MIG30J906H : 2-108E3A
MIG30J906HA : 2-108E4A
- Weight: 190g

EQUIVALENT CIRCUIT



961001EAA2

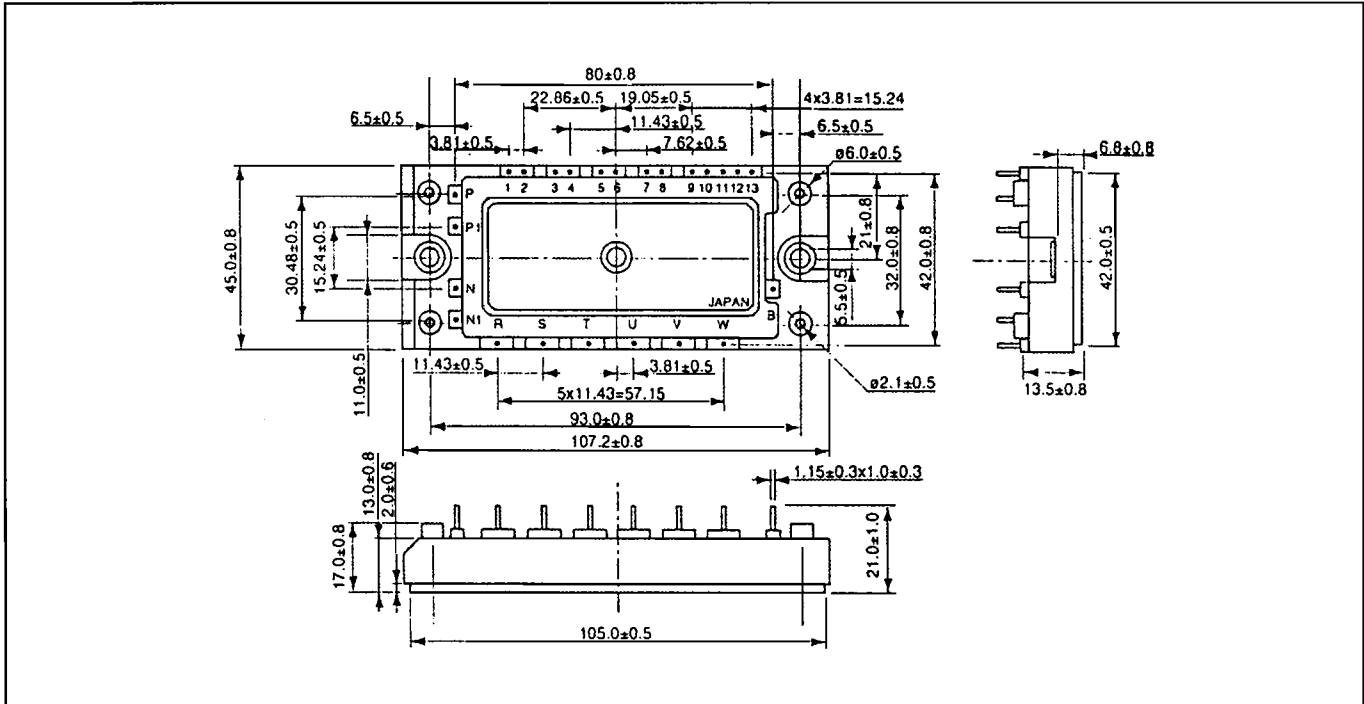
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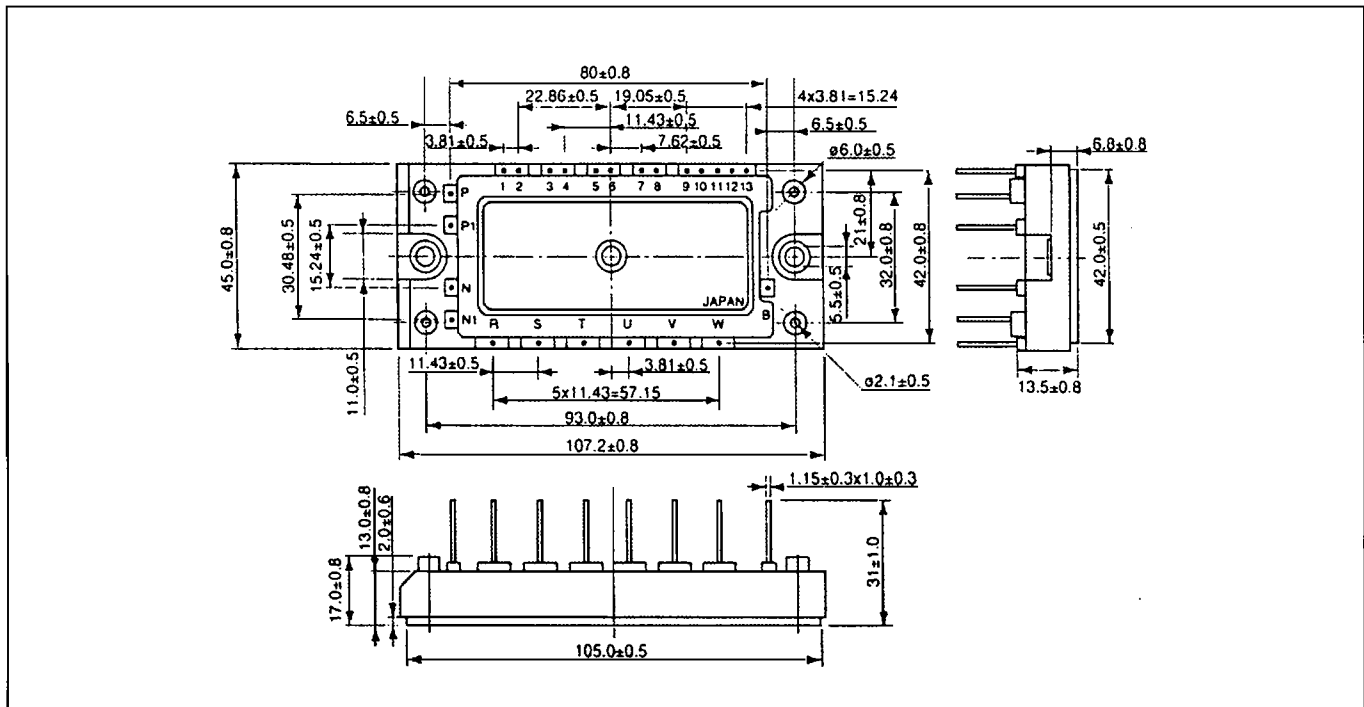
Package Dimensions

Units: mm



2-108E3A

Units: mm



2-108E4A

MAXIMUM RATINGS (Ta=25°C)

STAGE		CHARACTERISTIC		SYMBOL	RATING	UNIT	
Inverter	Collector-Emitter Voltage			V _{CES}	600	V	
	Gate-Emitter Voltage			V _{GES}	±20	V	
	Collector Current	DC		I _C	35/30	A	
		1ms		I _{CP}	70/60	A	
	Forward Current	DC		I _F	30	A	
		1ms		I _{FM}	60	A	
Collector Power Dissipation (T _c =25°C)			P _C	125	W		
Converter	Repetitive Peak Reverse Voltage			V _R RM	800	V	
	Average Output Rectified Current			I _O	30	A	
	Peak One Cycle Surge Forward Current (50Hz, Non-Repetitive)			I _{FSM}	400	A	
Brake	IGBT	Collector-Emitter Voltage		V _{CES}	600	V	
		Gate-Emitter Voltage		V _{GES}	±20	V	
		Collector Current	DC		I _C	35/30	A
			1ms		I _{CP}	70/60	A
	Collector Power Dissipation (T _c =25°C)			P _C	125	W	
	FWD	Reverse Voltage			V _R	600	V
Forward Current		DC		I _F	30	A	
		1ms		I _{FM}	60	A	
Module	Junction Temperature			T _j	150	°C	
	Storage Temperature Range			T _{stg}	-40 ~ 125	°C	
	Isolation Voltage			V _{Isol}	2500 (AC 1 min)	V	
	Screw Torque			—	6	N•m	

(25°C/40°C)

(25°C/40°C)

(25°C/40°C)

(25°C/40°C)

ELECTRICAL CHARACTERISTICS (Ta=25°C)

a. Inverter stage

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current		I _{GES}	V _{GE} =±20V, V _{CE} =0	—	—	±500	nA	
Collector Cut-off Current		I _{CES}	V _{CE} =600V, V _{GE} =0	—	—	1.0	mA	
Gate-Emitter Cut-off Voltage		V _{GE (off)}	I _C =3mA, V _{CE} =5V	5.0	—	8.0	V	
Collector-Emitter Saturation Voltage		V _{CE (sat)}	I _C =30A	T _j =25°C	—	2.1	2.7	V
			V _{GE} =15V	T _j =125°C	—	2.2	2.8	
Input Capacitance		C _{ies}	V _{CE} =10V, V _{GE} =0, f=1MHz	—	—	—	pF	
Switching Time	Rise Time	t _r	V _{CC} =300V I _C =30A V _{GE} =±15V R _G =43Ω (Note 1)	—	0.10	0.20	μs	
	Turn-on Time	t _{on}		—	0.25	0.50		
	Fall Time	t _f		—	0.15	0.30		
	Turn-off Time	t _{off}		—	0.50	0.80		
Forward Voltage		V _F	I _F =30A, V _{GE} =0	—	2.0	2.8	V	
Reverse Recovery Time		t _{rr}	I _F =30A, V _{GE} =-10V di/dt=100A/μs	—	0.08	0.15	μs	
Thermal Resistance		R _{th(j-c)}	Transistor	—	—	1.0	°C/W	
			Diode	—	—	2.6		

b. Converter Stage

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Repetitive Peak Reverse Current		I _{RRM}	V _{RRM} =800V	—	—	50	μA
Peak Forward Voltage		V _{FM}	I _{FM} =30A	—	1.05	1.20	V
Peak One Cycle Surge Forward Current		I _{FSM}	50Hz sine-half-wave	400	—	—	A
Thermal Resistance		R _{th (j-c)}	—	—	—	1.56	°C/W

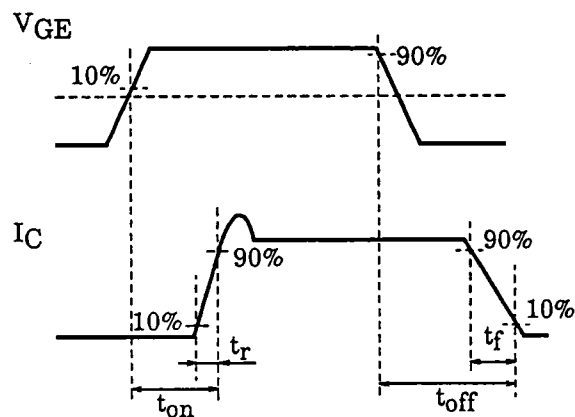
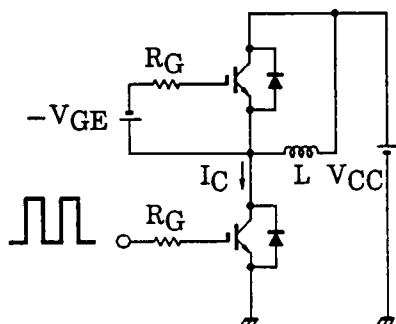
c. Brake stage

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current		I_{GES}	$V_{GE}=\pm 20V, V_{CE}=0$	—	—	± 500	nA	
Collector Cut-Off Current		I_{CES}	$V_{CE}=600V, V_{GE}=0$	—	—	1.0	mA	
Reverse Current		I_R	$V_R=600V$	—	—	1.0	mA	
Gate-Emitter Cut-Off Voltage		$V_{GE (off)}$	$I_C=3mA, V_{CE}=5V$	5.0	—	8.0	V	
Collector-Emitter Saturation Voltage		$V_{CE (sat)}$	$I_C=30A$	$T_j=25^\circ C$	—	2.1	2.7	V
			$V_{GE}=15V$	$T_j=125^\circ C$	—	2.2	2.8	
Input Capacitance		C_{ies}	$V_{CE}=10V, V_{GE}=0, f=1MHz$	—	—	—	pF	
Switching Time	Rise Time	t_r	$V_{CC}=300V$ $I_C=30A$ $V_{GE}=\pm 15V$ $R_G=43\Omega$ (Note 1)	—	0.10	0.20	μs	
	Turn-On Time	t_{on}		—	0.25	0.50		
	Fall Time	t_f		—	0.15	0.30		
	Turn-Off Time	t_{off}		—	0.50	0.80		
Forward Voltage		V_F	$I_F=30A, V_{GE}=0$	—	2.0	2.8	V	
Thermal Resistance		$R_{th(j-c)}$	Transistor	—	—	1.0	$^\circ C/W$	
			Diode	—	—	2.6		

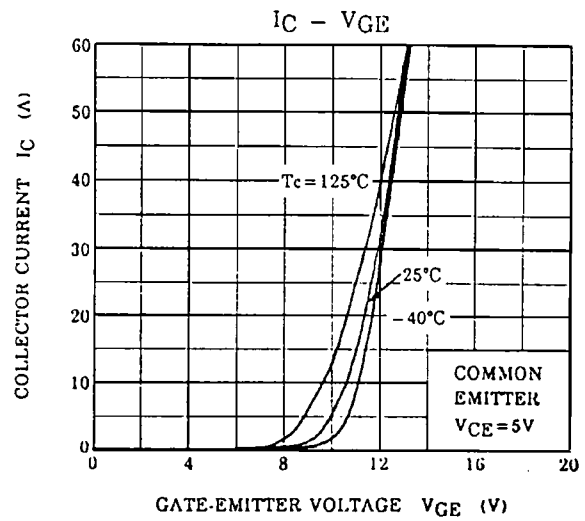
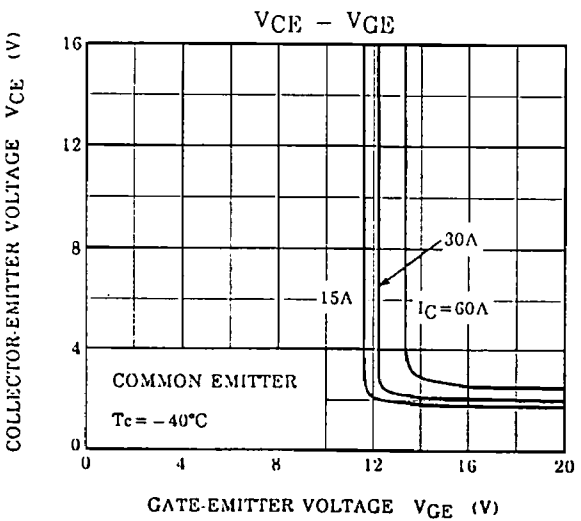
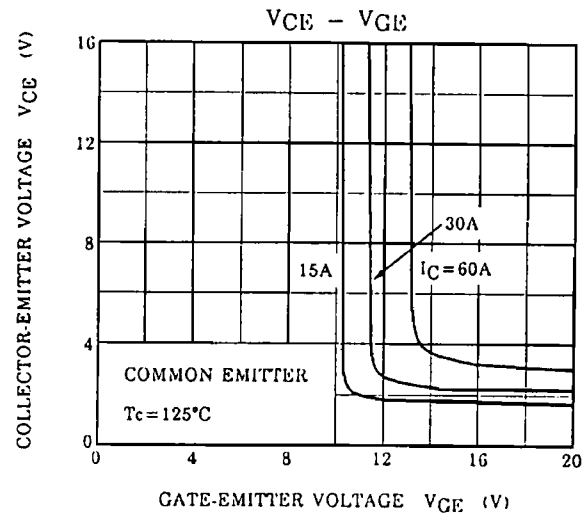
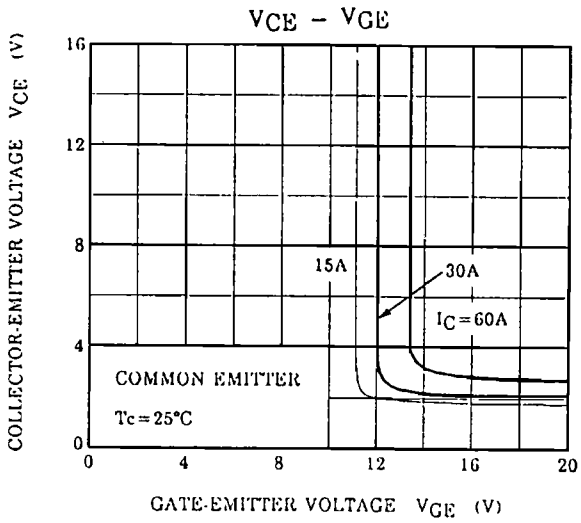
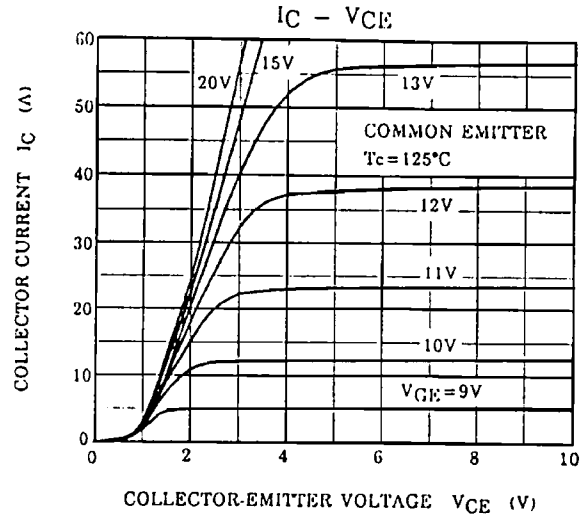
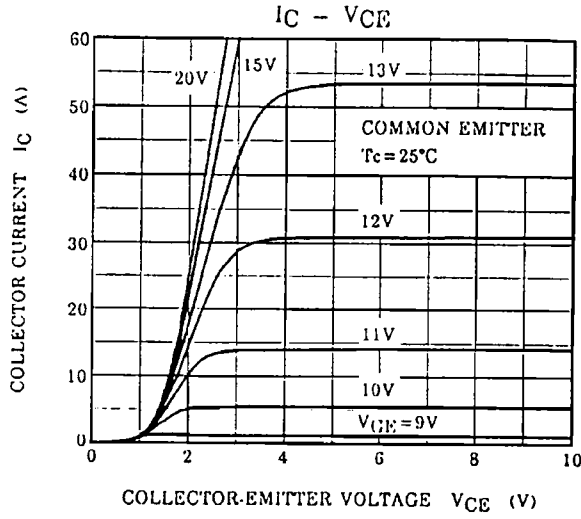
d. Thermistor

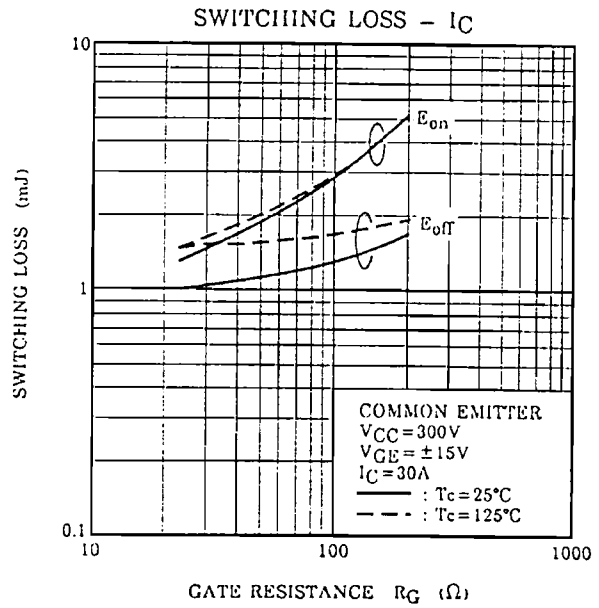
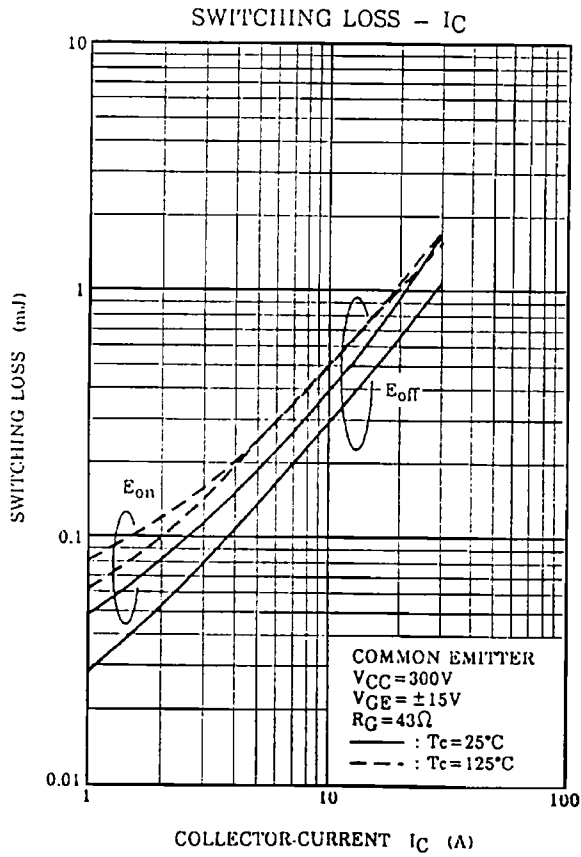
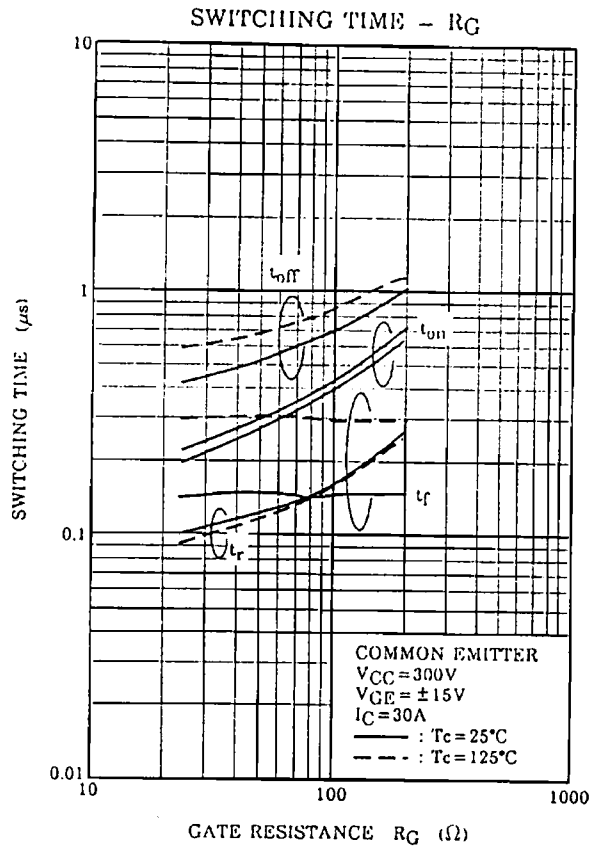
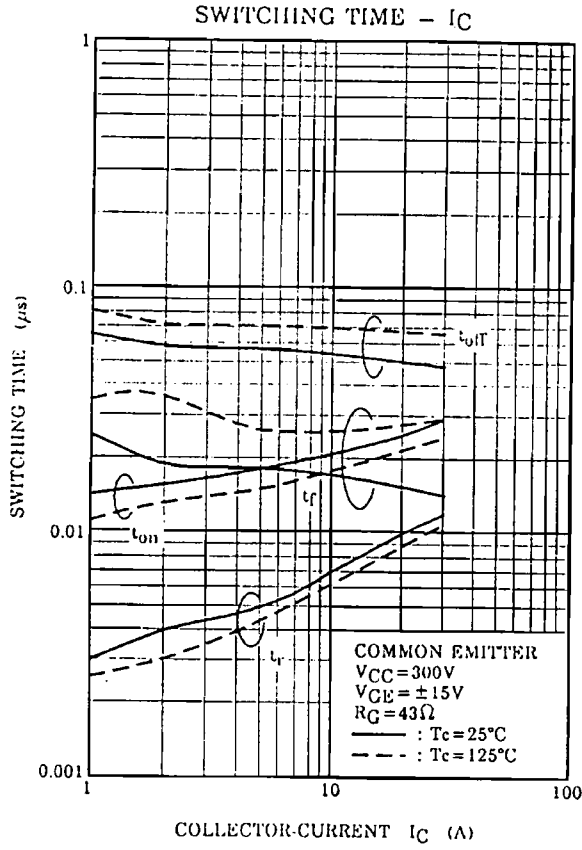
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Zero-power Resistance	R_{25}	$I_{TM}=0.2mA, T_c=25^\circ C$	17.31	20	23.14	$k\Omega$
B Value	B25/85	$T_c=25^\circ C/T_c=85^\circ C$	—	3760	—	K

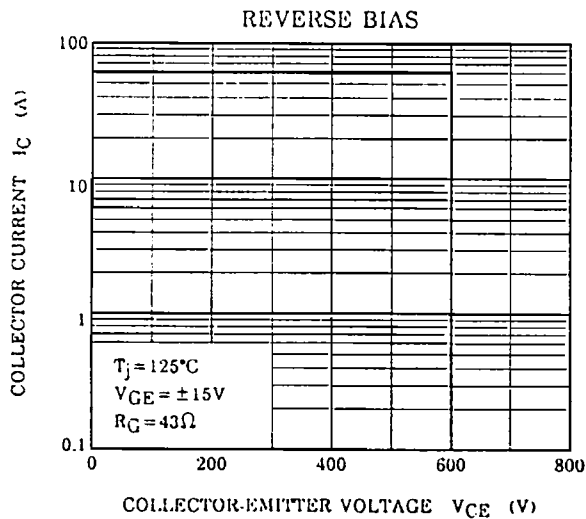
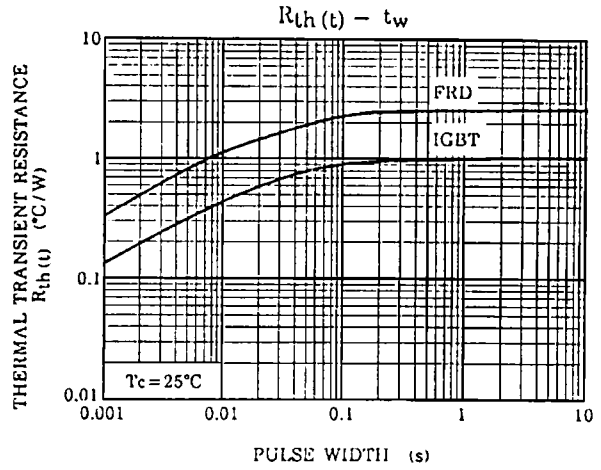
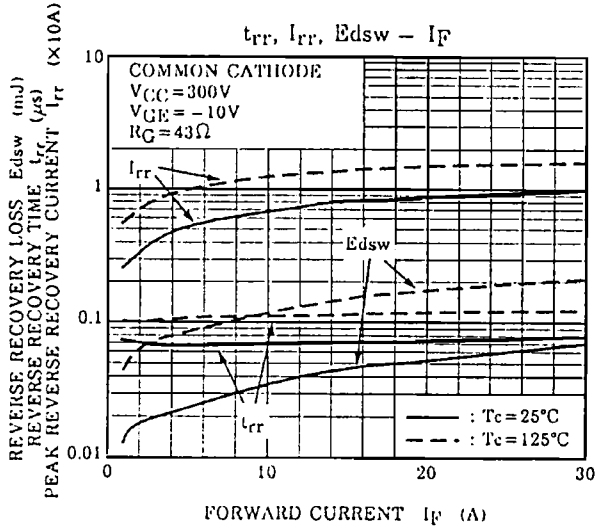
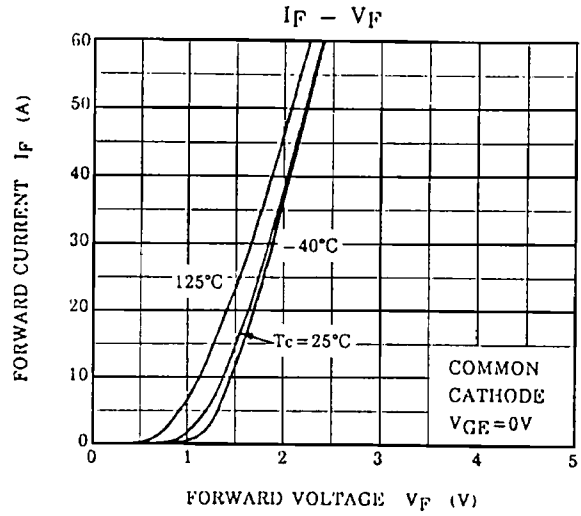
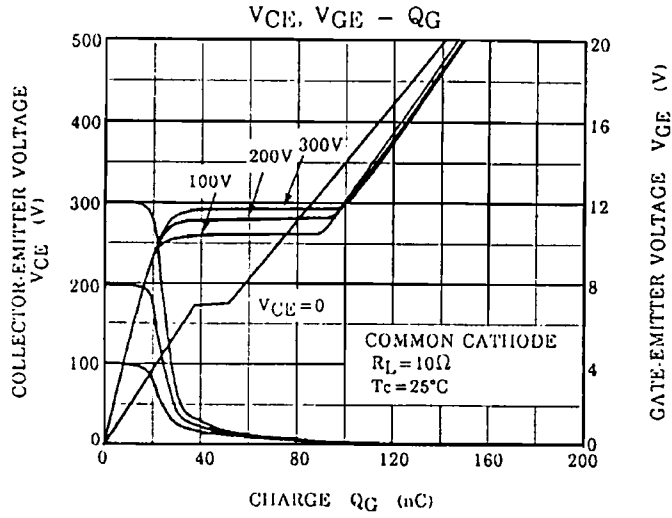
(Note 1) Switching Time Test Circuit & Timing Chart



a. Inverter stage / c. Brake stage







b. Converter stage

