



Shantou Huashan Electronic Devices Co., Ltd.

NPN SILICON TRANSISTOR

HE13009

HIGH VOLTAGE SWITCH MODE APPLICATIONS

High Speed Switching

Suitable for Switching Regulator and Monitor Control

ABSOLUTE MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$)

T_{stg} — Storage Temperature..... $-65\sim 150^{\circ}\text{C}$

T_j — Junction Temperature..... 150°C

P_C — Collector Dissipation ($T_c=25^{\circ}\text{C}$) 100W

V_{CBO} — Collector-Base Voltage..... 700V

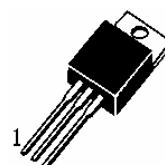
V_{CEO} — Collector-Emitter Voltage..... 400V

V_{EBO} — Emitter-Base Voltage..... 9V

I_C — Collector Current (DC) 12A

I_B — Base Current..... 6A

TO-220AB



1—Base, B

2—Collector, C

3—Emitter, E

ELECTRICAL CHARACTERISTICS ($T_a=25^{\circ}\text{C}$)

Symbol	Characteristics	Min	Typ	Max	Unit	Test Conditions
BV_{CEO}	Collector-Emitter Breakdown Voltage	400			V	$I_C=10\text{mA}$, $I_B=0$
I_{EBO}	Emitter Cut-off Current			1	mA	$V_{\text{EB}}=9\text{V}$, $I_C=0$
$H_{\text{FE}}(1)$	DC Current Gain	8		40		$V_{\text{CE}}=5\text{V}$, $I_C=5\text{A}$
$H_{\text{FE}}(2)$		6		30		$V_{\text{CE}}=5\text{V}$, $I_C=8\text{A}$
$V_{\text{CE}}(\text{sat}1)$	Collector- Emitter Saturation Voltage			1	V	$I_C=5\text{A}$, $I_B=1\text{A}$
$V_{\text{CE}}(\text{sat}2)$				1.5	V	$I_C=8\text{A}$, $I_B=1.6\text{A}$
$V_{\text{CE}}(\text{sat}3)$				3	V	$I_C=12\text{A}$, $I_B=3\text{A}$
$V_{\text{BE}}(\text{sat}1)$	Base-Emitter Saturation Voltage			1.2	V	$I_C=5\text{A}$, $I_B=1\text{A}$
$V_{\text{BE}}(\text{sat}2)$				1.6	V	$I_C=8\text{A}$, $I_B=1.6\text{A}$
C_{ob}	Output Capacitance		180		pF	$V_{\text{CB}}=10\text{V}$, $f=0.1\text{MHz}$
f_T	Current Gain-Bandwidth Product	4			MHz	$V_{\text{CE}}=10\text{V}$, $I_C=0.5\text{A}$
t_{ON}	Turn-On Time			1.1	μS	$V_{\text{CC}}=125\text{V}$, $I_C=8\text{A}$ $I_{\text{B}1}=-I_{\text{B}2}=1.6\text{A}$
t_{STG}	Storage Time			3	μS	
t_F	Fall Time			0.7	μS	



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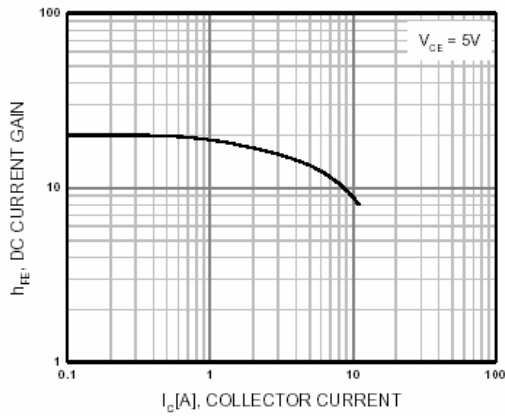


Figure 1. DC current Gain

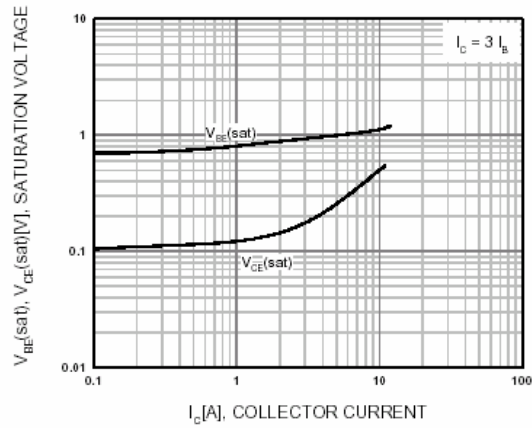


Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

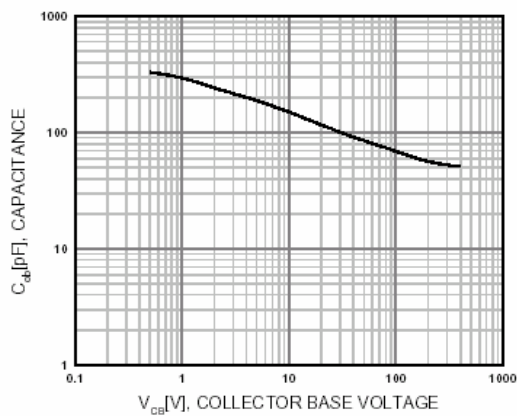


Figure 3. Collector Output Capacitance

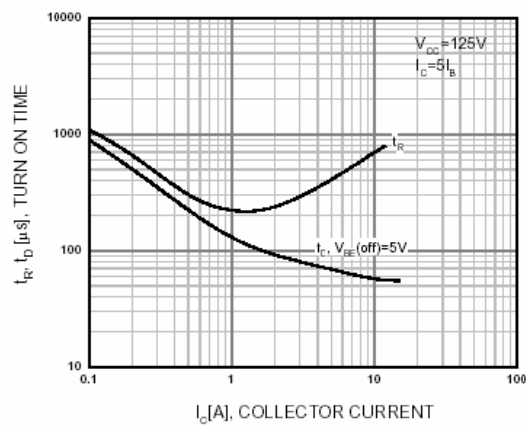


Figure 4. Turn On Time

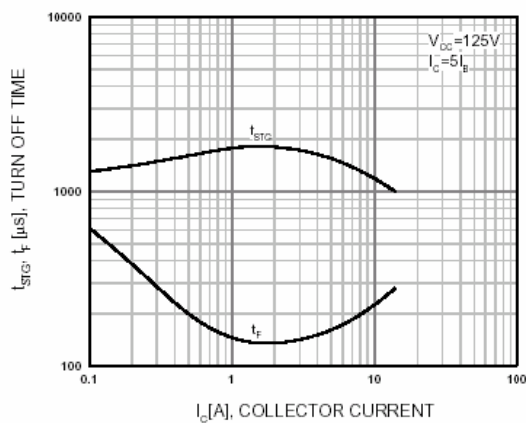


Figure 5. Turn Off Time

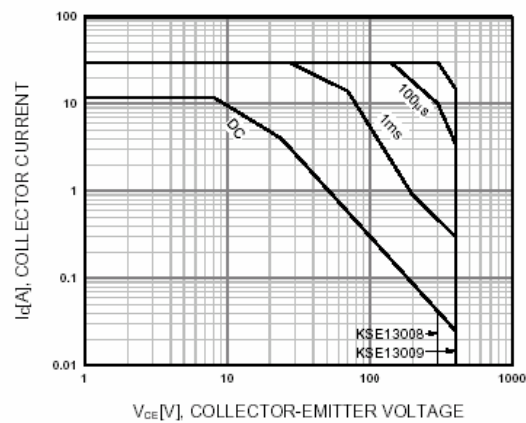


Figure 6. Safe Operating Area



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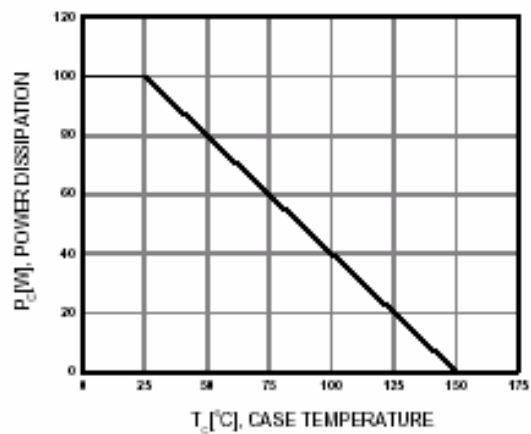


Figure 7. DC current Gain