

# 2SH20

## Silicon N-Channel IGBT

# HITACHI

1st. Edition  
Feb. 1995

### Application

High speed power switching

### Features

- High speed switching
- Low on saturation voltage

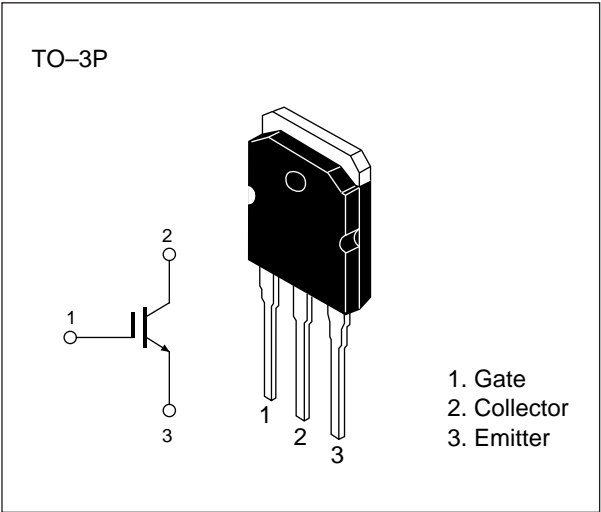


Table 1 Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to emitter voltage	$V_{CES}$	600	V
Gate to emitter voltage	$V_{GES}$	$\pm 20$	V
Collector current	$I_C$	36	A
Collector peak current	$i_{c(peak)}$	60	A
Collector dissipation	$P_C^*$	100	W
Channel temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

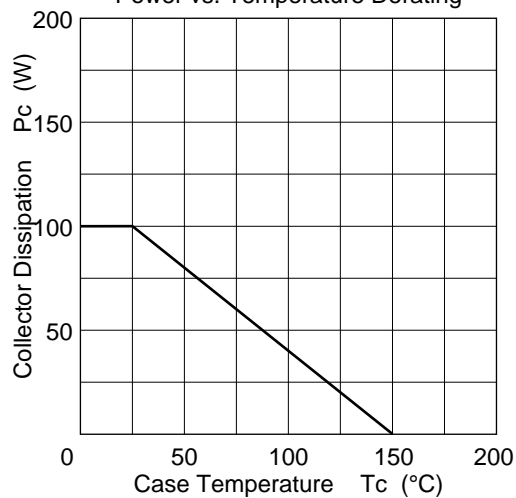
\* Value at  $T_c = 25^\circ\text{C}$

Table 2 Electrical Characteristics (Ta = 25°C)

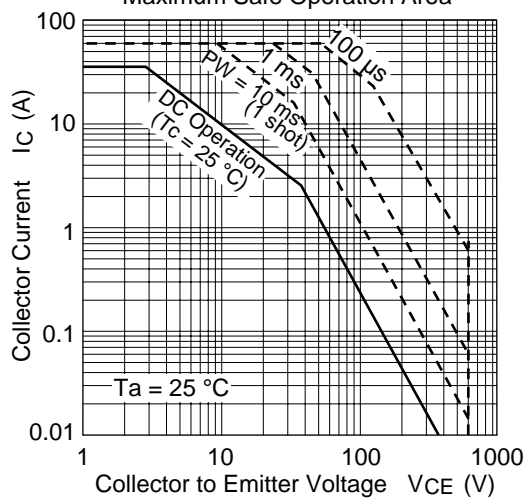
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to emitter breakdown voltage	$V_{(BR)CES}$	600	—	—	V	$I_C = 100\text{ }\mu\text{A}$ , $V_{GE} = 0$
Zero gate voltage collector current	$I_{CES}$	—	—	0.5	mA	$V_{CE} = 600\text{ V}$ , $V_{GE} = 0$
Gate to emitter leak current	$I_{GES}$	—	—	$\pm 1$	$\mu\text{A}$	$V_{GE} = \pm 20\text{ V}$ , $V_{CE} = 0$
Gate to emitter cutoff current	$V_{GE(off)}$	3.0	—	6.0	V	$I_C = 1\text{ mA}$ , $V_{CE} = 10\text{ V}$
Collector to emitter saturation voltage	$V_{CE(sat)1}$	—	1.5	—	V	$I_C = 15\text{ A}$ , $V_{GE} = 15\text{ V}$
Collector to emitter saturation voltage	$V_{CE(sat)2}$	—	2.0	2.6**	V	$I_C = 30\text{ A}$ , $V_{GE} = 15\text{ V}$
Input capacitance	$C_{ies}$	—	2600	—	pF	$V_{CE} = 10\text{ V}$ , $V_{GE} = 0$ , $f = 1\text{ MHz}$
Switching time	$t_r$	—	160	—	ns	$I_C = 30\text{ A}$ ,
	$t_{on}$	—	300	—		$R_L = 10\text{ }\Omega$ ,
	$t_f$	—	2000	—		$V_{GE} = \pm 15\text{ V}$
	$t_{off}$	—	2500	—		$R_g = 50\text{ }\Omega$

\*\* $V_{CE(sat)2}$  is specified at the correlated test condition ( $I_C=20\text{A}$ )

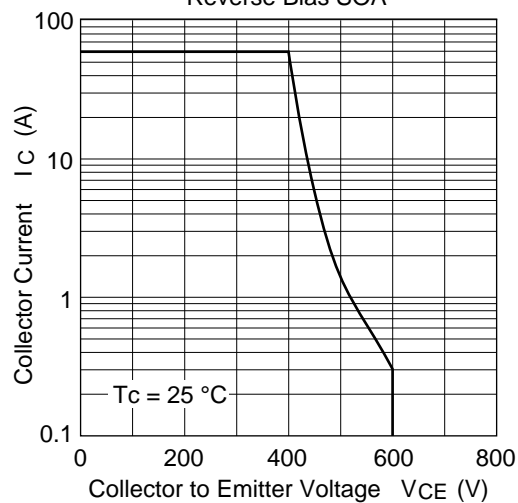
Power vs. Temperature Derating



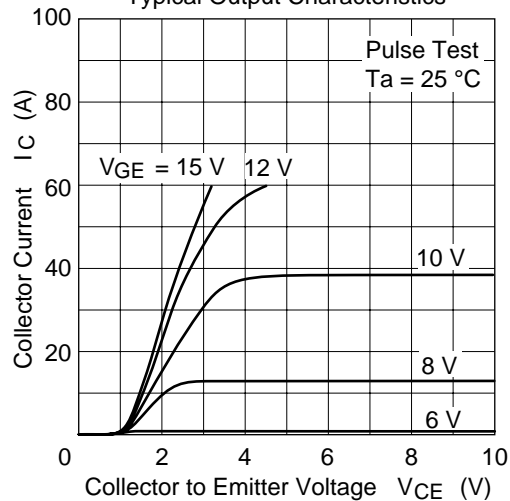
Maximum Safe Operation Area



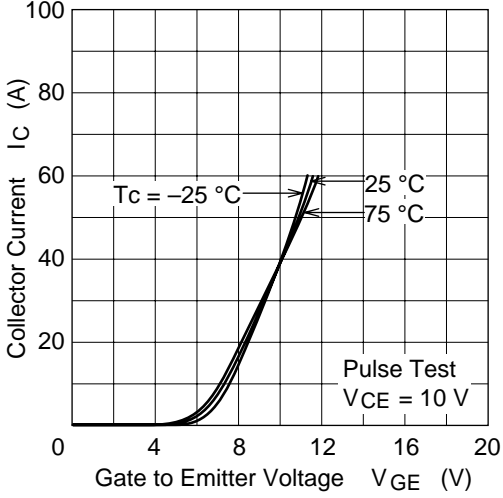
Reverse Bias SOA



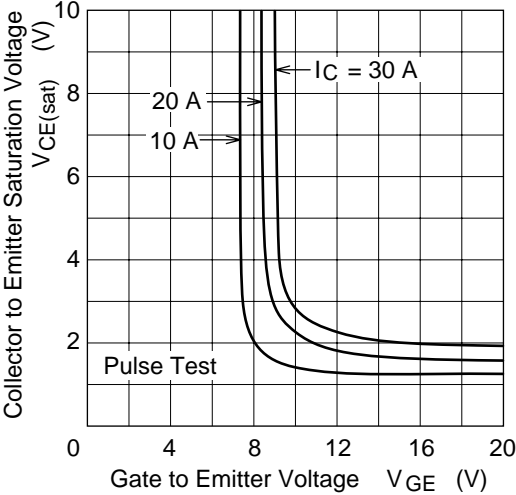
Typical Output Characteristics



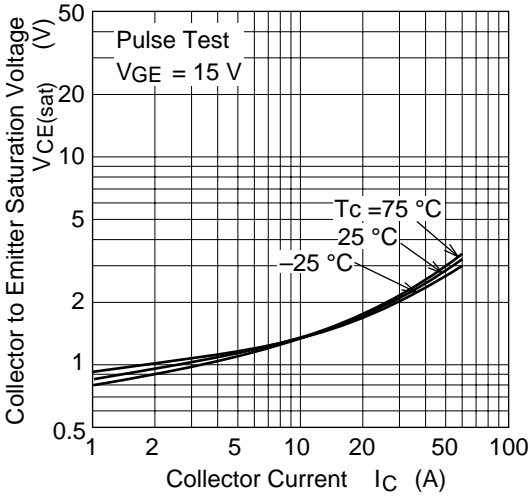
Typical Transfer Characteristics



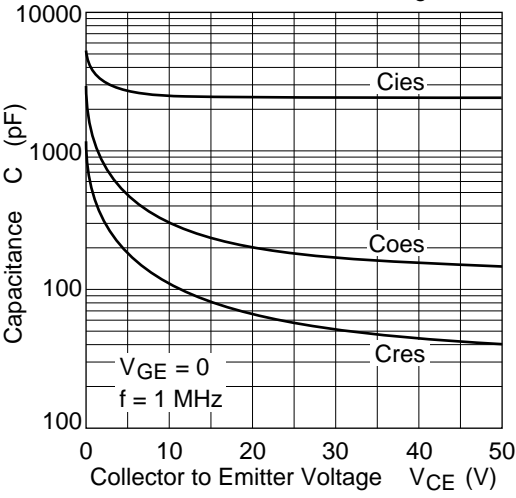
Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage

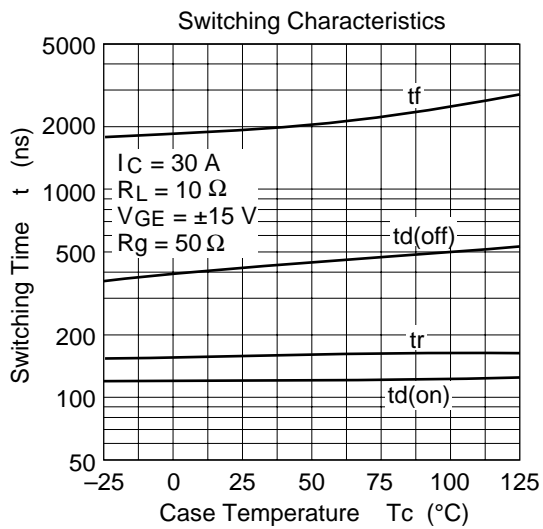
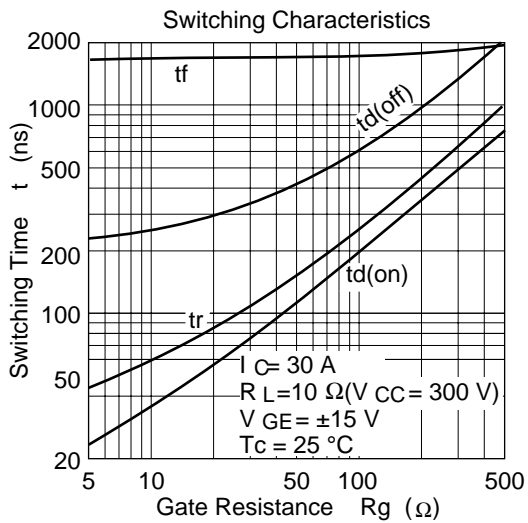
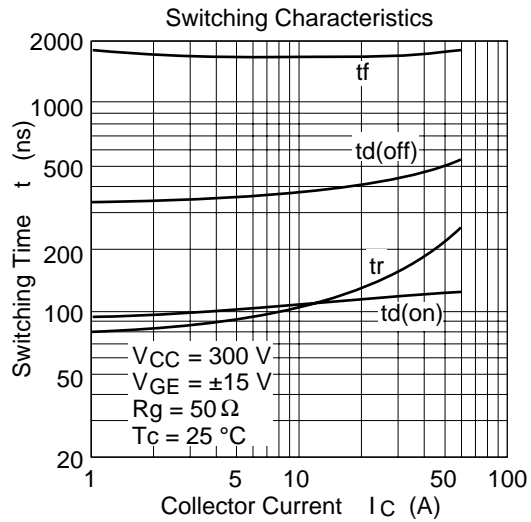
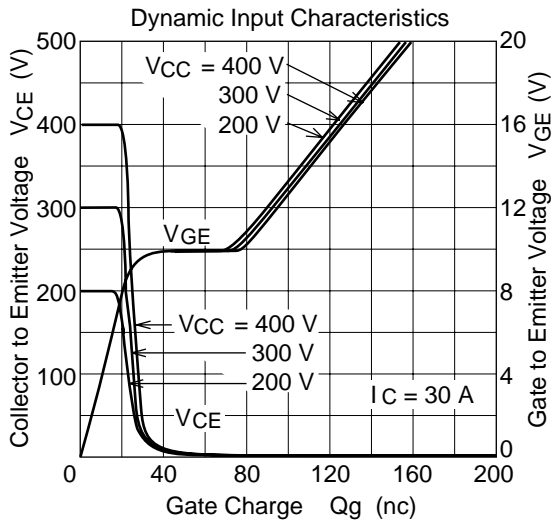


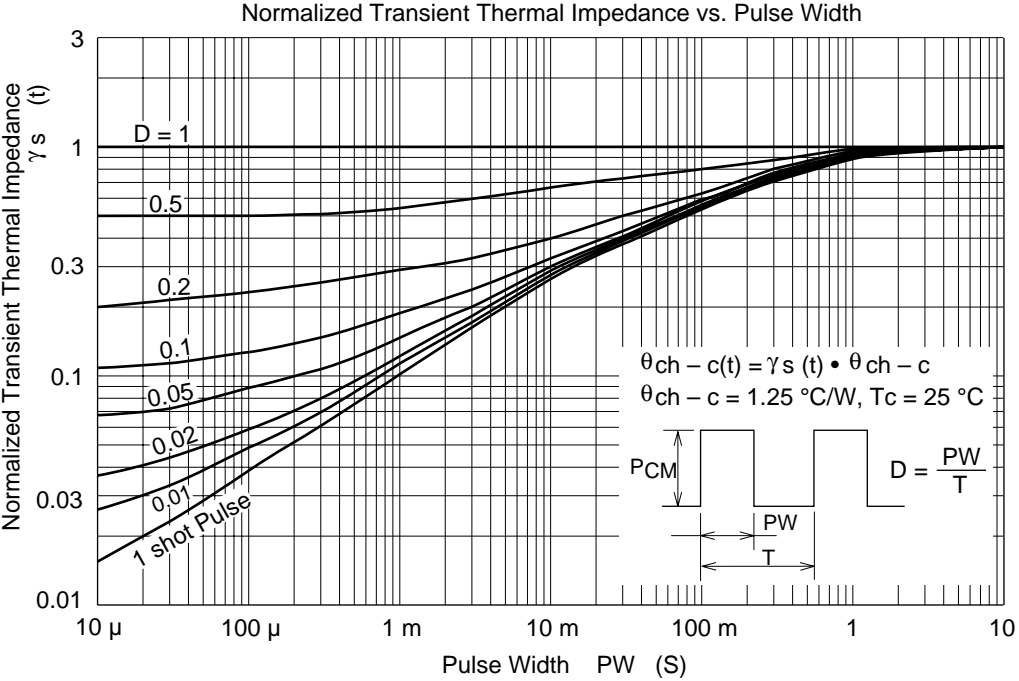
Collector to Emitter Saturation Voltage vs. Collector Current



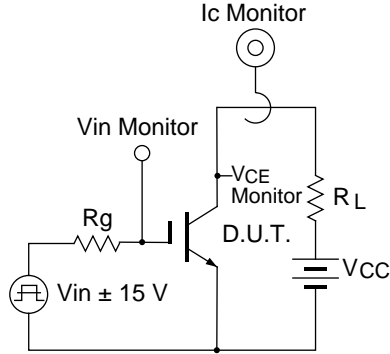
Typical Capacitance vs. Collector to Emitter Voltage



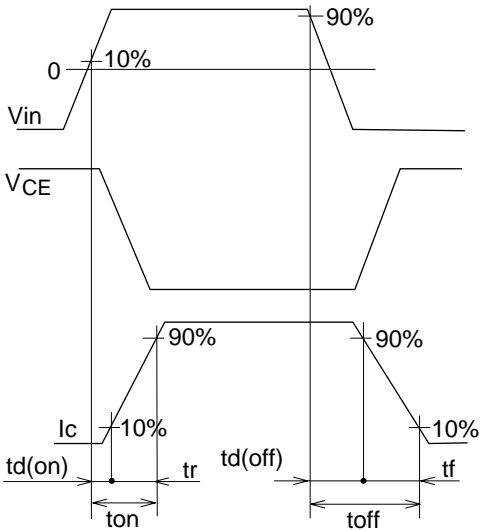




Switching Time Test Circuit



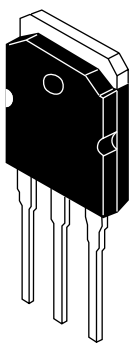
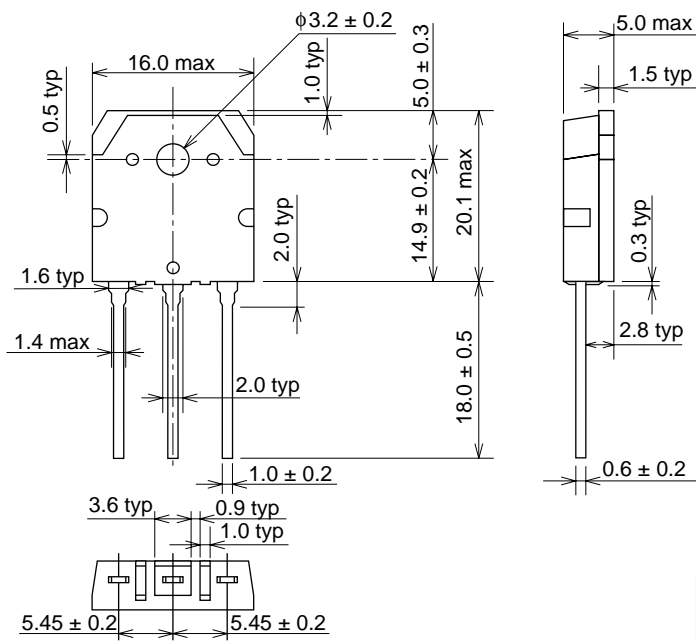
Waveforms



Package Dimensions

Unit : mm

• TO-3P



Hitachi Code	TO-3P
EIAJ	SC-65
JEDEC	—

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