

# Bipolar Transistor

50 V, 15 A, Low  $V_{CE(sat)}$ ,  
NPN TO-220F-3SG

## 2SC6082

### Features

- Adoption of MBIT Process
- Low Collector-to-Emitter Saturation Voltage
- Large Current Capacitance
- High-Speed Switching
- This is a Pb-Free Device

### Applications

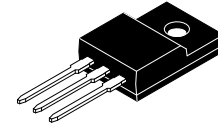
- High-Speed Switching Applications (Switching Regulator, Driver Circuit)

### Specifications

#### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

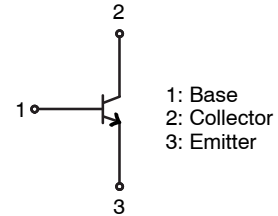
Symbol	Rating	Condition	Value	Unit
$V_{CBO}$	Collector-to-Base Voltage		60	V
$V_{CES}$	Collector-to-Emitter Voltage		60	V
$V_{CEO}$			50	V
$V_{EBO}$	Emitter-to-Base Voltage		6	V
$I_C$	Collector Current		15	A
$I_{CP}$	Collector Current (Pulse)	$PW \leq 10 \mu s$ , duty cycle $\leq 1\%$	20	A
$I_B$	Base Current		3	A
$P_C$	Collector Dissipation		2	mW
		$T_C = 25^\circ C$	23	mW
$T_j$	Junction Temperature		150	$^\circ C$
$T_{stg}$	Storage Temperature		-55 to +150	$^\circ C$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



TO-220 Fullpack, 3-Lead /  
TO-220F-3SG  
CASE 221AT

### ELECTRICAL CONNECTION



### MARKING DIAGRAM



C6082 = Device Code  
YWW = Date Code (Year & Week)  
ZZ = Assembly Lot

### ORDERING INFORMATION

Device	Package	Shipping
2SC6082-1E	TO-220F (Pb-Free)	50 / Tube

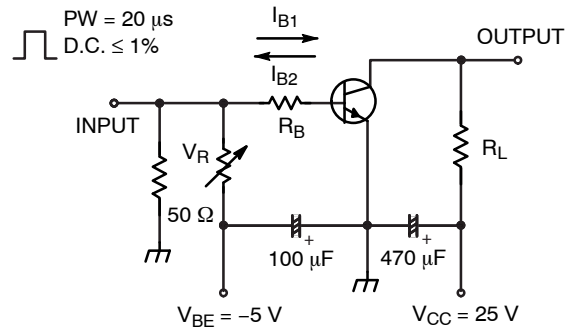
## 2SC6082

### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	Collector Cutoff Current	$V_{CB} = 40\text{ V}, I_E = 0\text{ A}$	-	-	10	$\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 4\text{ V}, I_C = 0\text{ A}$	-	-	10	$\mu\text{A}$
$H_{FE1}$	DC Current Gain	$V_{CE} = 2\text{ V}, I_C = 330\text{ mA}$	200	-	560	
$H_{FE2}$		$V_{CE} = 2\text{ V}, I_C = 10\text{ A}$	50	-	-	
$f_T$	Gain-Bandwidth Product	$V_{CE} = 10\text{ V}, I_C = 2\text{ A}$	-	195	-	MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{ V}, f = 1\text{ MHz}$	-	85	-	pF
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage	$I_C = 7.5\text{ mA}, I_B = 375\text{ mA}$	-	200	400	mV
$V_{BE(sat)}$	Base-to-Emitter Saturation Voltage	$I_C = 7.5\text{ mA}, I_B = 375\text{ mA}$	-	-	1.2	V
$V_{(BR)CBO}$	Collector-to-Base Breakdown Voltage	$I_C = 100\text{ }\mu\text{A}, I_E = 0\text{ A}$	60	-	-	V
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	$I_C = 100\text{ }\mu\text{A}, R_{BE} = 0\text{ }\Omega$	60	-	-	V
$V_{(BR)CEO}$		$I_C = 1\text{ mA}, R_{BE} = \infty$	50	-	-	V
$V_{(BR)EBO}$	Emitter-to-Base Breakdown Voltage	$I_E = 100\text{ }\mu\text{A}, I_C = 0\text{ A}$	5	-	-	V
$t_{on}$	Turn-On Time	See specified Test Circuit		52	-	ns
$t_{stg}$	Storage Time			560	-	ns
$t_f$	Fall Time			37	-	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

### Switching Time Test Circuit



$$I_C = 20I_{B1} = -20I_{B2} = 5\text{ A}$$

**Figure 1. Switching Time Test Circuit**

TYPICAL CHARACTERISTICS

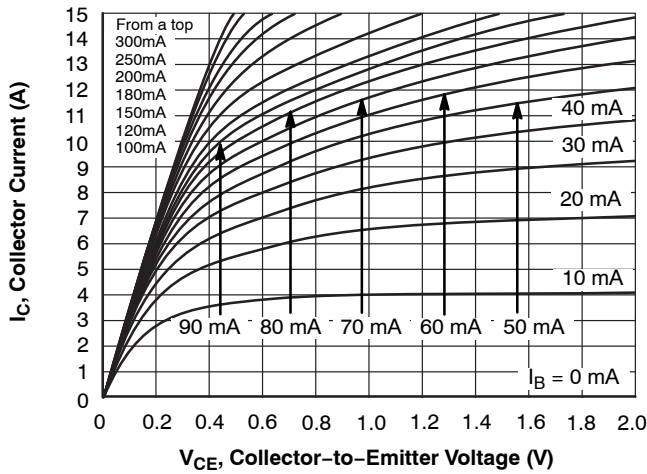


Figure 2.  $I_C - V_{CE}$

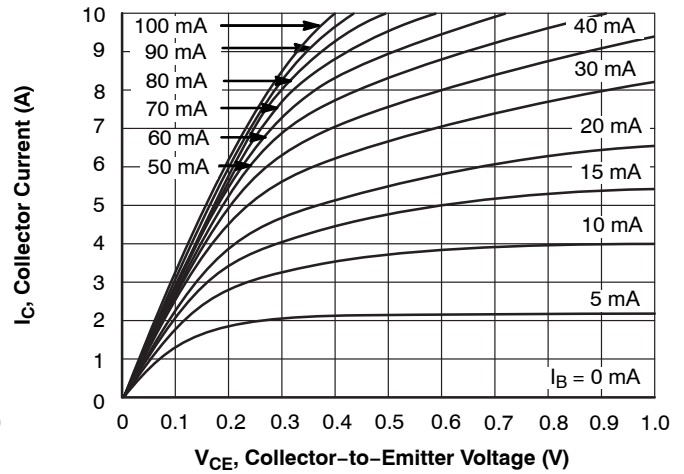


Figure 3.  $I_C - V_{CE}$

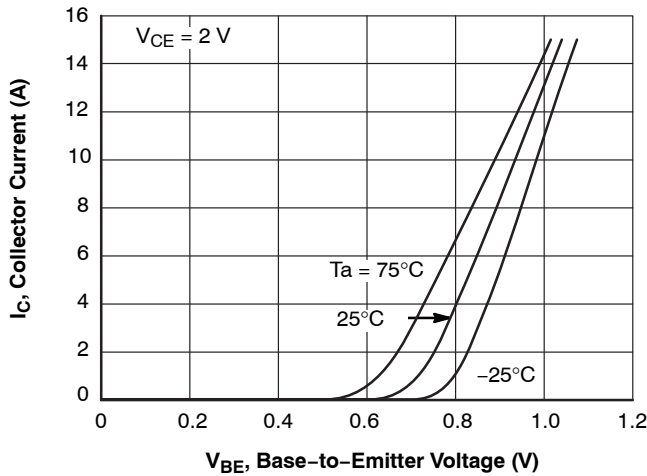


Figure 4.  $I_C - V_{BE}$

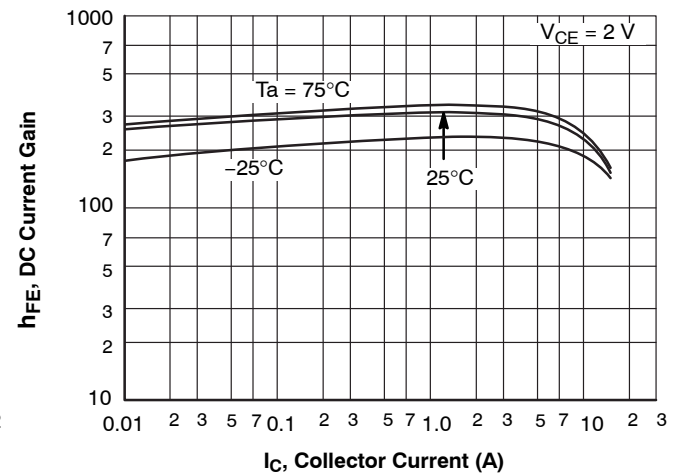


Figure 5.  $h_{FE} - I_C$

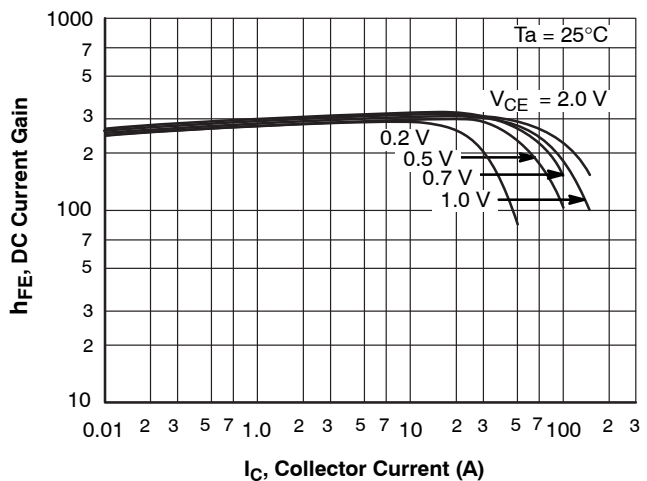


Figure 6.  $h_{FE} - I_C$

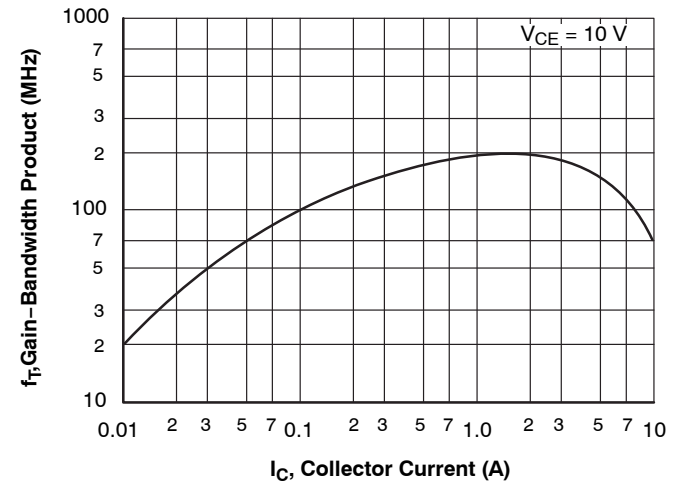


Figure 7.  $F_T - I_C$

TYPICAL CHARACTERISTICS (continued)

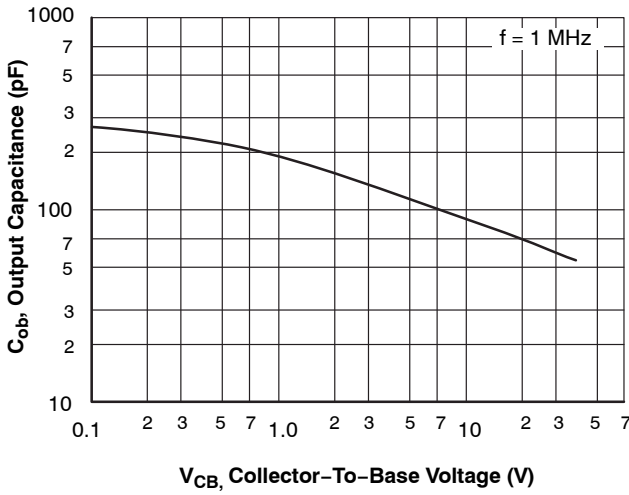


Figure 8.  $C_{ob} - V_{CB}$

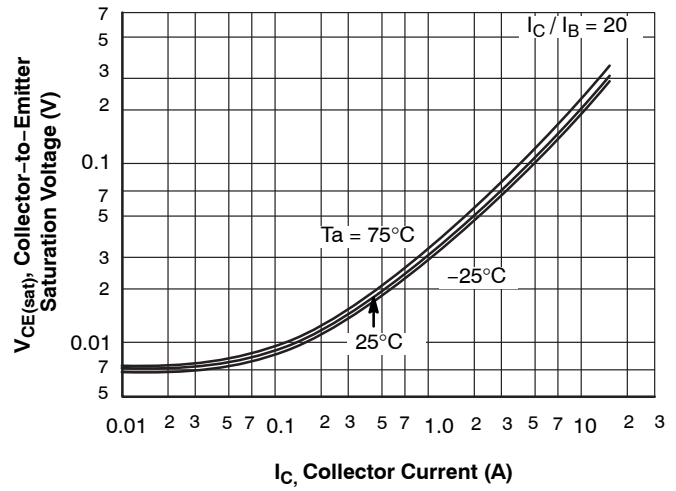


Figure 9.  $V_{CE(sat)} - I_C$

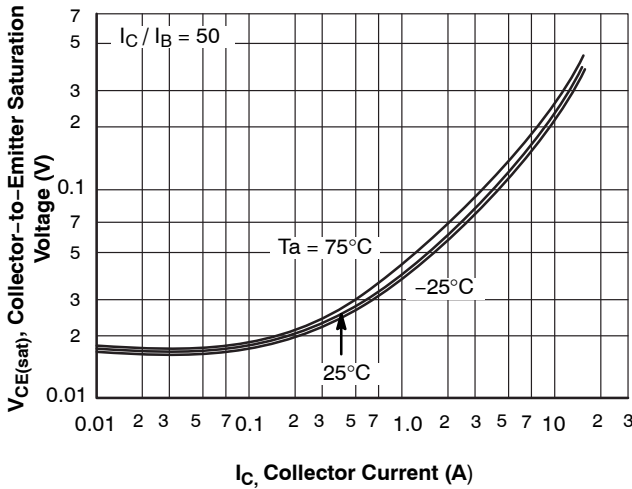


Figure 10.  $V_{CE(sat)} - I_C$

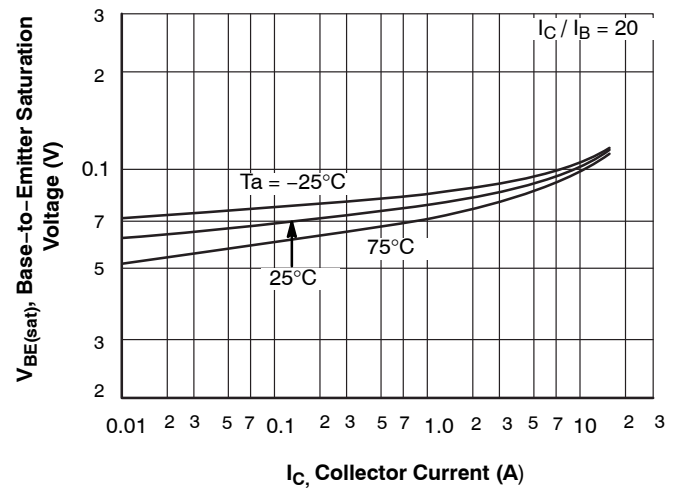


Figure 11.  $V_{BE(sat)} - I_C$

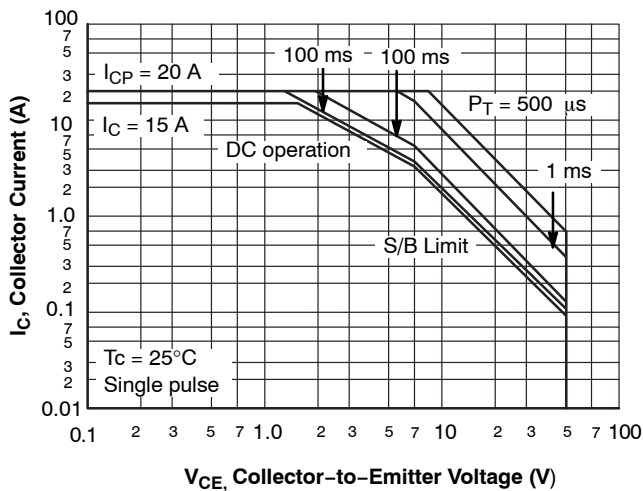


Figure 12. Forward Bias ASO

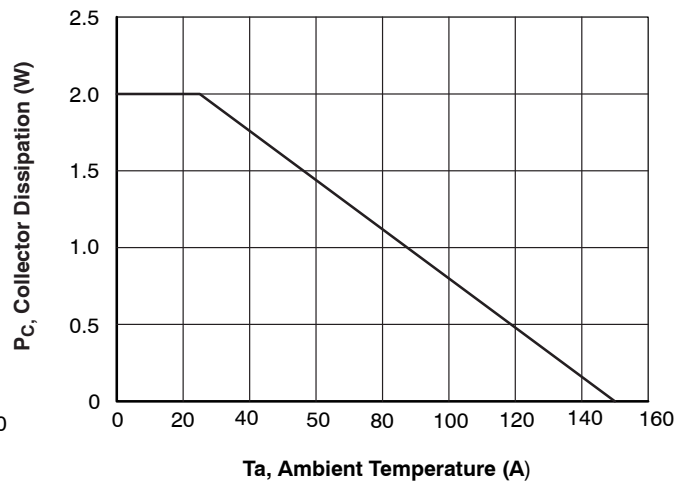


Figure 13.  $P_C - T_a$

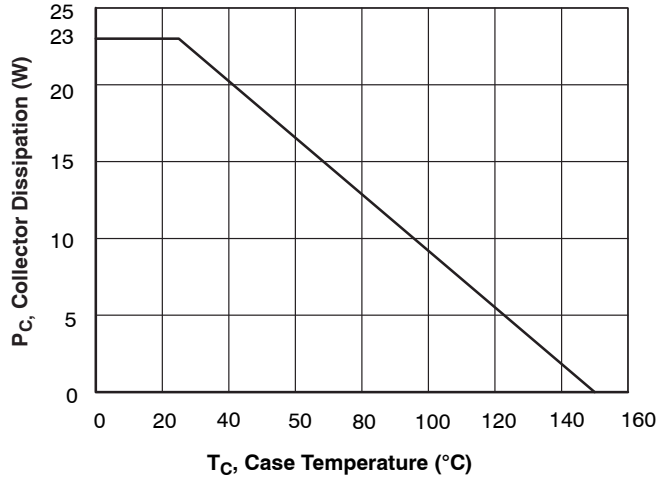


Figure 14. P<sub>C</sub> - T<sub>C</sub>

# MECHANICAL CASE OUTLINE

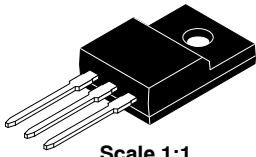
## PACKAGE DIMENSIONS

ON Semiconductor®

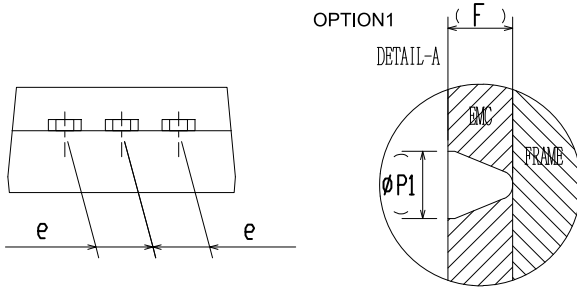
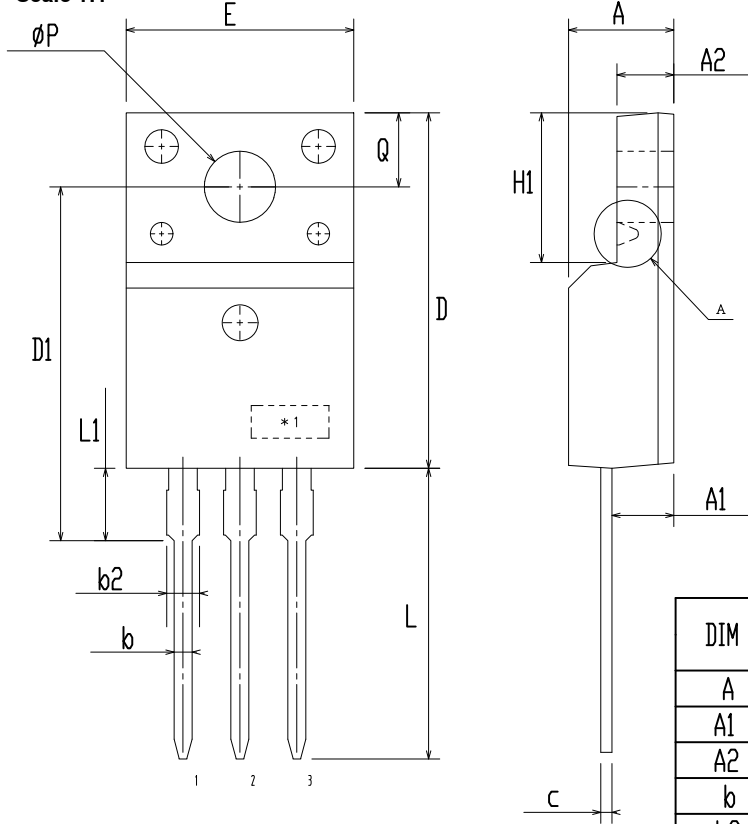


### TO-220 Fullpack, 3-Lead / TO-220F-3SG CASE 221AT ISSUE B

DATE 19 JAN 2021



Scale 1:1



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.50	4.70	4.90
A1	2.56	2.76	2.96
A2	2.34	2.54	2.74
b	0.70	0.80	0.90
b2	~	~	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.60	15.80	16.00
E	9.96	10.16	10.36
e	2.34	2.54	2.74
F	~	0.84	~
H1	6.48	6.68	6.88
L	12.78	12.98	13.18
L1	3.03	3.23	3.43
∅ P	2.98	3.18	3.38
∅ P1	~	1.00	~
Q	3.20	3.30	3.40

**NOTES:**

- A. DIMENSION AND TOLERANCE AS ASME Y14.5-2009
- B. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUCTIONS.
- C. OPTION 1 - WITH SUPPORT PIN HOLE  
OPTION 2 - NO SUPPORT PIN HOLE

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