

# Bipolar Transistor

-50 V, -20 A, Low  $V_{CE(sat)}$ ,  
NPN TO-220F-3SG

## 2SA2210

### 特長

- MBIT プロセス採用
- コレクタ・エミッタ飽和電圧が低い
- 電流容量が大きい
- スイッチングスピードが速い
- This is a Pb-Free Device

### 用途

- リレードライブ, ランプドライブ, モータドライブ。

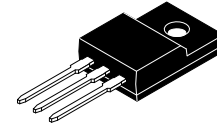
### 絶対最大定格 ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

項目	記号	条件	定格値	Unit
コレクタ・ベース電圧	$V_{CB0}$		-50	V
コレクタ・エミッタ電圧	$V_{CEO}$		-50	V
エミッタ・ベース電圧	$V_{EBO}$		-6	V
コレクタ電流	$I_C$		-20	A
コレクタ電流(パルス)	$I_{CP}$		-25	A
ベース電流	$I_B$		-3	A
コレクタ損失	$P_C$		2	W
		$T_C = 25^\circ\text{C}$	30	W
接合部温度	$T_j$		150	$^\circ\text{C}$
保存周囲温度	$T_{stg}$		-55 to +150	$^\circ\text{C}$

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.

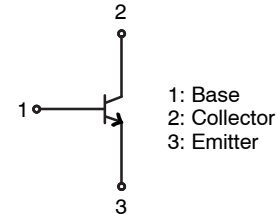
(参考訳)

最大定格を超えるストレスは、デバイスにダメージを与える危険性があります。これらの定格値を超えた場合は、デバイスの機能性を損ない、ダメージが生じたり、信頼性に影響を及ぼす危険性があります。

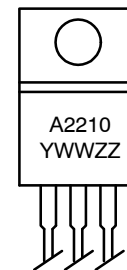


TO-220 Fullpack, 3-Lead /  
TO-220F-3SG  
CASE 221AT

### 電氣的接続図



### 製品と外形に伴う情報



A2210 = Device Code  
YWW = Date Code (Year & Week)  
ZZ = Assembly Lot

### ORDERING INFORMATION

Device	Package	Shipping
2SA2210-1E	TO-220F (Pb-Free)	50 / Tube

## 2SA2210

### 電気的特性 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

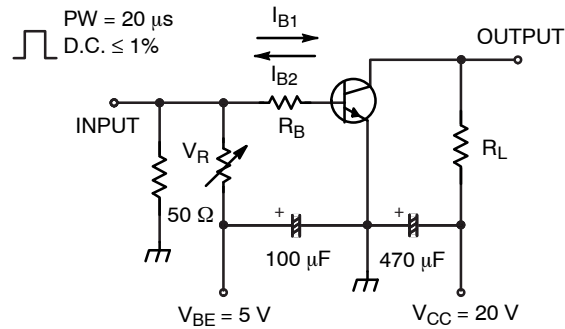
項目	記号	条件	Min	Typ	Max	Unit
コレクタシャ断電流	$I_{CBO}$	$V_{CB} = -40\text{ V}, I_E = 0\text{ A}$	-	-	-10	$\mu\text{A}$
エミッタシャ断電流	$I_{EBO}$	$V_{EB} = -4\text{ V}, I_C = 0\text{ A}$	-	-	-10	$\mu\text{A}$
直流電流増幅率	$h_{FE}$	$V_{CE} = -2\text{ V}, I_C = -1\text{ A}$	150	-	450	
利得帯域幅積	$f_T$	$V_{CE} = -10\text{ V}, I_C = -1\text{ A}$	-	140	-	MHz
出力容量	$C_{ob}$	$V_{CB} = -10\text{ V}, f = 1\text{ MHz}$	-	215	-	pF
コレクタ・エミッタ飽和電圧	$V_{CE(sat)}$	$I_C = -7\text{ A}, I_B = -350\text{ mA}$	-	-200	-500	mV
ベース・エミッタ飽和電圧	$V_{BE(sat)}$	$I_C = -7\text{ A}, I_B = -350\text{ mA}$	-	-	-1.2	V
コレクタ・ベース降伏電圧	$V_{(BR)CBO}$	$I_C = -100\text{ }\mu\text{A}, I_E = 0\text{ A}$	-50	-	-	V
コレクタ・エミッタ降伏電圧	$V_{(BR)CEO}$	$I_C = -1\text{ mA}, R_{BE} = \infty$	-50	-	-	V
エミッタ・ベース降伏電圧	$V_{(BR)EBO}$	$I_E = -100\text{ }\mu\text{A}, I_C = 0\text{ A}$	-6	-	-	V
ターンオン時間	$t_{on}$	指定回路において		60	-	ns
蓄積時間	$t_{stg}$			270	-	ns
下降時間	$t_f$			20	-	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.

(参考訳)

製品パラメータは、特別な記述が無い限り、記載されたテスト条件に対する電気的特性で示しています。異なる条件下で製品動作を行った時には、電気的特性で示している特性を得られない場合があります。

### スイッチングタイム測定回路図



$$I_C = 20I_{B1} = -20I_{B2} = -7\text{ A}$$

図 1. スwitchingタイム測定回路図

TYPICAL CHARACTERISTICS

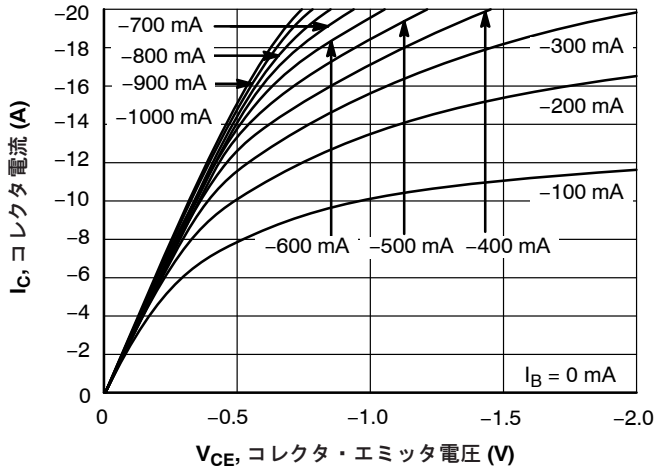


図 2.  $I_C - V_{CE}$

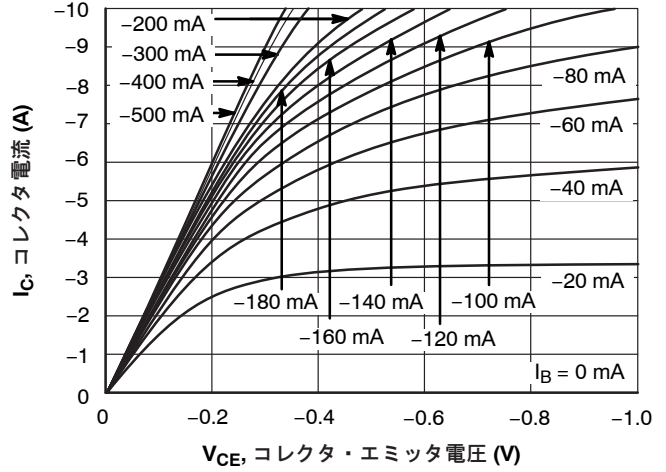


図 3.  $I_C - V_{CE}$

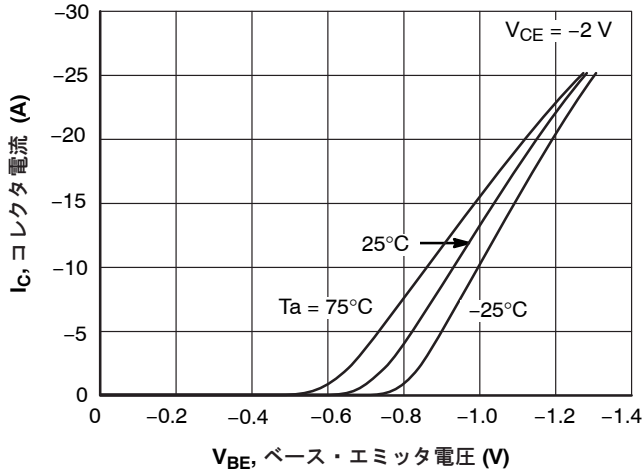


図 4.  $I_C - V_{BE}$

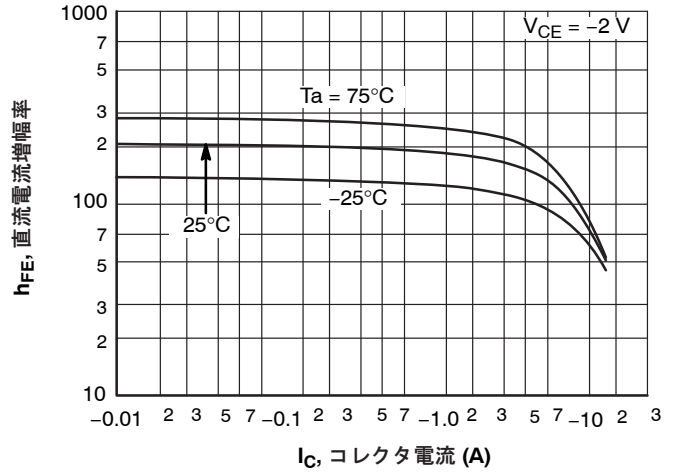


図 5.  $h_{FE} - I_C$

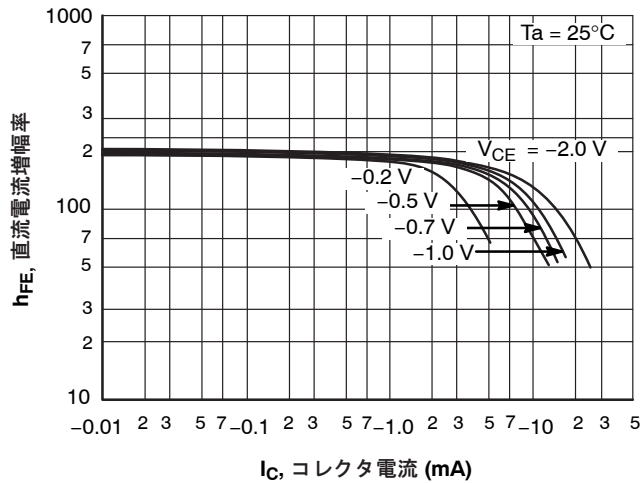


図 6.  $h_{FE} - I_C$

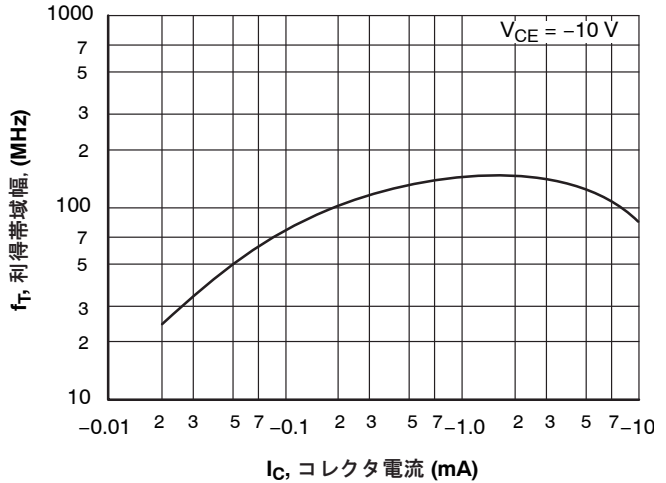


図 7.  $f_T - I_C$

TYPICAL CHARACTERISTICS (continued)

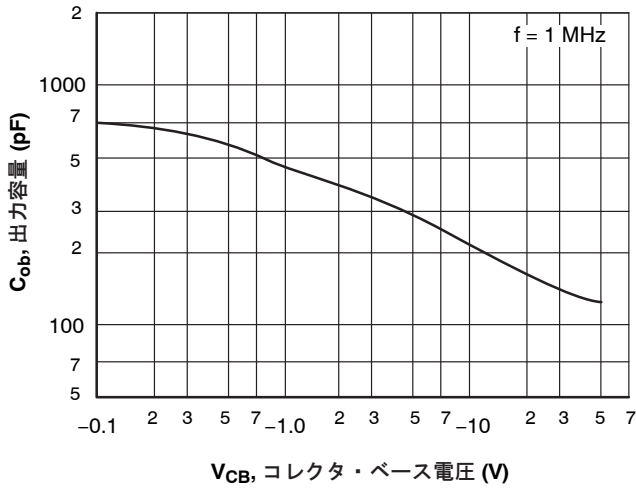


図 8.  $C_{ob} - V_{CB}$

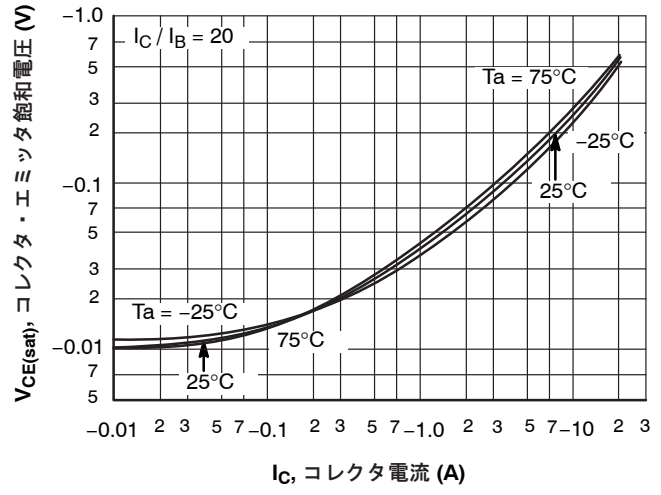


図 9.  $V_{CE(sat)} - I_C$

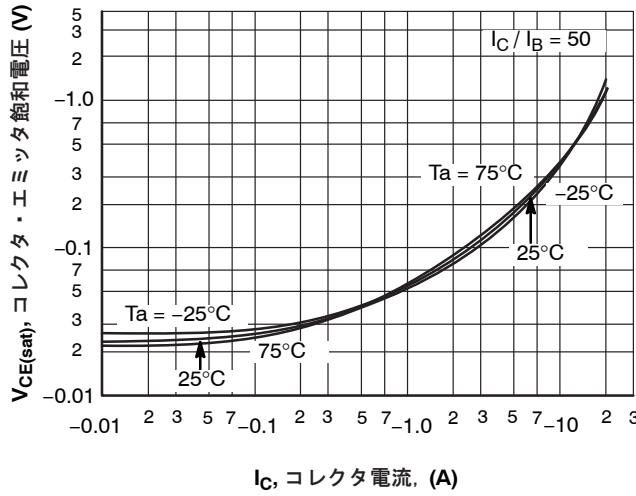


図 10.  $V_{CE(sat)} - I_C$

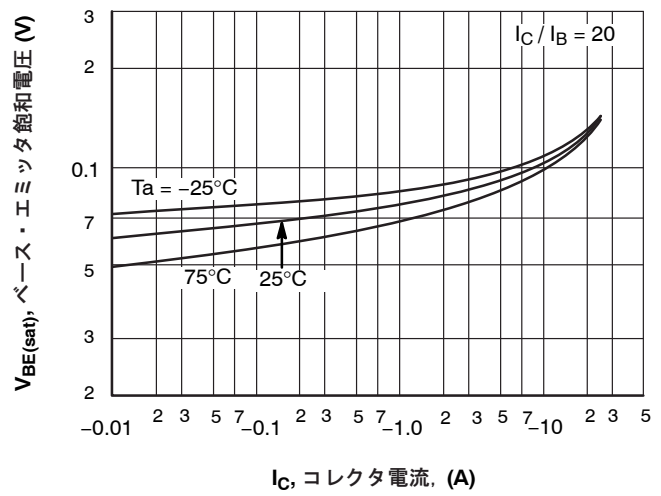


図 11.  $V_{BE(sat)} - I_C$

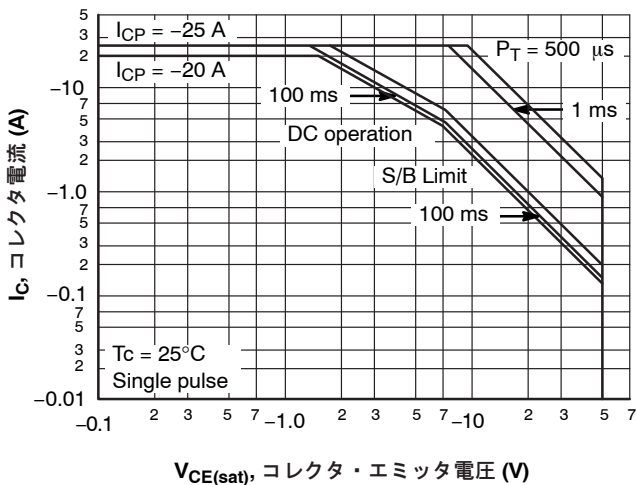


図 12. Forward Bias ASO

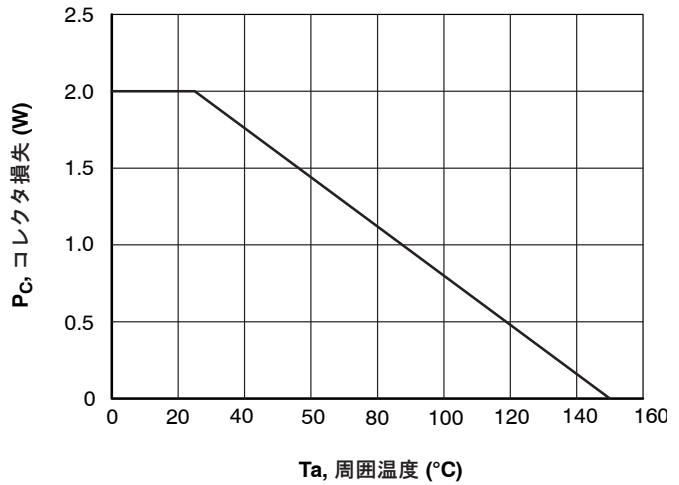
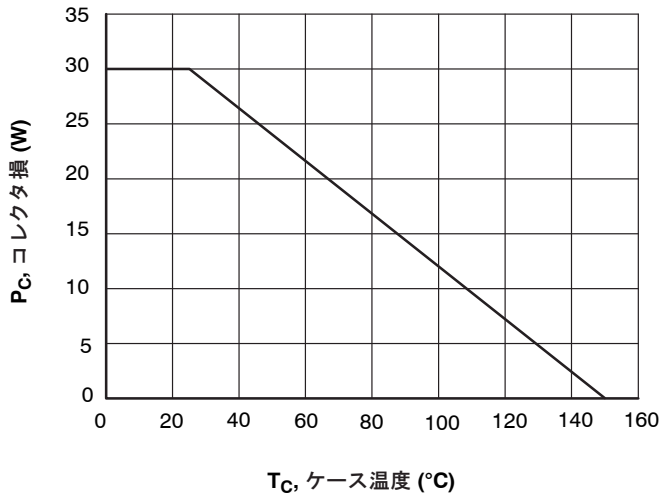


図 13.  $P_C - T_a$



$T_C$ , ケース温度 (°C)

図 14.  $P_C - T_C$

# MECHANICAL CASE OUTLINE

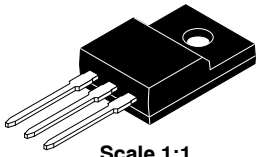
## PACKAGE DIMENSIONS

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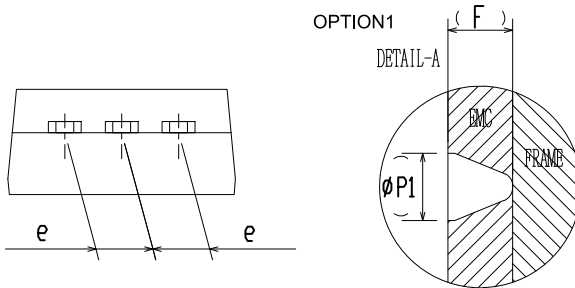
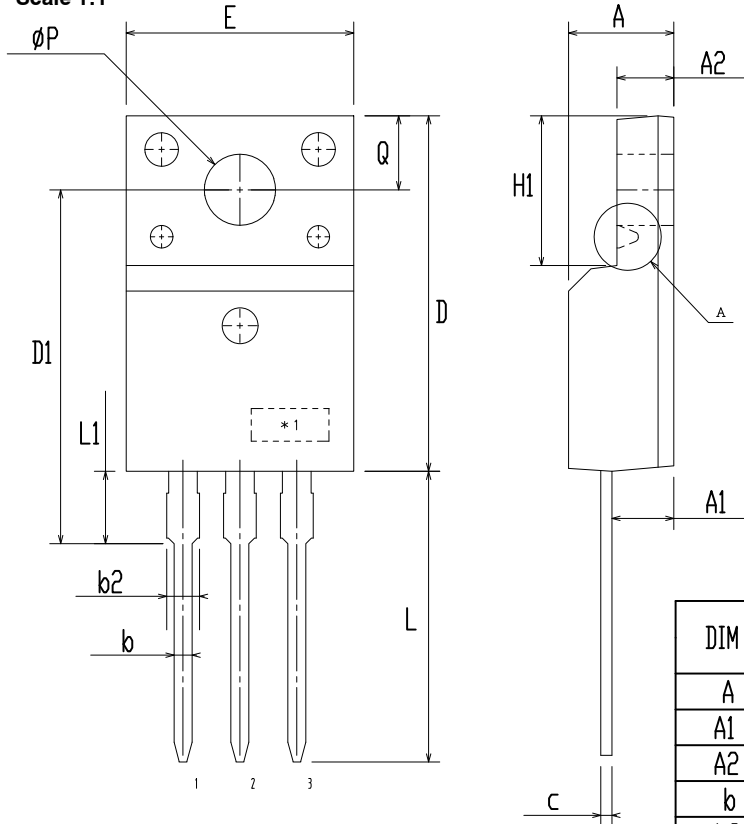


### TO-220 Fullpack, 3-Lead / TO-220F-3SG CASE 221AT ISSUE B

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
phi P	2.98	3.18	3.38
phi 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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