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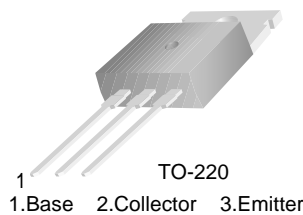
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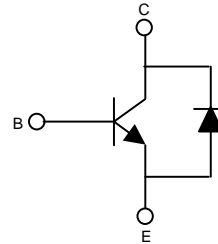
## High Voltage Fast Switching NPN Power Transistor

### Features

- Built-in Diode between Collector and Emitter
- Suitable for Electronic Ballast and Switch Mode Power Supplies



Internal Schematic Diagram



### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector-Base Voltage	700	V
$V_{CEO}$	Collector-Emitter Voltage	400	V
$V_{EBO}$	Emitter-Base Voltage	9	V
$I_C$	Collector Current (DC)	8	A
$I_{CP}$	* Collector Current (Pulse)	16	A
$I_B$	Base Current (DC)	4	A
$P_C$	Collector Dissipation ( $T_C = 25^\circ\text{C}$ )	80	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-55 ~ 150	$^\circ\text{C}$

\* Pulse Test: PW = 300ms, Duty Cycle = 2% Pulsed

### Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max	Units
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 500\mu\text{A}, I_E = 0$	700			V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 5\text{mA}, I_B = 0$	400			V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 500\mu\text{A}, I_C = 0$	9			V
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 9\text{V}, I_C = 0$			1	mA
$h_{FE1}$ $h_{FE2}$	DC Current Gain	$V_{CE} = 5\text{V}, I_C = 2\text{A}$ $V_{CE} = 5\text{V}, I_C = 5\text{A}$	8 5		40 30	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 2\text{A}, I_B = 0.4\text{A}$			1	V
		$I_C = 5\text{A}, I_B = 1\text{A}$			2	V
		$I_C = 8\text{A}, I_B = 2\text{A}$			3	V

Symbol	Parameter	Conditions	Min.	Typ.	Max	Units
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 2A, I <sub>B</sub> = 0.4A			1.2	V
		I <sub>C</sub> = 5A, I <sub>B</sub> = 1A			1.6	V
V <sub>F</sub>	Diode Forward Voltage	I <sub>C</sub> = 3A			2.5	V
C <sub>ob</sub>	Output Capacitance	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz		60		pF
t <sub>STG</sub>	Storage Time	V <sub>CC</sub> = 125V, I <sub>C</sub> = 5A			3	μs
t <sub>F</sub>	Fall Time	I <sub>B1</sub> = -I <sub>B2</sub> = 1A, R <sub>L</sub> = 50Ω			0.7	μs
t <sub>STG</sub>	Storage Time	V <sub>CC</sub> = 30V, I <sub>C</sub> = 5A, L=200μH			2.3	μs
t <sub>F</sub>	Fall Time	I <sub>B1</sub> =1A, R <sub>BB</sub> = 0Ω, V <sub>BE(OFF)</sub> = -5V V <sub>CLAMP</sub> = 250V			150	ns

\* Pulse test: PW = 300μs, Duty cycl e= 2%

### h<sub>FE</sub> Classification

Classification	H1	H2
h <sub>FE1</sub>	15 ~ 28	26 ~ 39

## Typical Characteristics

Figure 1. Static Characteristic

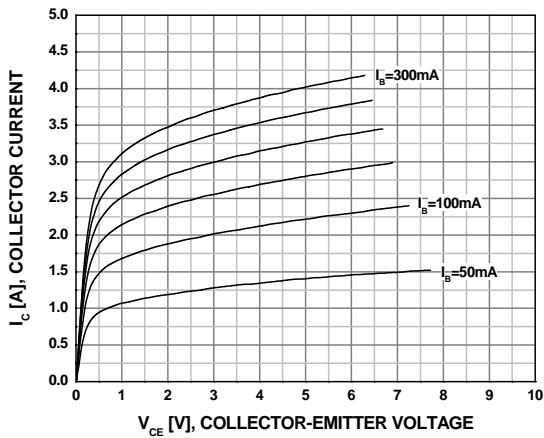


Figure 2. DC Current Gain (H1 Grade)

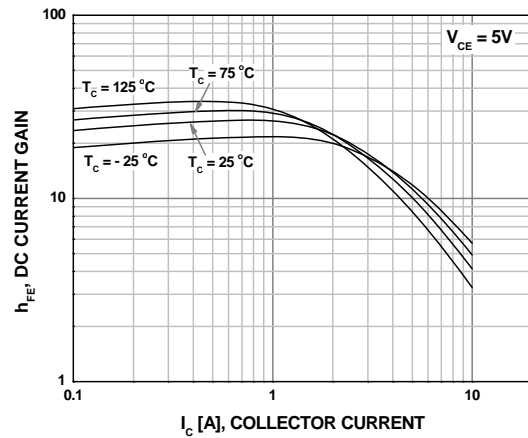


Figure 3. DC Current Gain (H2 Grade)

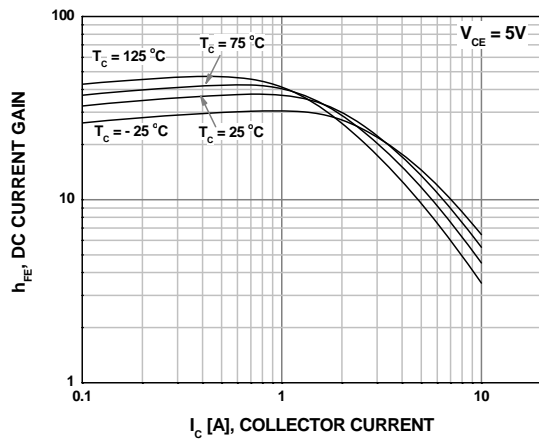


Figure 4. Collector-Emitter Saturation Voltage

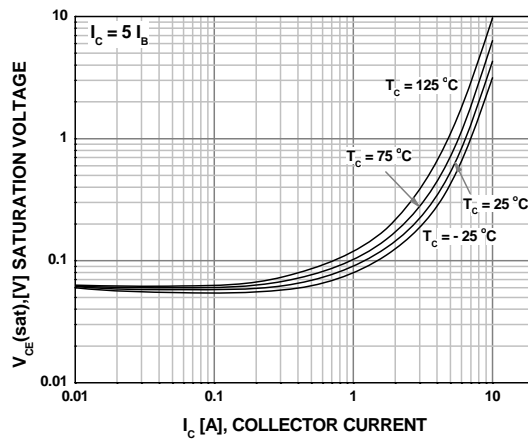


Figure 5. Base-Emitter Saturation Voltage

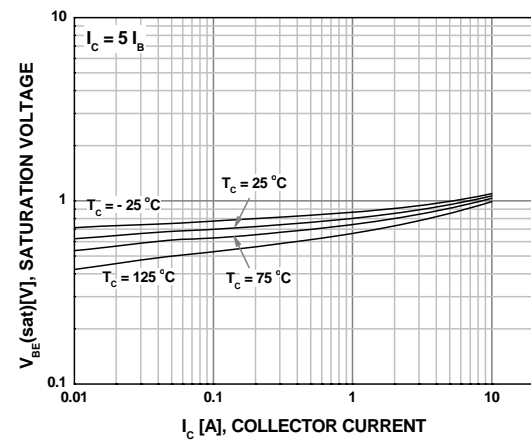
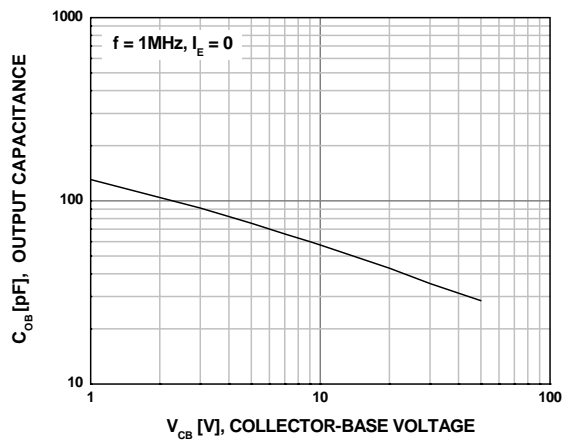


Figure 6. Output Capacitance



## Typical Characteristics (Continued)

Figure 7. Power Derating

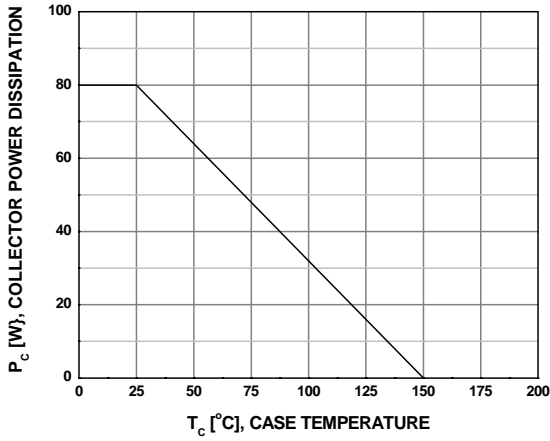


Figure 8. Reverse Biased Safe Operating Area

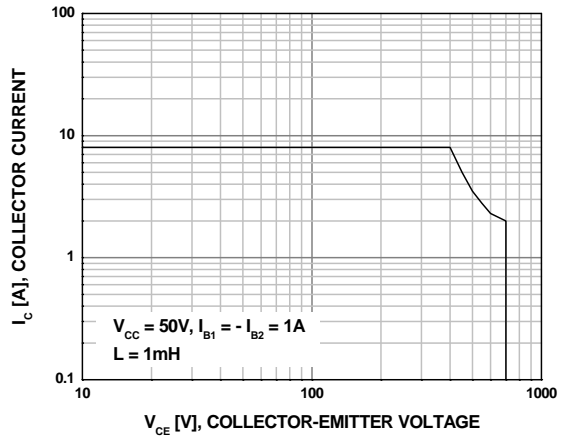
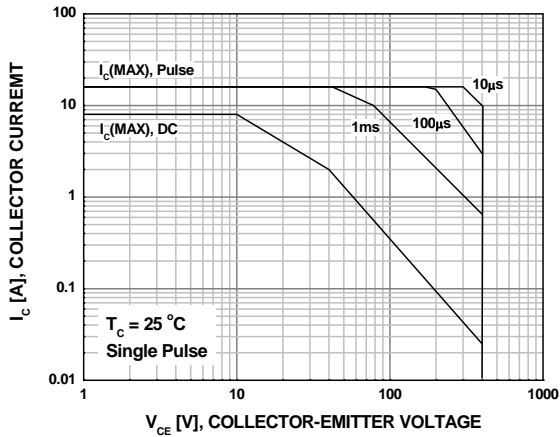


Figure 9. Forward Biased Safe Operating Area





- NOTES:**
- A) REFERENCE JEDEC, TO-220, VARIATION AB
  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DIMENSIONS COMMON TO ALL PACKAGE SUPPLIERS EXCEPT WHERE NOTED [ ].
  - D) LOCATION OF MOLDED FEATURE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
  - E) DOES NOT COMPLY JEDEC STANDARD VALUE.
  - F) "A1" DIMENSIONS AS BELOW:  
 SINGLE GAUGE = 0.51 - 0.61  
 DUAL GAUGE = 1.10 - 1.45
  - G) DRAWING FILE NAME: TO220B03REV9
  - H) PRESENCE IS SUPPLIER DEPENDENT
  - I) SUPPLIER DEPENDENT MOLD LOCKING HOLES IN HEATSINK.

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