

# 2SH13

## Silicon N-Channel IGBT

# HITACHI

1st. Edition  
Feb. 1995

### Application

High speed power switching

### Features

- High speed switching
- Low on saturation voltage

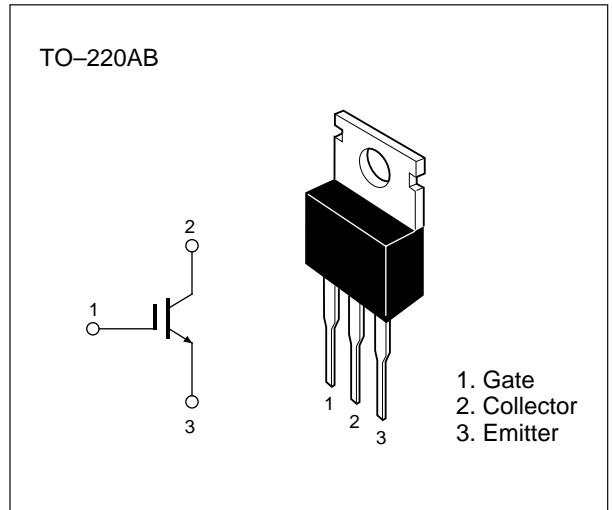


Table 1 Absolute Maximum Ratings (Ta = 25°C)

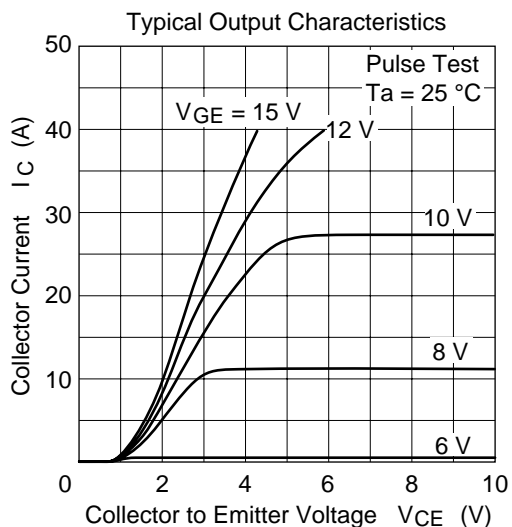
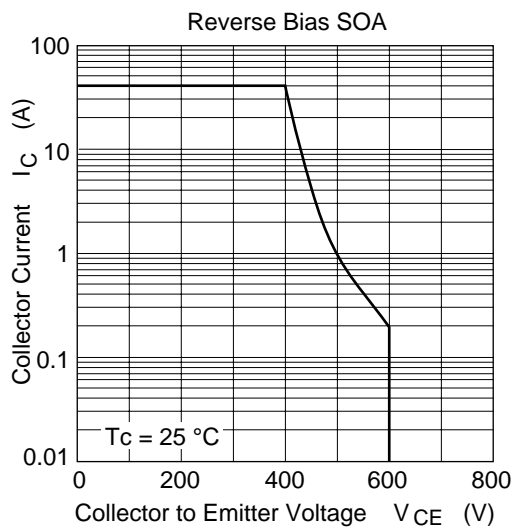
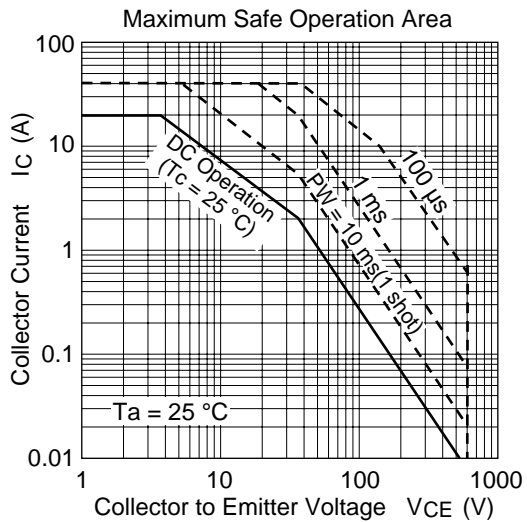
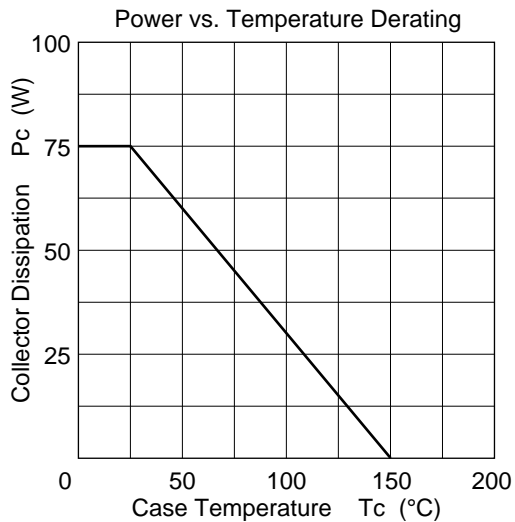
Item	Symbol	Ratings	Unit
Collector to emitter voltage	$V_{CES}$	600	V
Gate to emitter voltage	$V_{GES}$	$\pm 20$	V
Collector current	$I_C$	20	A
Collector peak current	$i_{c(peak)}$	40	A
Collector dissipation	$P_C^*$	75	W
Channel temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

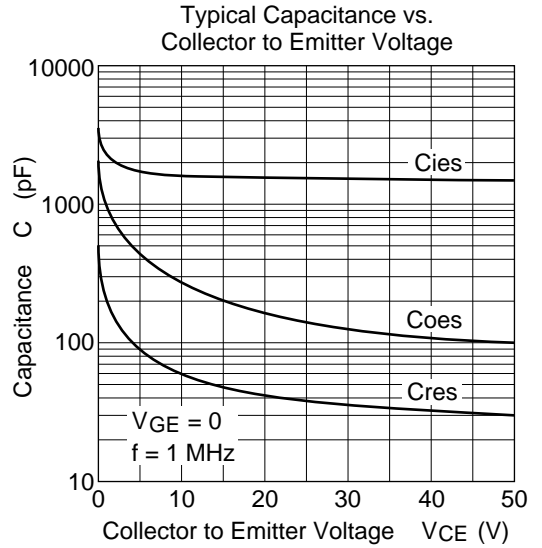
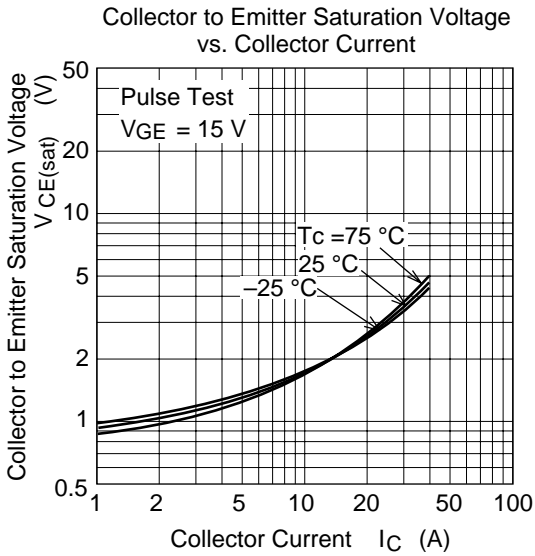
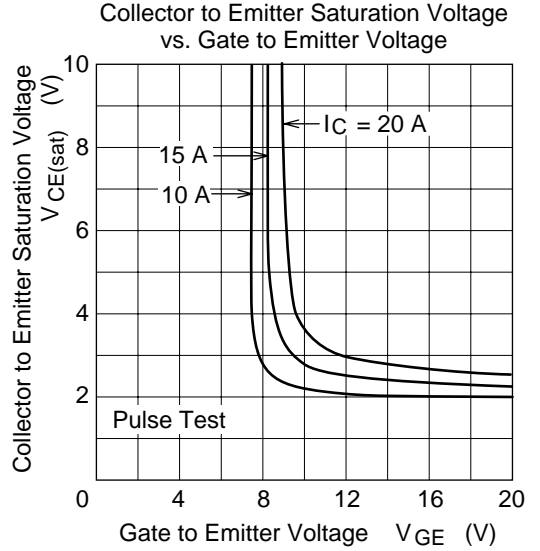
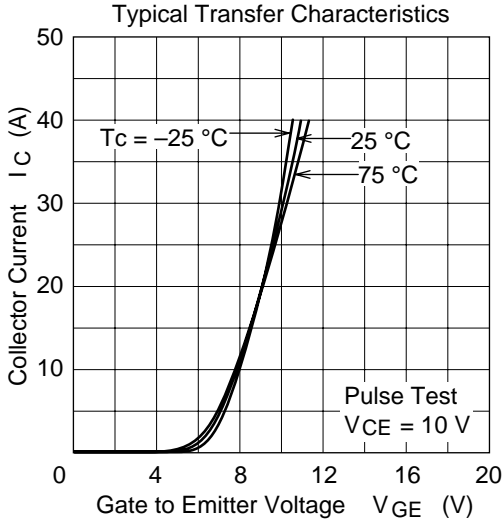
\* Value at  $T_c = 25^\circ\text{C}$

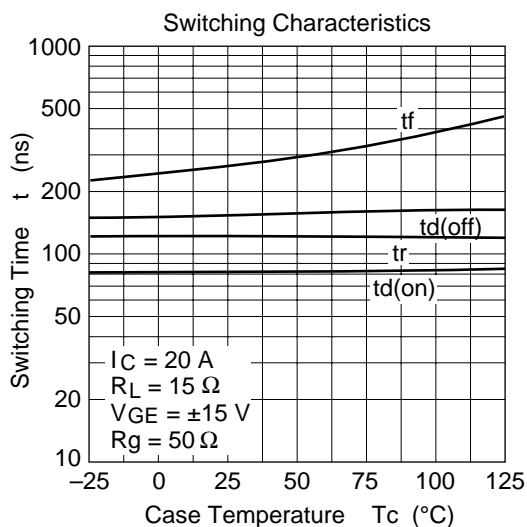
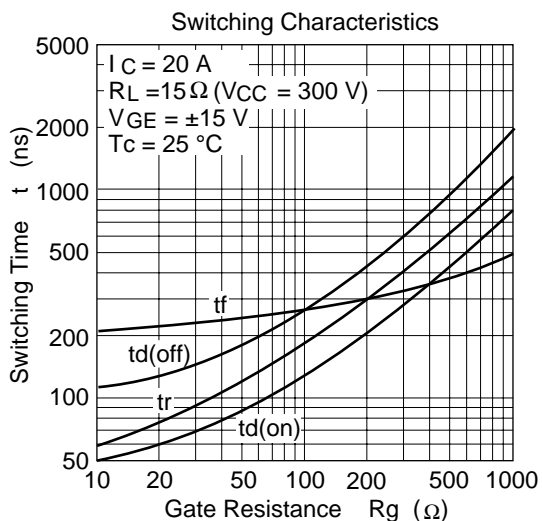
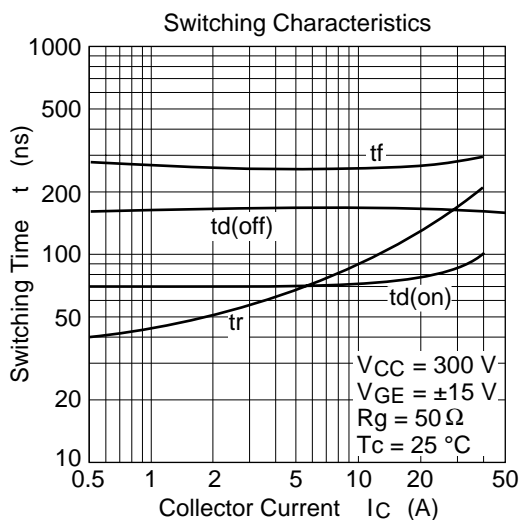
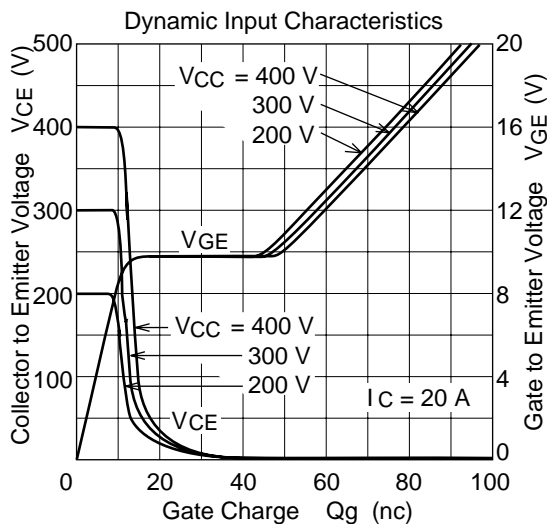
## 2SH13

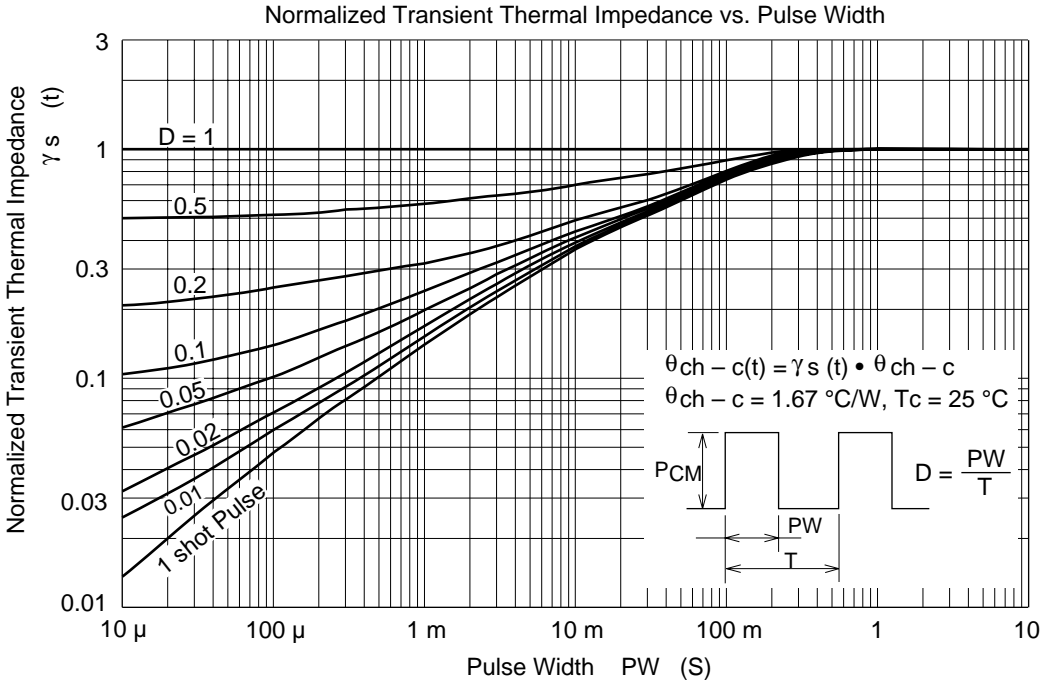
**Table 2 Electrical Characteristics** ( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to emitter breakdown voltage	$V_{(BR)CES}$	600	—	—	V	$I_C = 100\ \mu\text{A}$ , $V_{GE} = 0$
Zero gate voltage collector current	$I_{CES}$	—	—	0.5	mA	$V_{CE} = 600\ \text{V}$ , $V_{GE} = 0$
Gate to emitter leak current	$I_{GES}$	—	—	$\pm 1$	$\mu\text{A}$	$V_{GE} = \pm 20\ \text{V}$ , $V_{CE} = 0$
Gate to emitter cutoff current	$V_{GE(off)}$	3.0	—	5.0	V	$I_C = 1\ \text{mA}$ , $V_{CE} = 10\ \text{V}$
Collector to emitter saturation voltage	$V_{CE(sat)1}$	—	2.0	—	V	$I_C = 10\ \text{A}$ , $V_{GE} = 15\ \text{V}$
Collector to emitter saturation voltage	$V_{CE(sat)2}$	—	2.6	3.3	V	$I_C = 20\ \text{A}$ , $V_{GE} = 15\ \text{V}$
Input capacitance	$C_{ies}$	—	1800	—	pF	$V_{CE} = 10\ \text{V}$ , $V_{GE} = 0$ , $f = 1\ \text{MHz}$
Switching time	$t_r$	—	130	—	ns	$I_C = 20\ \text{A}$ , $R_L = 15\ \Omega$ , $V_{GE} = \pm 15\ \text{V}$ $R_g = 50\ \Omega$
	$t_{on}$	—	210	—		
	$t_f$	—	300	600		
	$t_{off}$	—	500	1000		

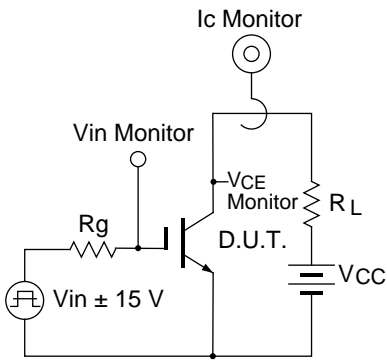




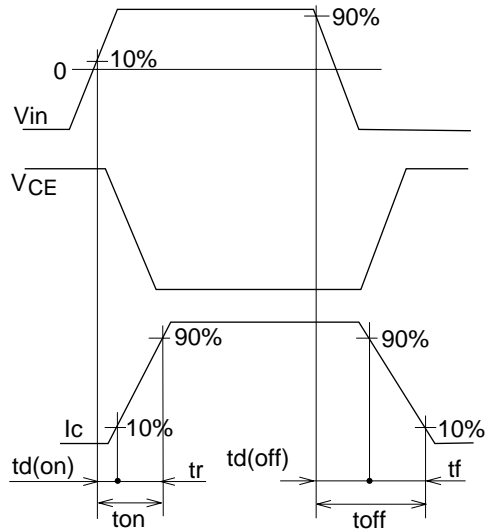




Switching Time Test Circuit



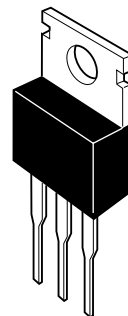
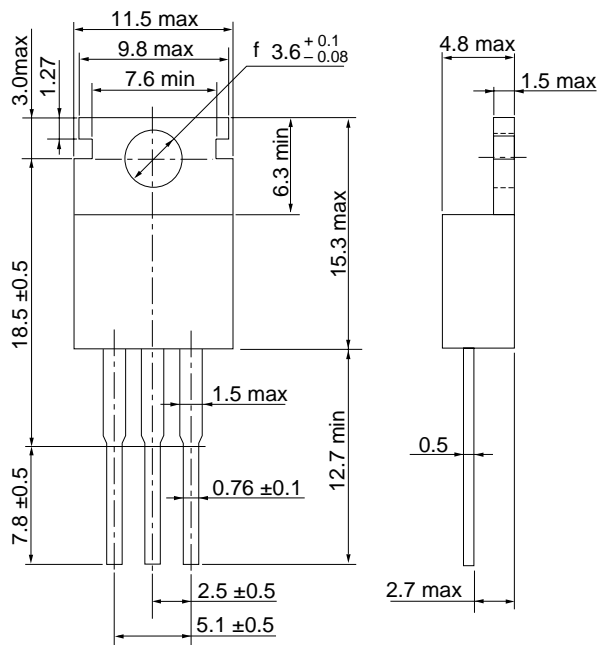
Waveforms



Package Dimensions

Unit : mm

• TO-220AB



Hitachi Code	TO-220AB
EIAJ	SC-46
JEDEC	—

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