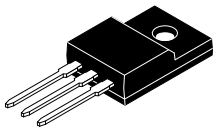
Bipolar Transistor

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

2SC6082



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

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)

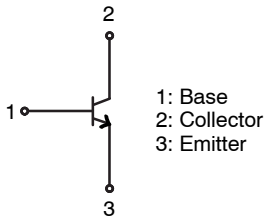
Specifications

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

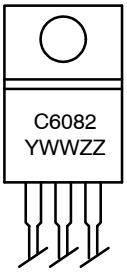
Symbol	Rating	Condition	Value	Unit
V_{CBO}	Collector−to−Base Voltage		60	V
V_{CES}	Collector−to−Emitter Voltage		60	V
V_{CEO}			50	V
V_{EBO}	Emitter−to−Base Voltage		6	V
I_C	Collector Current		15	A
I_{CP}	Collector Current (Pulse)	PW ≤ 10 μs, duty cycle ≤1%	20	A
I_B	Base Current		3	A
P_C	Collector Dissipation		2	W
		T_C = 25°C	23	W
Tj	Junction Temperature		150	°C
Tstg	Storage Temperature		−55 to +150	°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.

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

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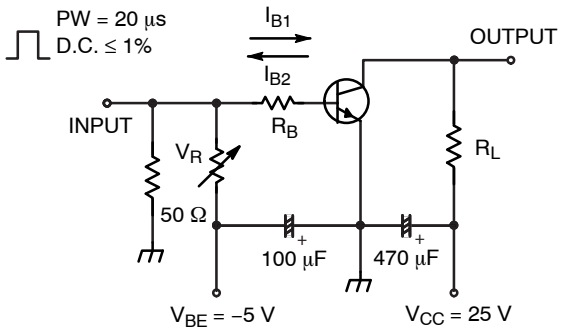
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	Collector Cutoff Current	V_{CB} = 40 V, I_E = 0 A	–	–	10	μA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 4 V, I_C = 0 A	–	–	10	μA
$H_{FE}1$	DC Current Gain	V_{CE} = 2 V, I_C = 330 mA	200	–	560	
$H_{FE}2$		V_{CE} = 2 V, I_C = 10 A	50	–	–	
f_T	Gain−Bandwidth Product	V_{CE} = 10 V, I_C = 2 A	–	195	–	MHz
Cob	Output Capacitance	V_{CB} = 10 V, f = 1 MHz	–	85	–	pF
V_{CE}(sat)	Collector−to−Emitter Saturation Voltage	I_C = 7.5 mA, I_B = 375 mA	–	200	400	mV
V_{BE}(sat)	Base−to−Emitter Saturation Voltage	I_C = 7.5 mA, I_B = 375 mA	–	–	1.2	V
$V_{(BR)CBO}$	Collector−to−Base Breakdown Voltage	I_C = 100 μA, I_E = 0 A	60	–	–	V
$V_{(BR)CES}$	Collector−to−Emitter Breakdown Voltage	I_C = 100 μA, R_{BE} = 0 Ω	60	–	–	V
$V_{(BR)CEO}$		I_C = 1 mA, R_{BE} = ∞	50	–	–	V
$V_{(BR)EBO}$	Emitter−to−Base Breakdown Voltage	I_E = 100 μA, I_C = 0 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



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

Figure 1. Switching Time Test Circuit

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TYPICAL CHARACTERISTICS

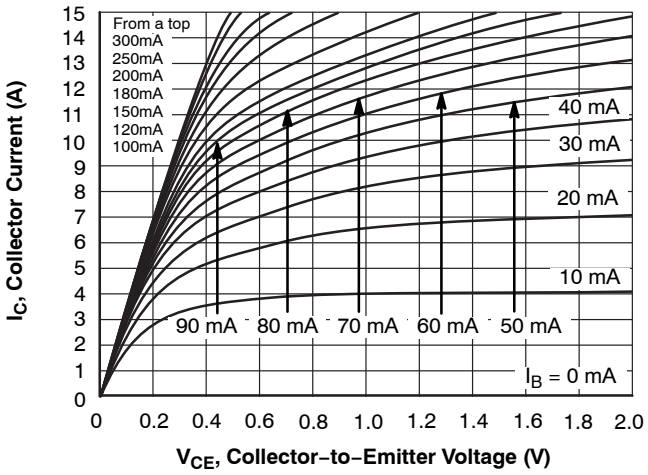

Figure 2. $I_C - V_{CE}$

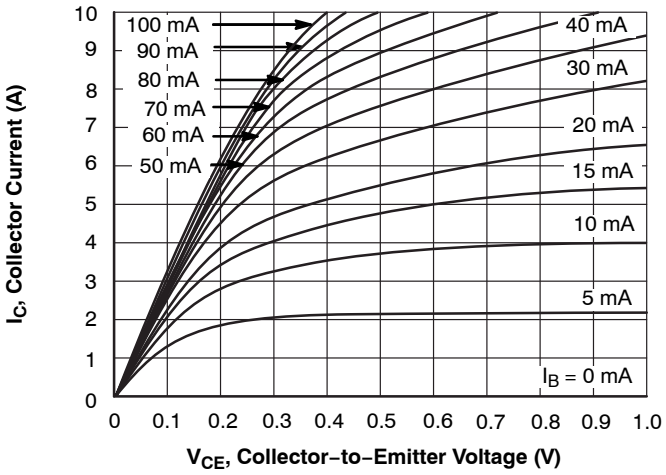

Figure 3. $I_C - V_{CE}$

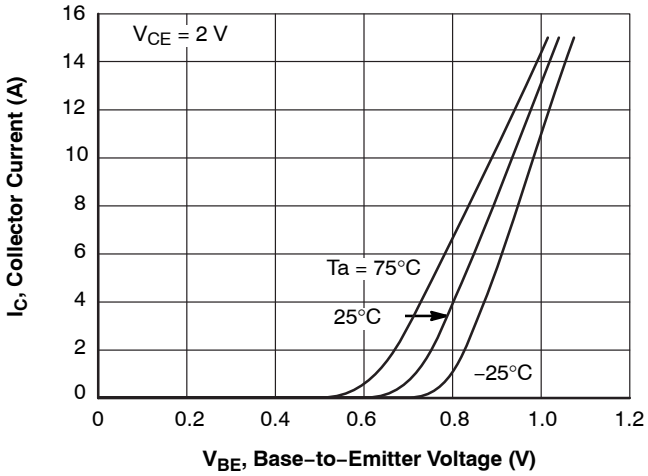

Figure 4. $I_C - V_{BE}$

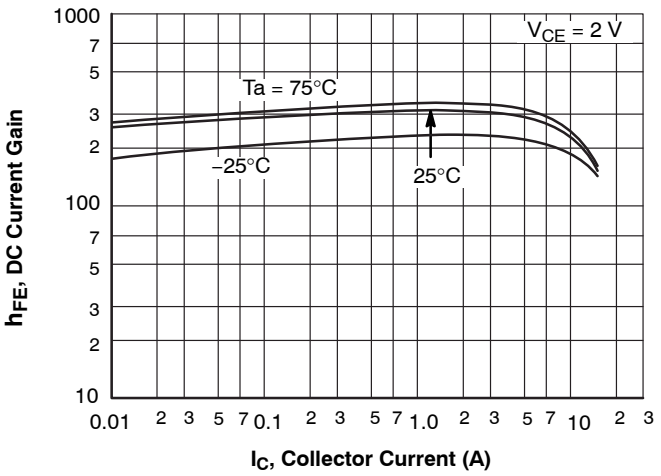

Figure 5. $h_{FE} - I_C$

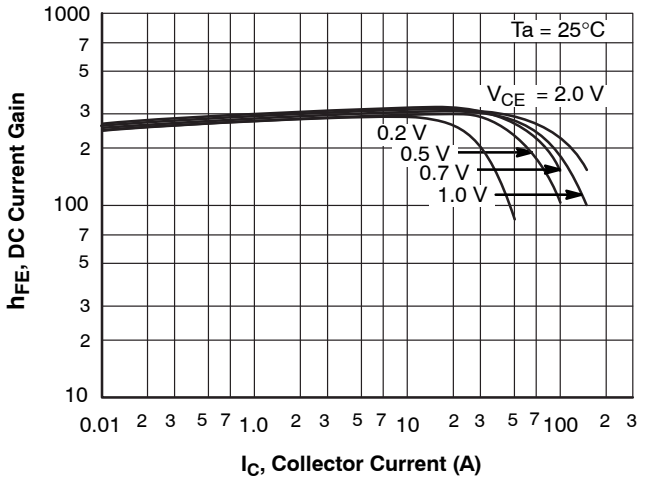

Figure 6. $h_{FE} - I_C$

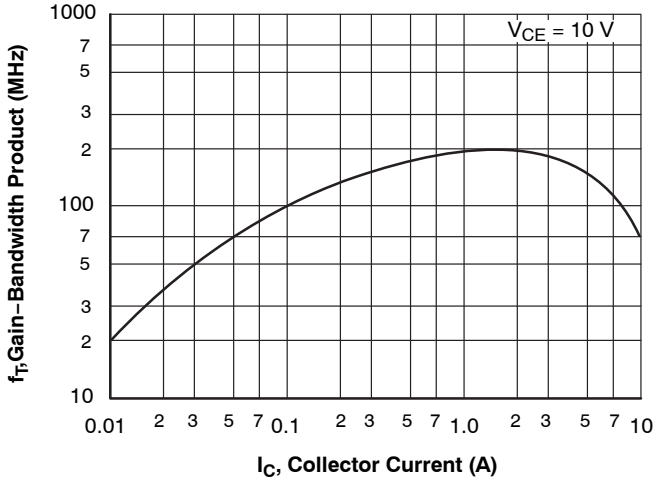

Figure 7. $F_T - I_C$

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TYPICAL CHARACTERISTICS (continued)

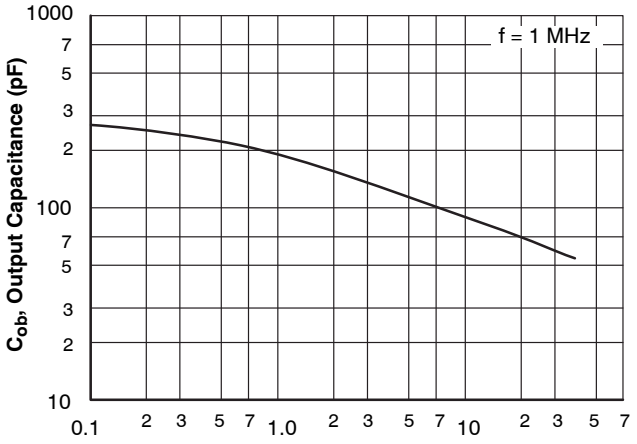

Figure 8. C_{ob} − V_{CB}

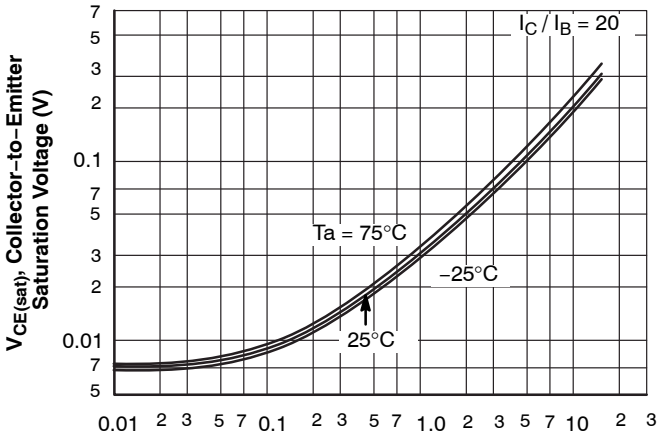

Figure 9. $V_{CE(sat)}$ − I_C

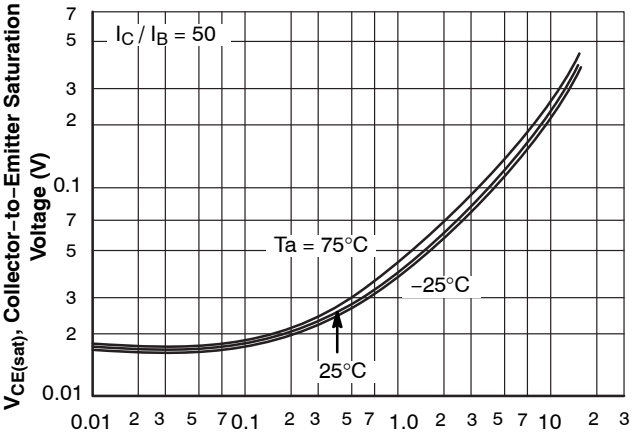

Figure 10. $V_{CE(sat)}$ − I_C

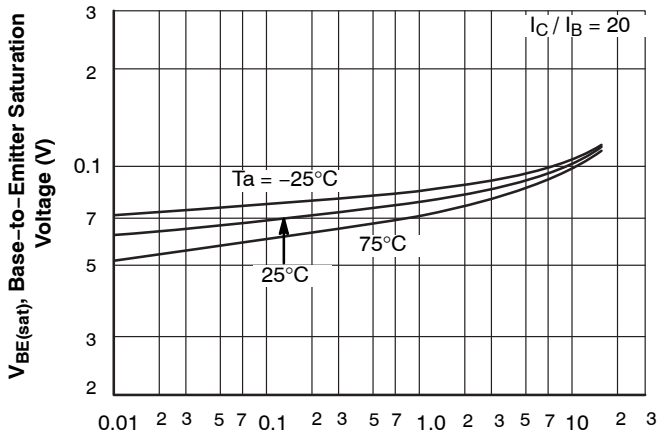

Figure 11. $V_{BE(sat)}$ − I_C

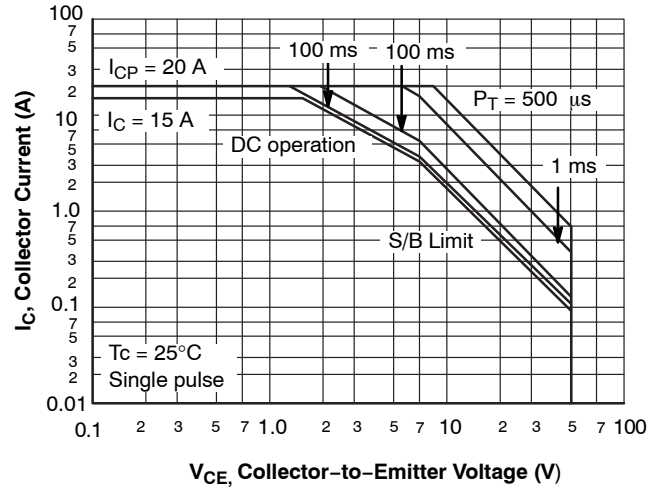

Figure 12. Forward Bias ASO

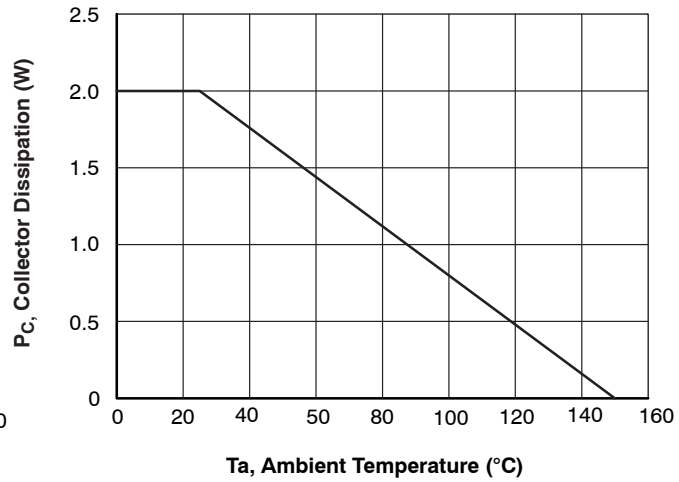

Figure 13. P_C − Ta

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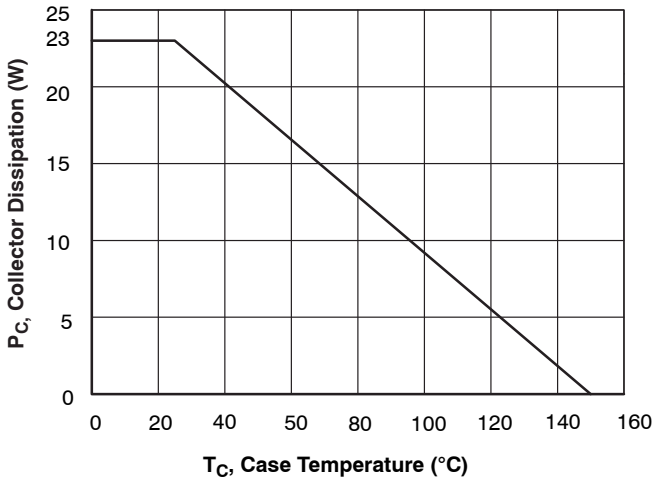

Figure 14. P_C – T_C

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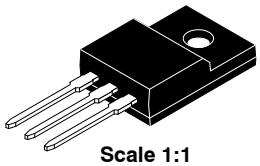
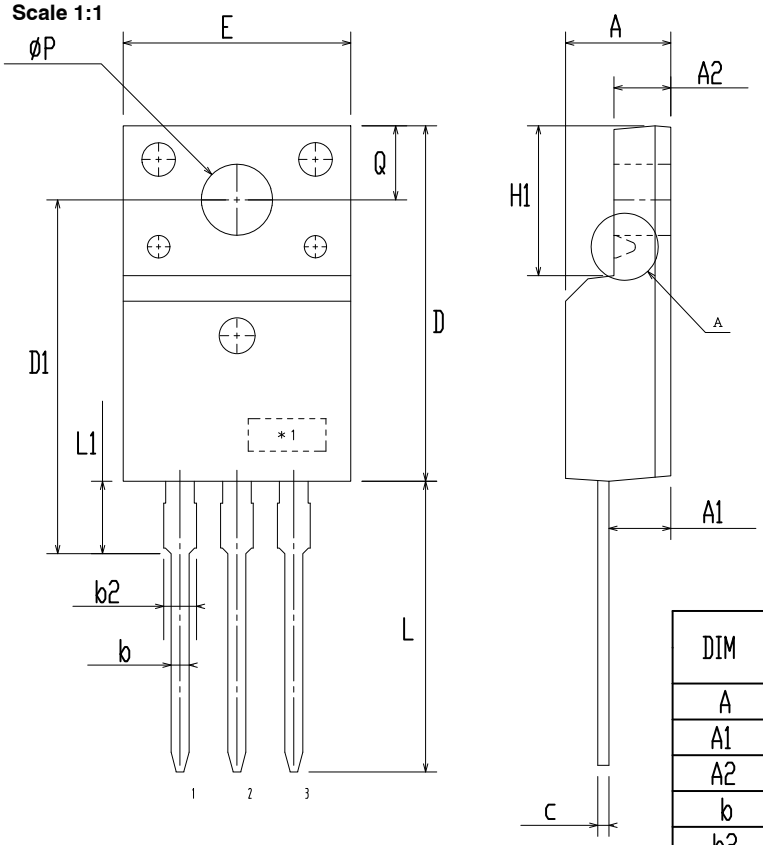
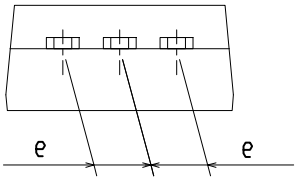
CASE 221AT
ISSUE B

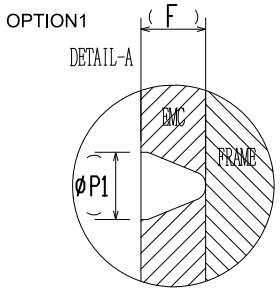
DATE 19 JAN 2021



Scale 1:1







DIM	MILLIMITERS		
	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
ø P	2.98	3.18	3.38
ø 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 PROTRUCSIONS.
C. OPTION 1 - WITH SUPPORT PIN HOLE
OPTION 2 - NO SUPPORT PIN HOLE

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