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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.
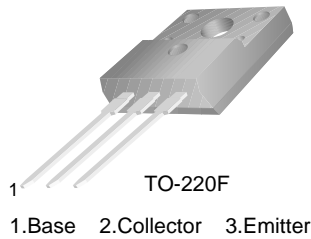
FAIRCHILD

May 2007

FJPF3305

High Voltage Switch Mode Application

• High Speed Switching

• Suitable for Electronic Ballast and Switching Regulator

TO-220F

1.Base   2.Collector   3.Emitter

Absolute Maximum Ratings * T_a = 25°C unless otherwise noted

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)	4	A
I_{CP}	Collector Current (Pulse)	8	A
I_B	Base Current	2	A
P_C	Collector Dissipation (T_a = 25°C)	30	W
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature	-65 ~ 150	°C

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

Electrical Characteristics * T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max	Units
BV_{CBO}	Collector-Base Breakdwon Voltage	I_C = 500μA, I_E = 0	700			V
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_C = 5mA, I_B = 0	400			V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E = 500μA, I_C = 0	9			V
I_{CBO}	Collector Cut-off Current	V_{CB} = 700V, I_E = 0			1	μA
I_{EBO}	Emitter Cut-off Current	V_{EB} = 9V, I_C = 0			1	μA
h_{FE1} h_{FE2}	DC Current Gain *	V_{CE} = 5V, I_C = 1A V_{CE} = 5V, I_C = 2A	19 8		35 40	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 1A, I_B = 0.2A I_C = 2A, I_B = 0.5A I_C = 4A, I_B = 1A			0.5 0.6 1.0	V V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 1A, I_B = 0.2A I_C = 2A, I_B = 0.5A			1.2 1.6	V V
f_T	Current Gain Bandwidth Product	V_{CE} = 5V, I_C = 1A	4			MHz
C_{ob}	Output Capacitance	V_{CB} = 10V, f = 1MHz		65		pF
t_{ON}	Turn On Time	V_{CC} = 125V			0.8	μs
t_{STG}	Storge Time	I_C = 2A = $5I_{B1}$ = -$5I_{B2}$ R_L = 62.5Ω			4.0	μs
t_F	Fall Time				0.9	μs

* Pulse Test: PW ≤ 300μs, Duty Cycle ≤ 2%

h_{FE} Classification

Classification	H1	H2
h_{FE2}	19 ~ 28	26 ~ 35

Typical Performance Characteristics

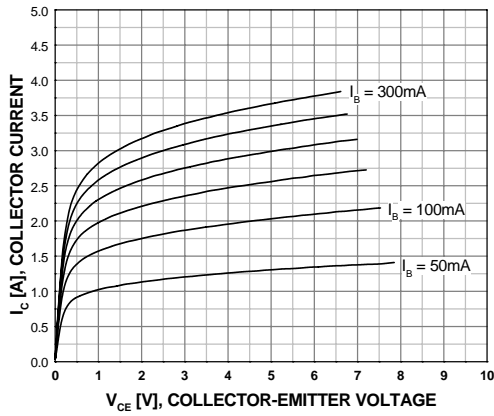### Figure 1. Static Characteristic

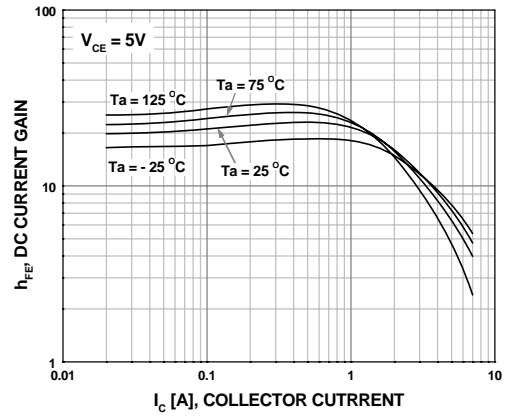### Figure 2. DC Current Gain (R-Grade)

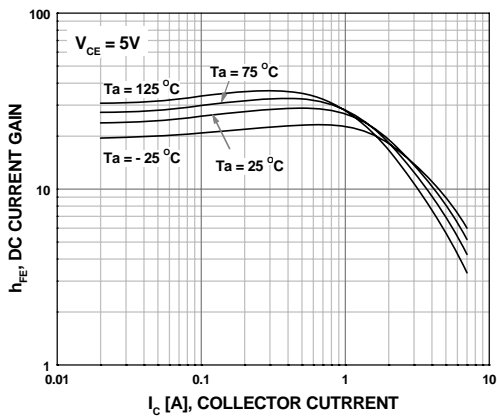### Figure 3. DC Current Gain (O-Grade)

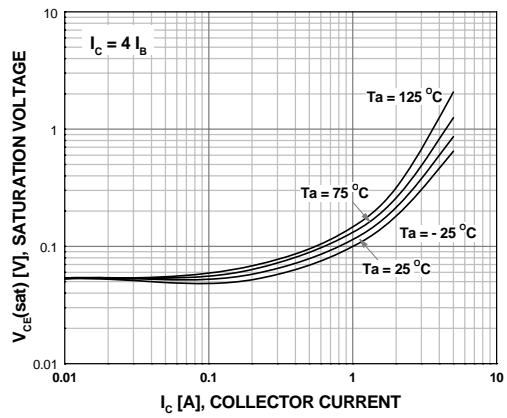### Figure 4. Saturation Voltage (R-Grade)
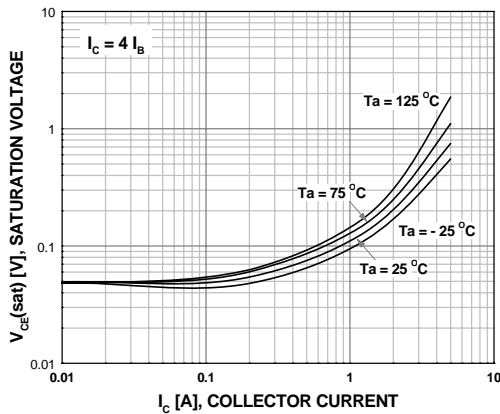

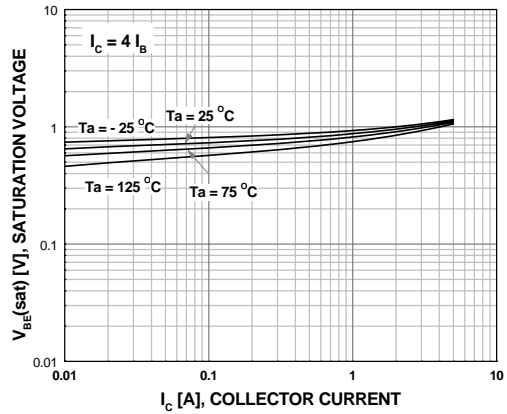### Figure 5. Saturatin Voltage (O-Grade)

Figure 6. Saturation Voltage (R-Grade)

Typical Performance Characteristics (Continued)
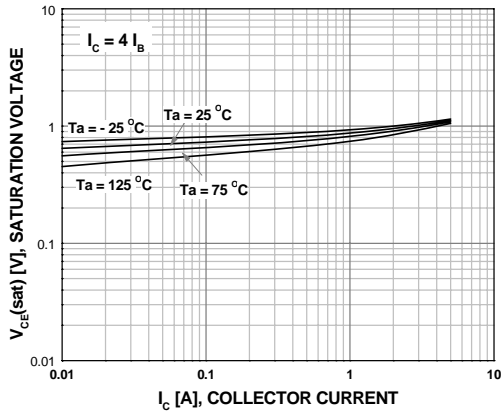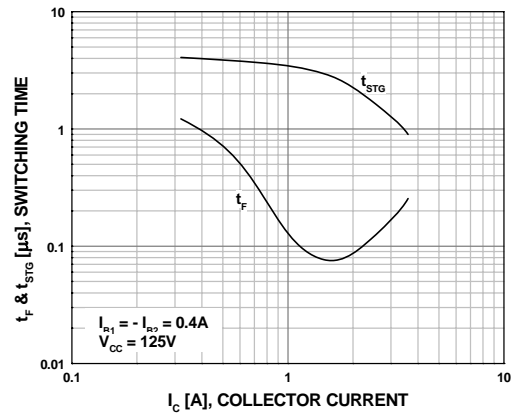
Figure 7. Saturation Voltage (O-Grade)

$I_C = 4 I_B$

$V_{CE}(sat)$ [V], SATURATION VOLTAGE

Ta = - 25 °C
Ta = 25 °C
Ta = 125 °C
Ta = 75 °C

I_C [A], COLLECTOR CURRENT

Figure 8. Switching Time

t_F & t_{STG} [μs], SWITCHING TIME

t_{STG}

t_F

$I_{B1} = - I_{B2} = 0.4A$
$V_{CC} = 125V$

I_C [A], COLLECTOR CURRENT

Figure 9. Reverse Biased Safe Operating Area

I_C [A], COLLECTOR CURRENT

$I_{B1} = 2A$, $R_{B2} = 0$
$V_{CC} = 50V$, L=1mH

V_{CE} [V], COLLECTOR-EMITTER VOLTAGE
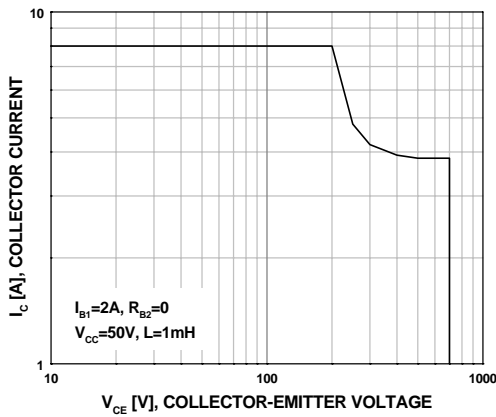
Figure 10. Forward Biased Safe Operating Area

I_C [A], COLLECTOR CURRENT

I_C (Pulse)
1ms
I_C (DC)
5ms
500μs

$T_C = 25$°C
Single Pulse

V_{CE} [V], COLLECTOR-EMITTER VOLTAGE
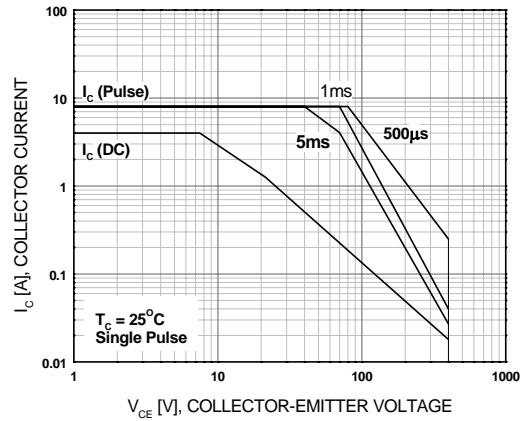
Figure 11. Power Derating

P_C[W], POWER DISSIPATION

Tc[°C], CASE TEMPERATURE

| A | | B | 10.36 9.96 |

∅ 3.28 3.08

3.40
3.20

(7.00)

SEE NOTE "F"

16.00
15.60

(3.23) B

1

3

(2.14)

1.47
1.24

10.05
9.45

0.90
0.70

⊕ | 0.50 (M) | A

30°

0.45
0.25

2.54

2.54

B 2.66
2.42

(0.70)

6.88
6.48

SEE NOTE "F"

1 X 45°

B 16.07
15.67

2.96
2.56

B 0.60
0.45

B 4.90
4.50

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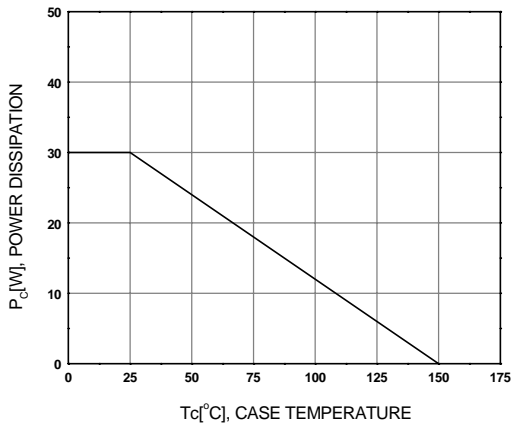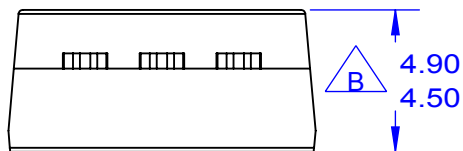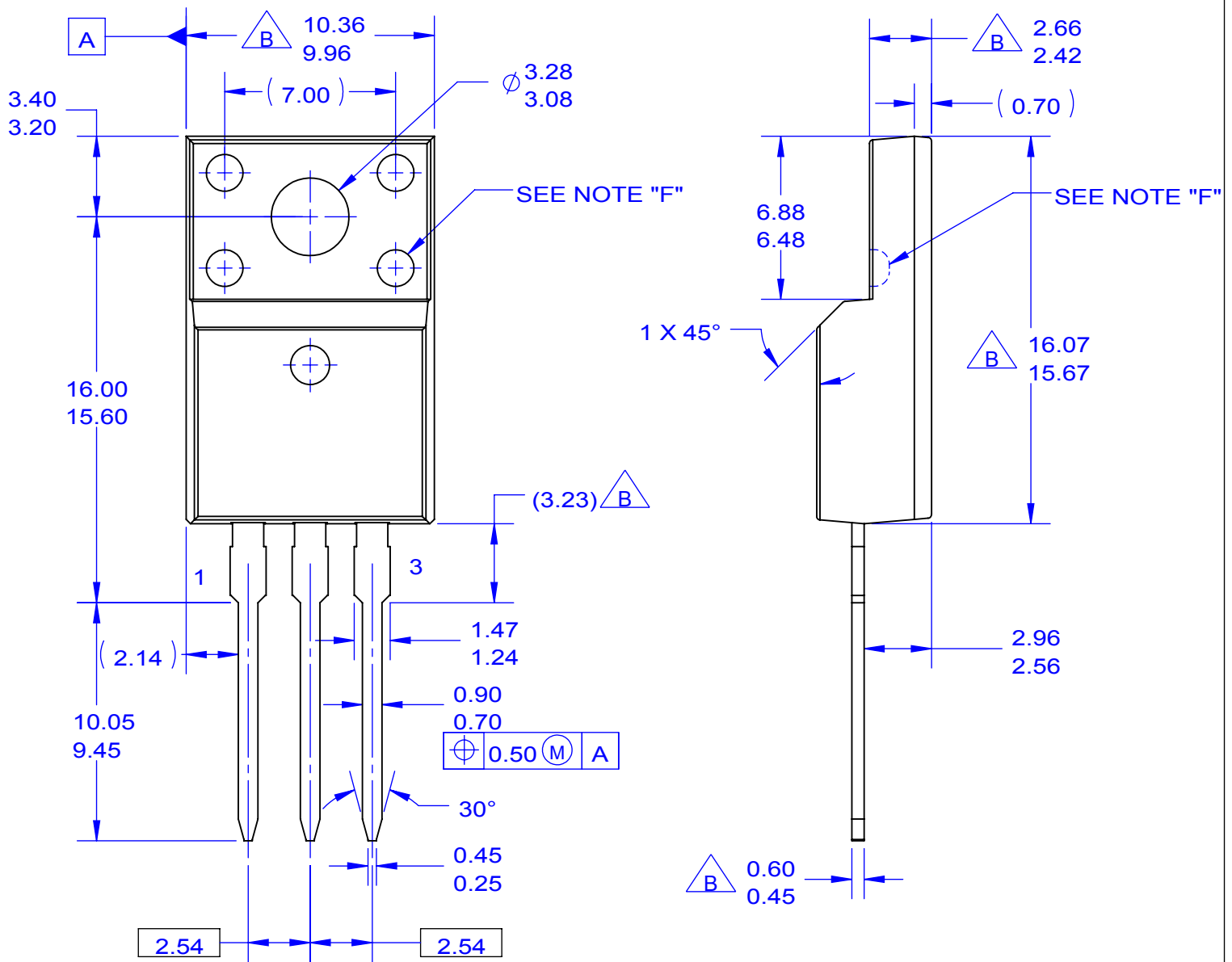
NOTES:

A. EXCEPT WHERE NOTED CONFORMS TO
   EIAJ SC91A.
B. DOES NOT COMPLY EIAJ STD. VALUE.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DIMENSIONS ARE EXCLUSIVE OF BURRS,
   MOLD FLASH AND TIE BAR PROTRUSIONS.
E. DIMENSION AND TOLERANCE AS PER ASME
   Y14.5-1994.
F. OPTION 1 - WITH SUPPORT PIN HOLE.
   OPTION 2 - NO SUPPORT PIN HOLE.
G. DRAWING FILE NAME: TO220M03REV5

PUBLICATION ORDERING INFORMATION