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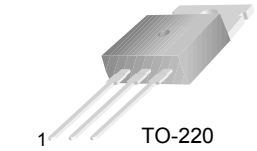
Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

May 2010

KSC5305D
NPN Silicon Transistor

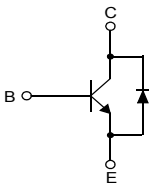
Features

- High Voltage High Speed Power Switch Application
- Built-in Free-wheeling Diode makes efficient anti saturation operation
- Suitable for half bridge light ballast Applications
- No need to interest an h_{FE} value because of low variable storage-time spread even though corner spirit product
- Low base drive requirement



1.Base 2.Collector 3.Emitter

Equivalent Circuit



Absolute Maximum Ratings T_a = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CBO}	Collector Base Voltage	800	V
V_{CEO}	Collector Emitter Voltage	400	V
V_{EBO}	Emitter Base Voltage	12	V
I_C	Collector Current (DC)	5	A
I_{CP}	*Collector Current (Pulse)	10	A
I_B	Base Current (DC)	2	A
I_{BP}	*Base Current (Pulse)	4	A
P_C	Power Dissipation (T_C=25°C)	75	W
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature	- 65 to 150	°C

* Pulse Test : Pulse Width = 5mS, Duty cycles ≤ 10%

Thermal Characteristics

Symbol	Parameter		Rating	Units
$R_{\theta jc}$	Thermal Resistance	Junction to Case	1.65	°C/W
$R_{\theta ja}$		Junction to Ambient	62.5	°C/W

Electrical Characteristics T_a=25°C unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
BV_{CBO}	Collector-Base Breakdown Voltage	I_C=1mA, I_E=0	800	-	-	V
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_C=5mA, I_B=0	400	-	-	V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E=1mA, I_C=0	12	-	-	V
I_{CBO}	Collector Cut-off Current	V_{CB}=500V, I_E=0	-	-	10	μA
I_{EBO}	Emitter Cut-off Current	V_{EB}= 9V, I_C= 0	-	-	10	μA
h_{FE1} h_{FE2}	DC Current Gain	V_{CE}=1V, I_C=0.8A V_{CE}=1V, I_C=2A	22 8	- -	- -	
V_{CE}(sat)	Collector-Emitter Saturation Voltage	I_C=0.8A, I_B=0.08A I_C=2A, I_B=0.4A	- -	- -	0.4 0.5	V V
V_{BE}(sat)	Base-Emitter Saturation Voltage	I_C=0.8A, I_B=0.08A I_C=2A, I_B=0.4A	- -	- -	1.0 1.0	V V
C_{ob}	Output Capacitance	V_{CB}=10V, f=1MHz	-	-	75	pF
t_{ON}	Turn On Time	V_{CC}=300V, I_C=2A, I_{B1}=0.4A, I_{B2}=-1A, R_L=150Ω	-	-	150	ns
t_{STG}	Storage Time		-	-	2	μs
t_F	Fall Time		-	-	0.2	μs
t_{STG}	Storage Time	V_{CC}=15V, V_Z=300V, I_C=2A, I_{B1}=0.4A, I_{B2}=-0.4A, L_C=200μH	-	-	2.25	μs
t_F	Fall Time		-	-	150	ns
V_F	Diode Forward Voltage	I_F=1A I_F=2A	- -	- -	1.5 1.6	V V
t_{rr}	* Reverse recovery time (di/dt = 10A/μs)	I_F=0.4A I_F=1A I_F=2A	- - -	800 1.4 1.9	- - -	ns μs μs

* Pulse Test : Pulse Width = 5mS, Duty cycles ≤ 10%

Typical Characteristics

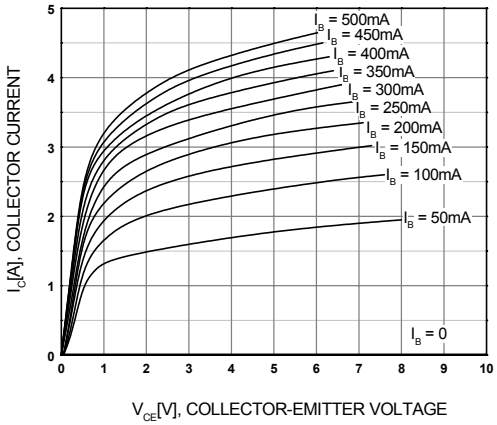


Figure 1. Static Characteristic

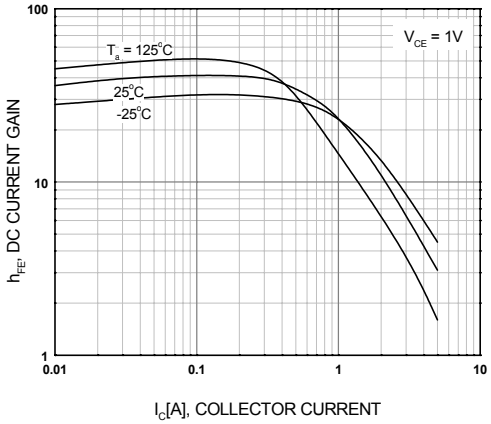


Figure 2. DC current Gain

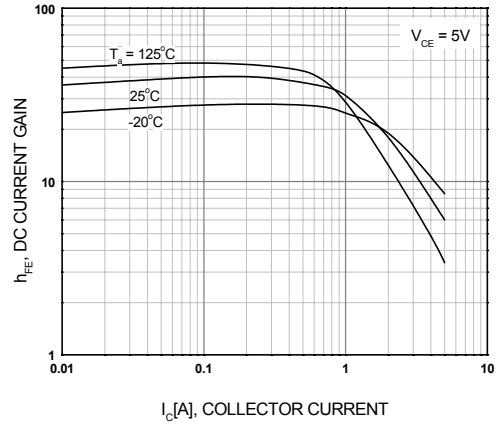


Figure 3. DC current Gain

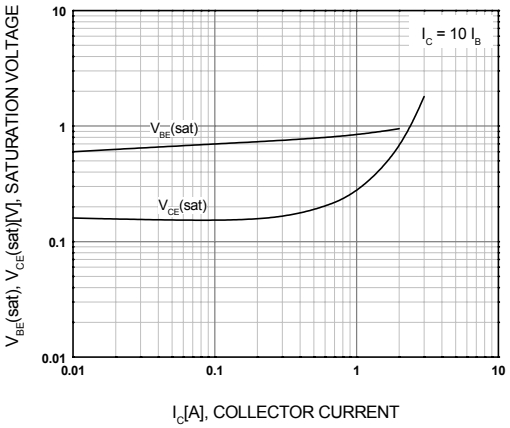


Figure 4. Collector-Emitter Saturation Voltage Base-Emitter Saturation Voltage

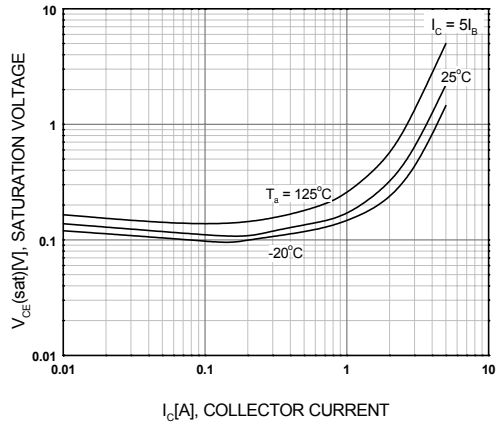


Figure 5. Collector-Emitter Saturation Voltage

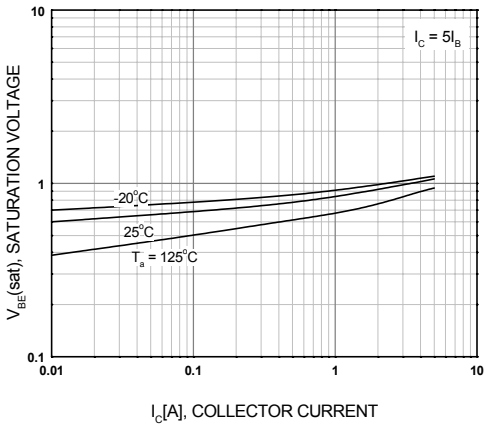


Figure 6. Base-Emitter Saturation Voltage

Typical Characteristics (Continued)

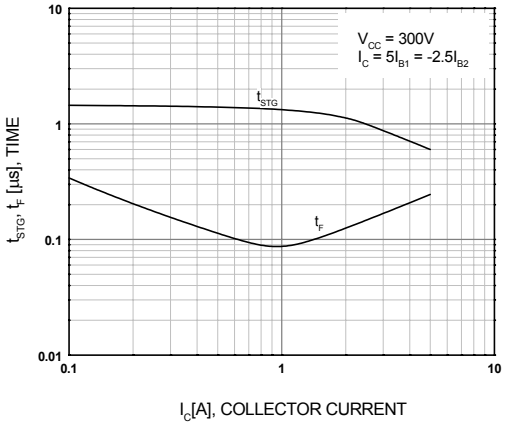


Figure 7. Switching Time

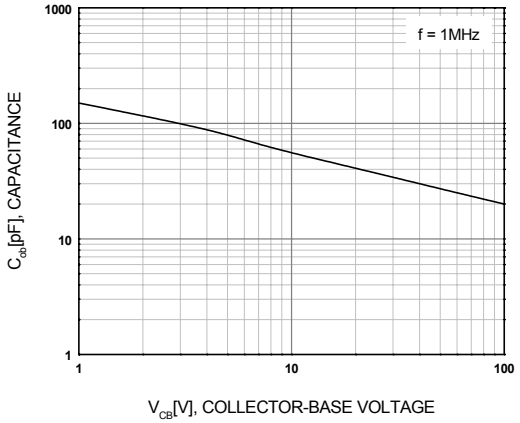


Figure 8. Collector Output Capacitance

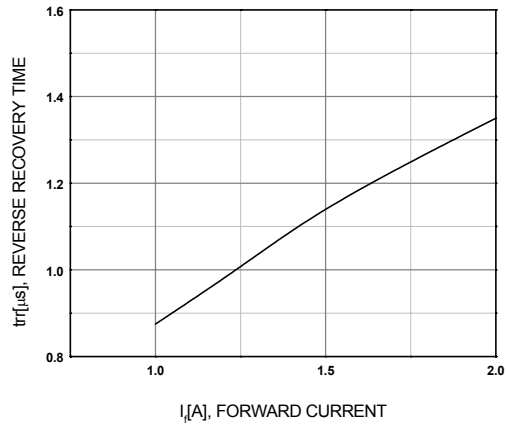


Figure 9. Reverse Recovery Time

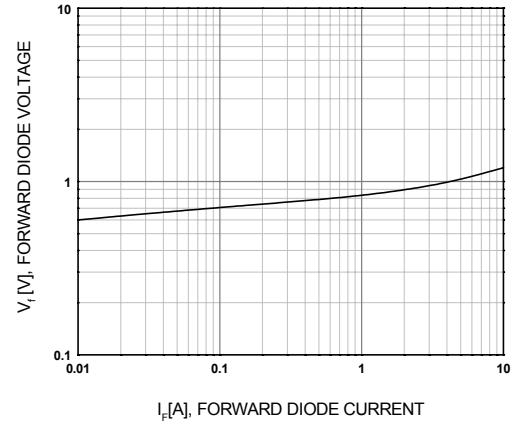


Figure 10. Forward Diode Voltage

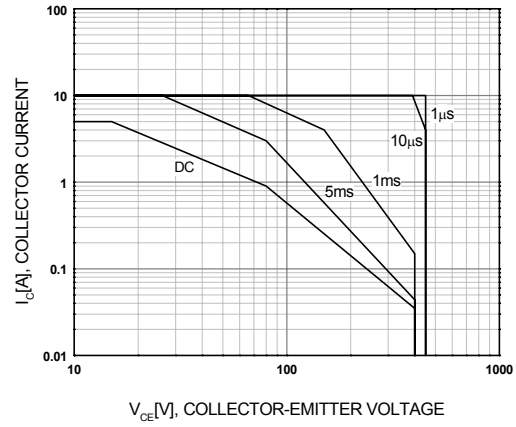


Figure 11. Safe Operating Area

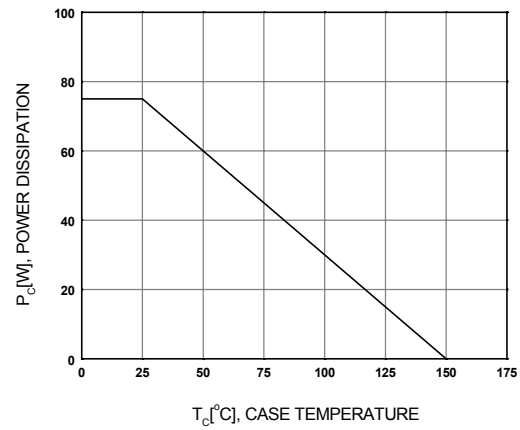


Figure 12. Power Derating

Typical Characteristics (Continued)

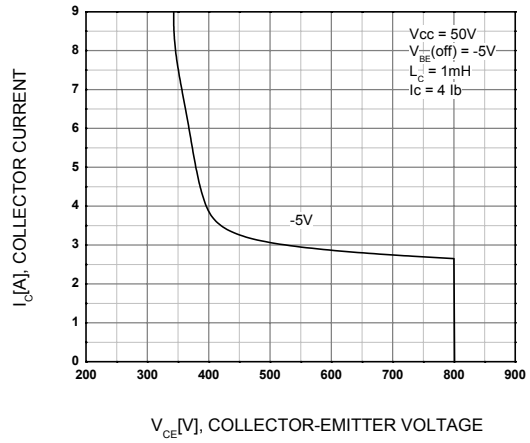


Figure 13. Reverse Bias Safe Operating

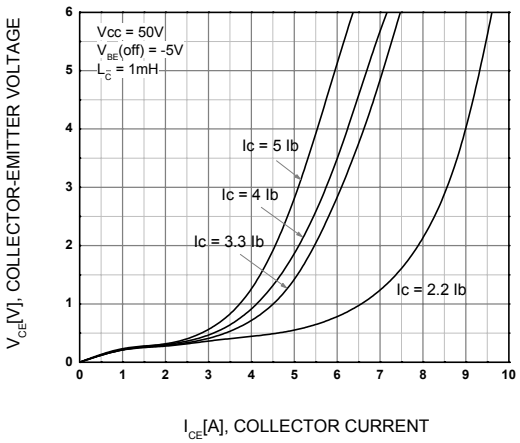
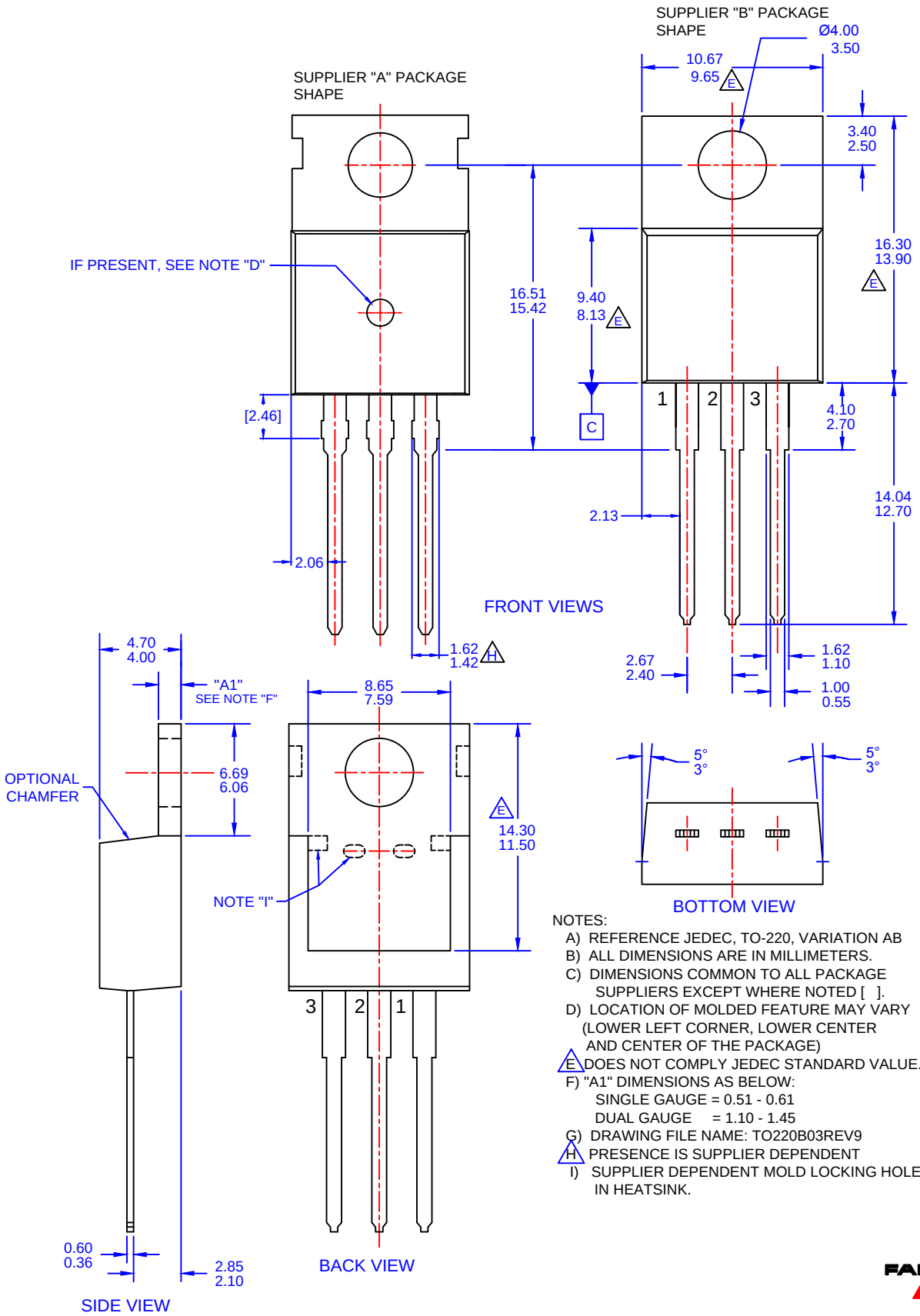


Figure 14. RBSOA Saturation



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.

FAIRCHILD

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