

GN6050E

Silicon N Channel IGBT

HITACHI

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Application

High speed power switching

Features

- High speed switching
 $t_f = 200 \text{ ns typ, } 400 \text{ ns max}$
- Low on saturation voltage
 $V_{CE(sat)} = 4 \text{ V max}$
- Narrower $V_{GE(off)}$ voltage range
 $V_{GE(off)} = 3 \text{ to } 5 \text{ V}$
- Built in gate protection diodes from electrostatic damage
- Latch-free operation

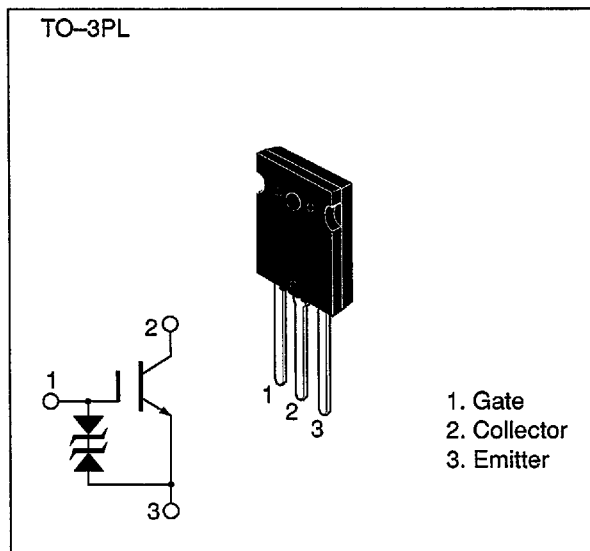


Table 1 Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Collector to emitter voltage	V_{CES}	600	V
Gate to emitter voltage	V_{GES}	± 20	V
Collector current	I_C	50	A
Collector peak current	$i_{c(peak)}$	100	A
Channel dissipation	P_C^*	200	W
Channel temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	$-55 \text{ to } +150$	$^\circ\text{C}$

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

GN6050E**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	$I_C = 10 \text{ mA}$, $V_{GE} = 0$
Gate to emitter breakdown voltage	$V_{(BR)GES}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{CE} = 0$
Zero gate voltage collector current	I_{CES}	—	—	0.5	mA	$V_{CE} = 480 \text{ V}$, $V_{GE} = 0$
Gate to emitter leak current	I_{GES}	—	—	± 10	μA	$V_{GE} = \pm 16 \text{ V}$, $V_{CE} = 0$
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	3.0	V	$I_C = 25 \text{ A}$, $V_{GE} = 15 \text{ V}$
Collector to emitter saturation voltage	$V_{CE(sat)2}$	—	3.0	4.0	V	$I_C = 50 \text{ A}$, $V_{GE} = 15 \text{ V}$
Input capacitance	C_{ies}	—	3700	—	pF	$V_{CE} = 10 \text{ V}$, $V_{GE} = 0$, $f = 1 \text{ MHz}$
Switching time	t_r	—	400	800	ns	$I_C = 50 \text{ A}$,
	t_{on}		500	1000		$R_L = 6 \text{ }\Omega$,
	t_f		200	400		$V_{GE} = \pm 15 \text{ V}$
	t_{off}		600	1200		$R_g = 50 \text{ }\Omega$

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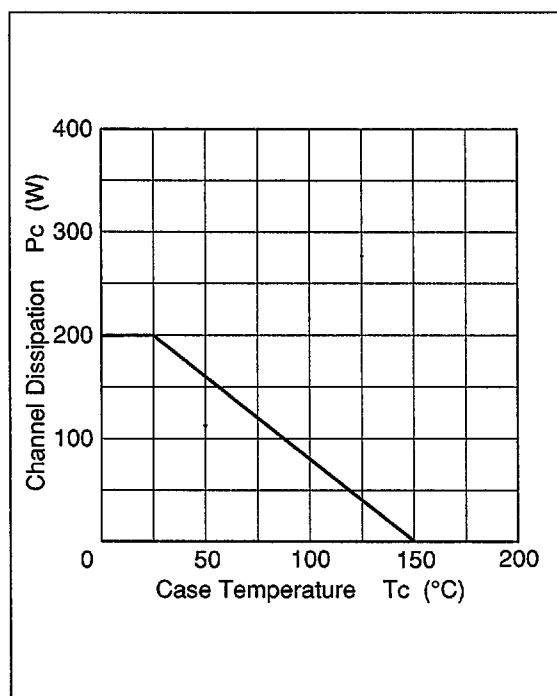


Figure 1 Power vs. Temperature Derating

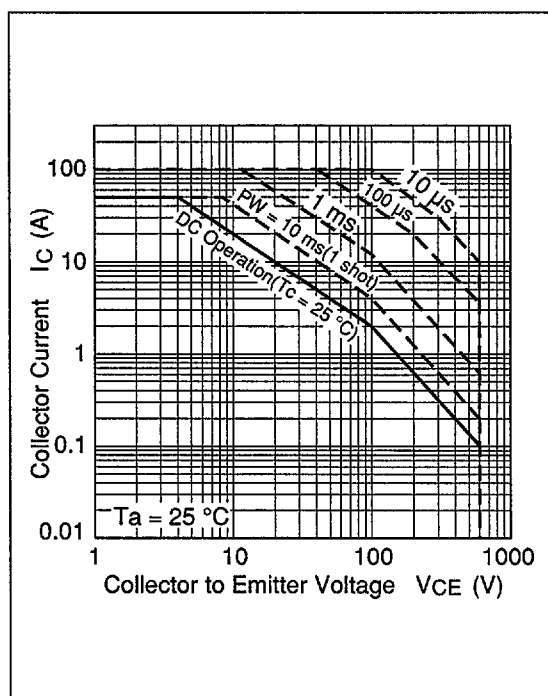


Figure 2 Maximum Safe Operation Area

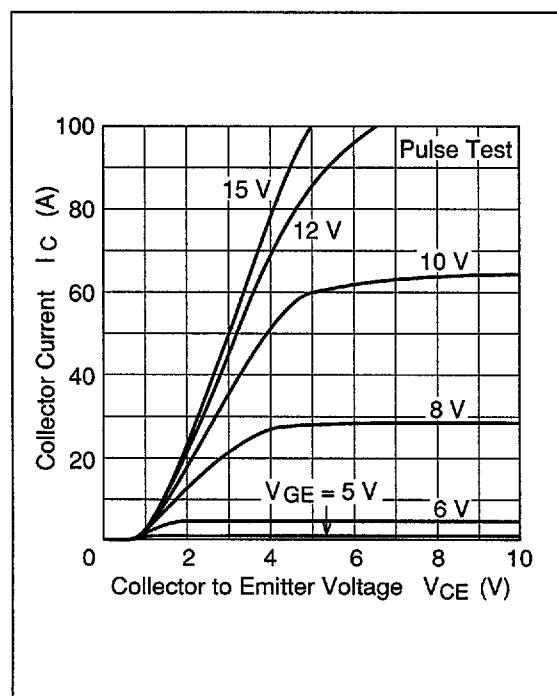


Figure 3 Typical Output Characteristics

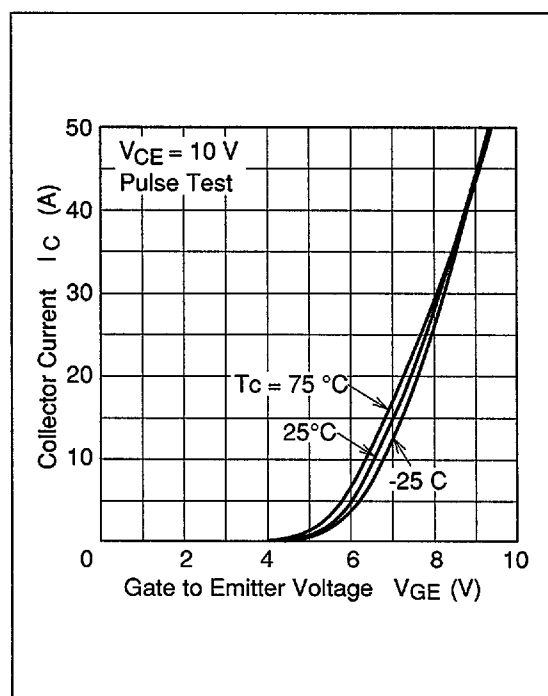


Figure 4 Typical Transfer Characteristics

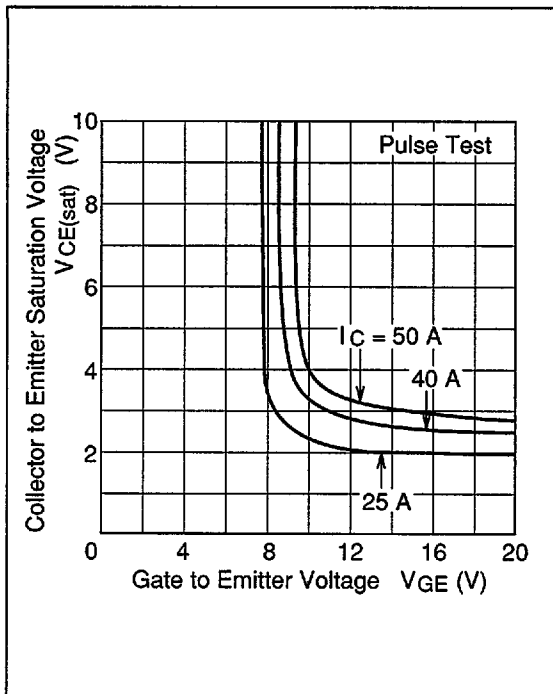
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Figure 5 Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage

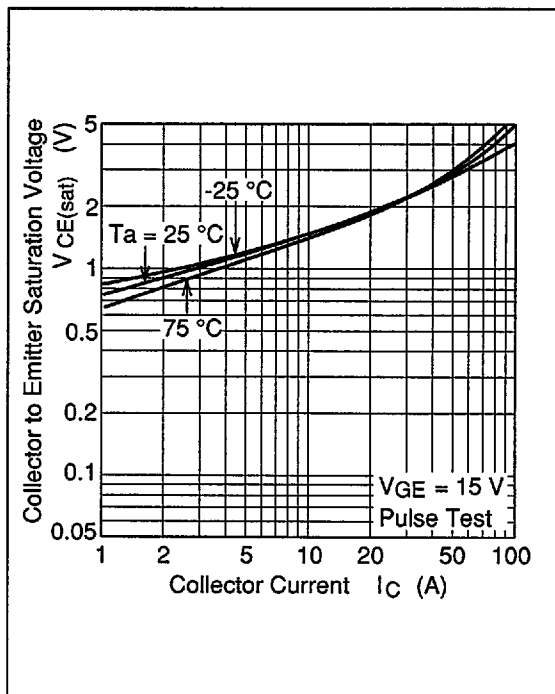


Figure 6 Collector to Emitter Saturation Voltage vs. Collector Current

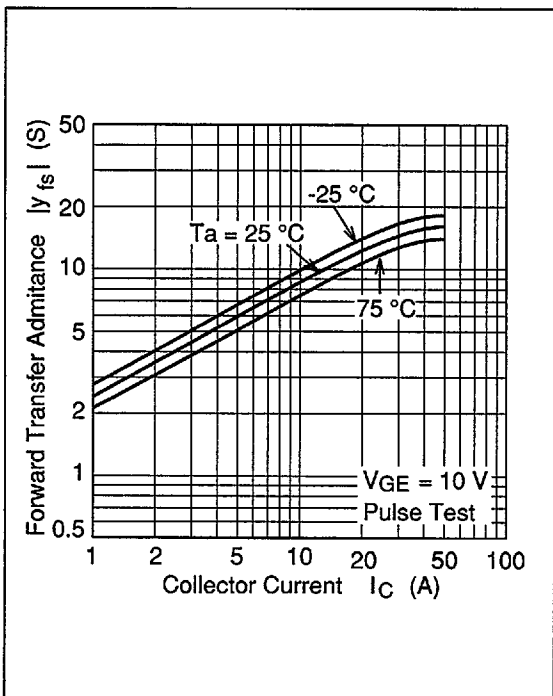


Figure 7 Forward Transfer Admittance vs. Collector Current

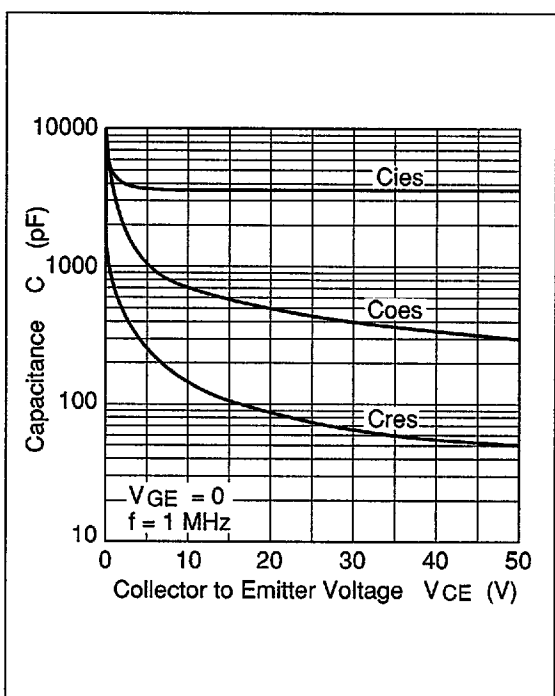


Figure 8 Typical Capacitance vs. Collector to Emitter Voltage

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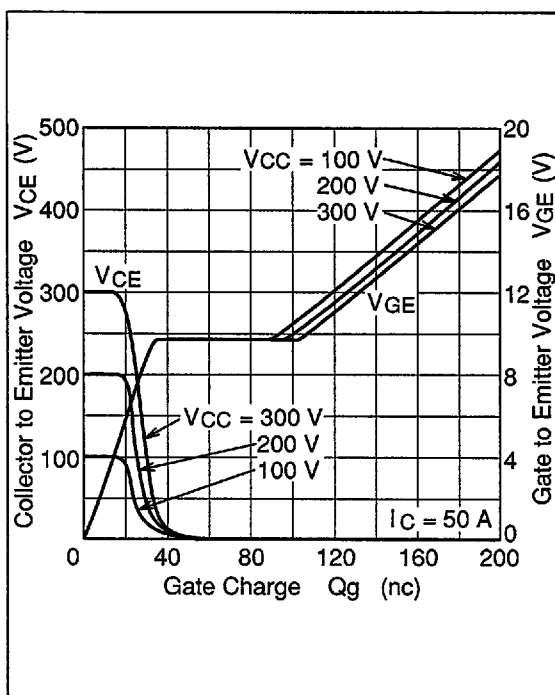


Figure 9 Dynamic Input Characteristics

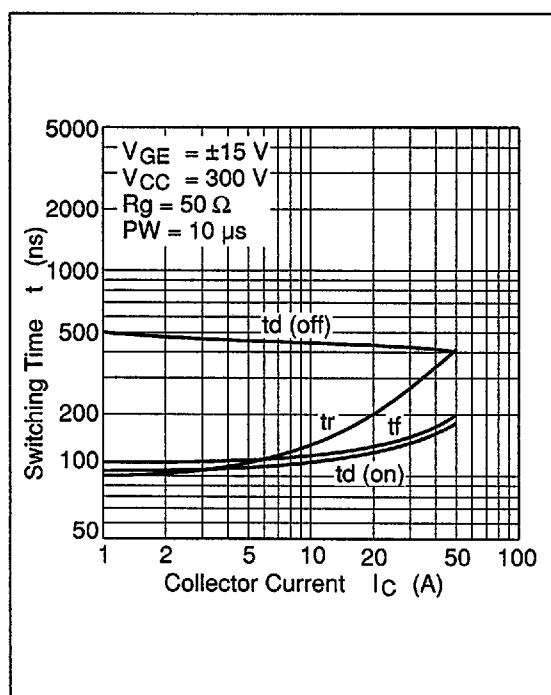


Figure 10 Switching Characteristics

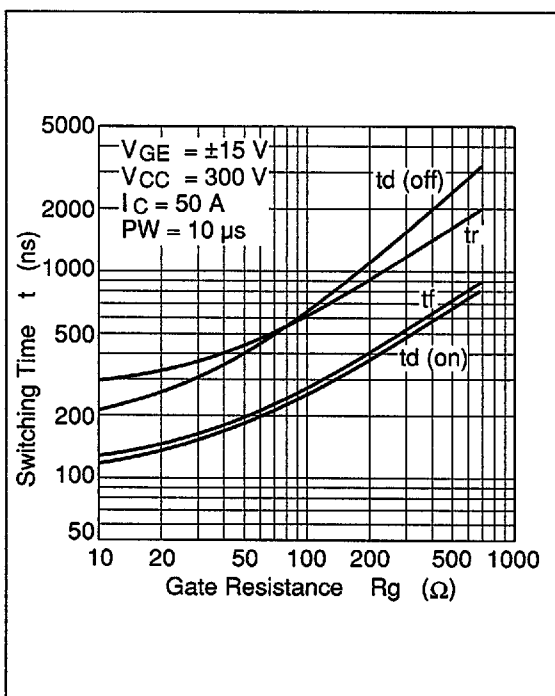
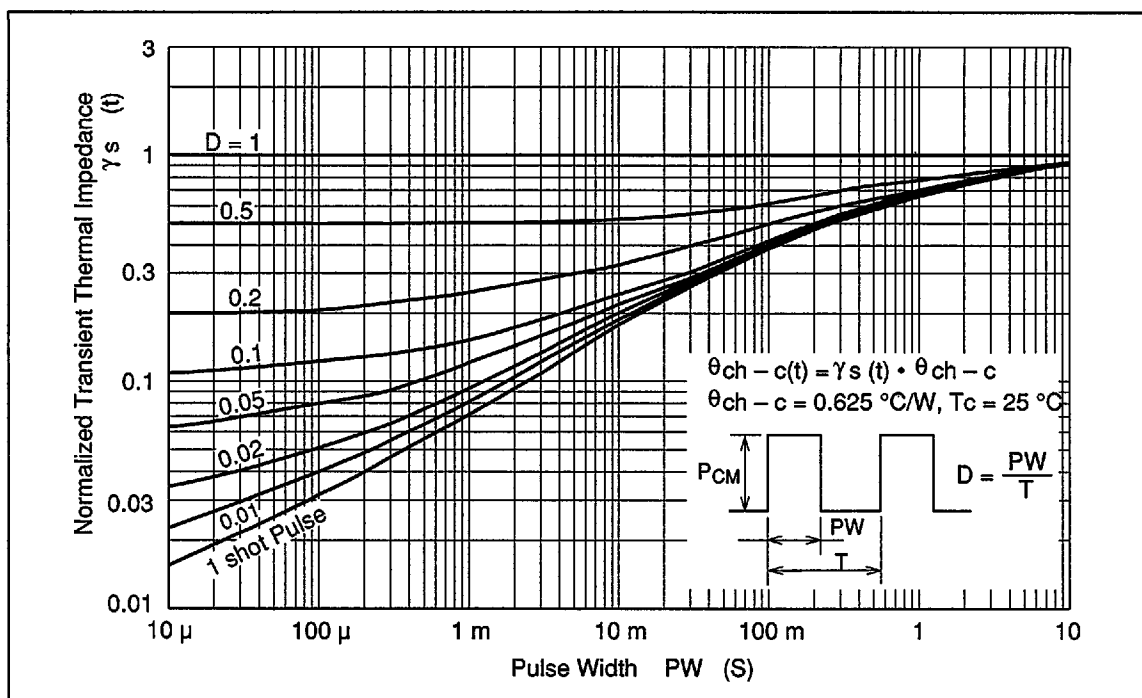
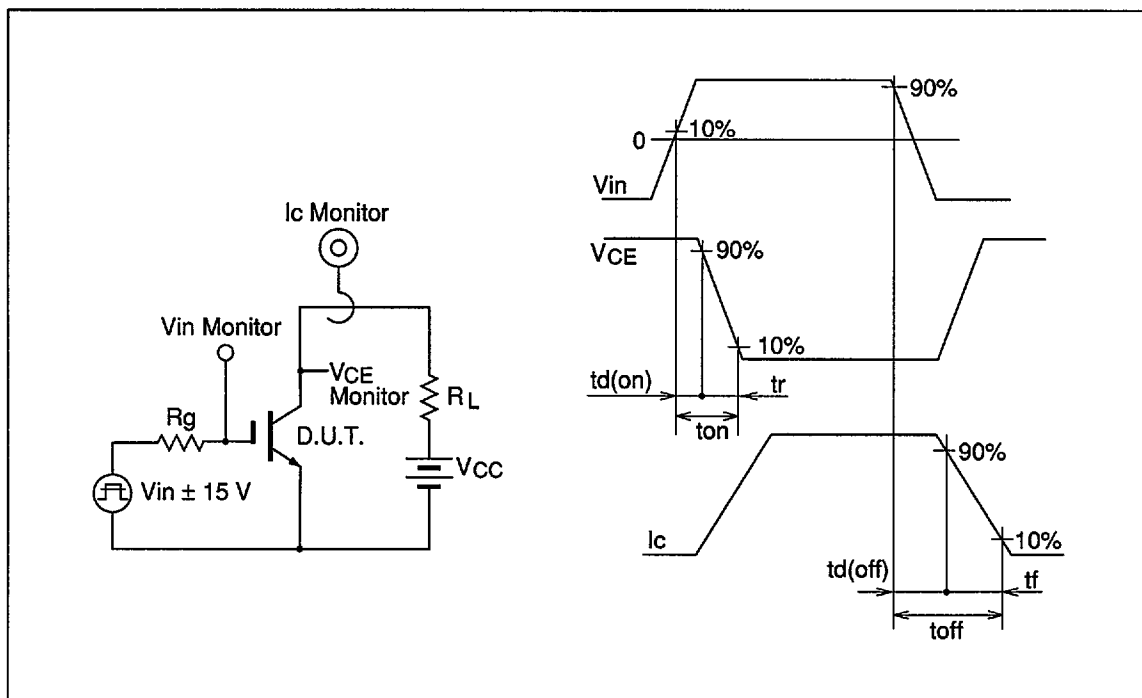


Figure 11 Switching Characteristics

GN6050E**Figure 12 Normalized Transient Thermal Impedance vs. Pulse Width****Switching Time Test Circuit and Waveforms**

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Package Dimensions

Unit : mm

TO-3PL

