

Bipolar Transistor

50 V, 5 A, Low $V_{CE(sat)}$, NPN TO-220-3L

2SD1060

特長

- コレクタ・エミッタ飽和電圧が低い: $V_{CE(sat)} = 0.3 \text{ V max} / I_C = 3 \text{ A}, I_B = 0.3 \text{ A}$

用途

- リレードライブ, 高速インバータ, コンバータなどの一般大電流スイッチング用に適する

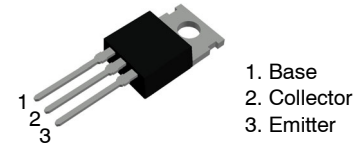
絶対最大定格 ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

記号	項目	条件	定格値	Unit
V_{CBO}	コレクタ・ベース電圧	-	60	V
V_{CEO}	コレクタ・エミッタ電圧	-	50	V
V_{EBO}	エミッタ・ベース電圧	-	6	V
I_C	コレクタ電流	-	5	A
I_{CP}	コレクタ電流 (パルス)	-	9	A
P_C	コレクタ損失	-	1.75	W
		$T_C = 25^\circ\text{C}$	30	W
T_j	接合部温度	-	150	$^\circ\text{C}$
T_{stg}	保存周囲温度	-	-55~+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)

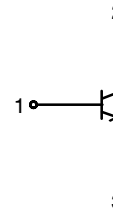
最大定格を超えるストレスは、デバイスにダメージを与える危険性があります。これらの定格値を超えた場合は、デバイスの機能性を損ない、ダメージが生じ、信頼性に影響を及ぼす危険性があります。



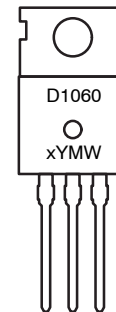
1. Base
2. Collector
3. Emitter

TO-220, 3L
CASE 221AU

電気的接続図



マーキング



- D1060x = Specific Device Code
 x = S/R
 Y = Year of Production
 M = Assembly Operation Month
 W = Work Week Number

ORDERING INFORMATION

Device	Package	Shipping
2SD1060R-1E	TO-220-3L (Pb-Free)	50 Units / Tube
2SD1060S-1E	TO-220-3L (Pb-Free)	50 Units / Tube

2SD1060

電氣的特性 ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

記号	項目	条件	定格値			Unit
			Min	Typ	Max	
I_{CBO}	コレクタしゃ断電流	$V_{CB} = 40\text{ V}, I_E = 0\text{ A}$	-	-	0.1	mA
I_{EBO}	エミッタしゃ断電流	$V_{EB} = 4\text{ V}, I_C = 0\text{ A}$	-	-	0.1	mA
h_{FE1}	直流電流増幅率	$V_{CE} = 2\text{ V}, I_C = 1\text{ A}$	100※	-	280※	
h_{FE2}		$V_{CE} = 2\text{ V}, I_C = 2\text{ A}$	80	-	-	
f_T	利得帯域幅積	$V_{CE} = 5\text{ V}, I_C = 1\text{ A}$	-	30	-	MHz
Cob	出力容量	$V_{CB} = 10\text{ V}, f = 1\text{ MHz}$	-	100	-	pF
$V_{CE(sat)}$	コレクタ・エミッタ飽和電圧	$I_C = 3\text{ A}, I_B = 0.3\text{ A}$	-	-	0.3	V
$V_{(BR)CBO}$	コレクタ・ベース降伏電圧	$I_C = 1\text{ mA}, I_E = 0\text{ A}$	60	-	-	V
$V_{(BR)CEO}$	コレクタ・エミッタ降伏電圧	$I_C = 1\text{ mA}, R_{BE} = \infty$	50	-	-	V
$V_{(BR)EBO}$	エミッタ・ベース降伏電圧	$I_E = 1\text{ mA}, I_C = 0\text{ A}$	6	-	-	V
t_{on}	ターンオン時間	指定回路において	-	0.1	-	μs
t_{stg}	蓄積時間		-	1.4	-	μs
t_f	下降時間		-	0.2	-	ns

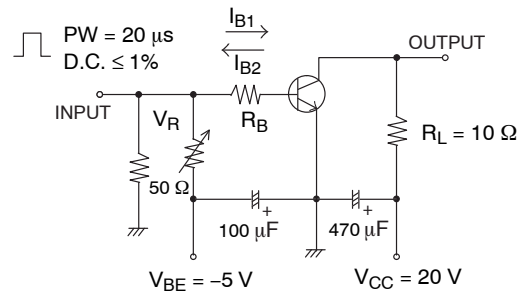
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

(参考記)

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氣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、電氣的特性で示している特性を得られない場合があります。

※ 2SD1060 は 1 A h_{FE} により次のように分類している。

ランク	R	S
h_{FE}	100~200	140~280



$$I_C = 10I_{B1} = -10I_{B2} = 2\text{ A}$$

図 1. スイッチングタイム測定回路図

TYPICAL CHARACTERISTICS

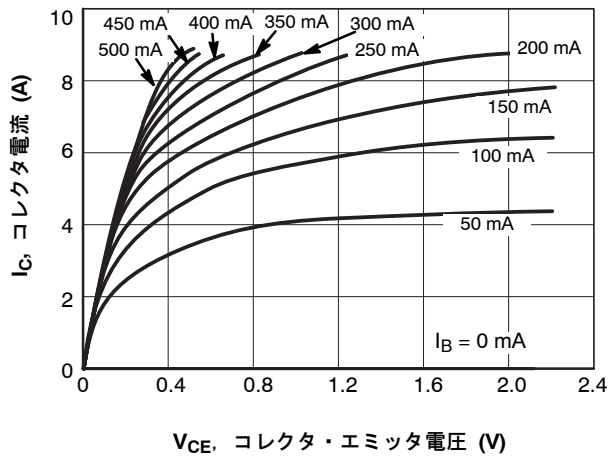


図 2. $I_C - V_{CE}$

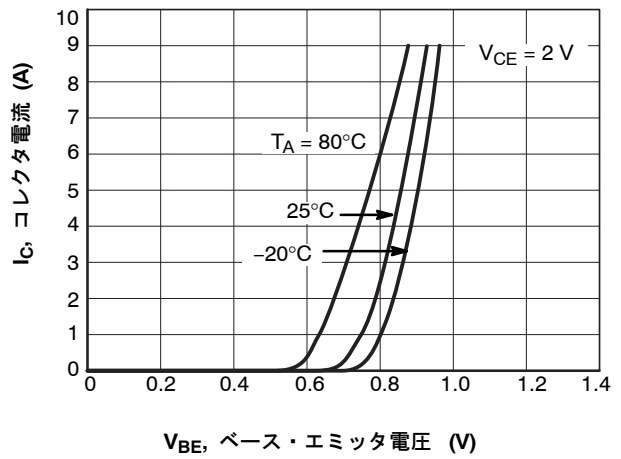


図 3. $I_C - V_{BE}$

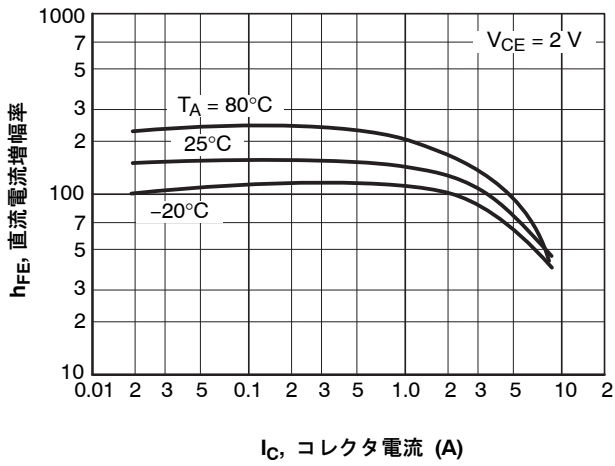


図 4. $h_{FE} - I_C$

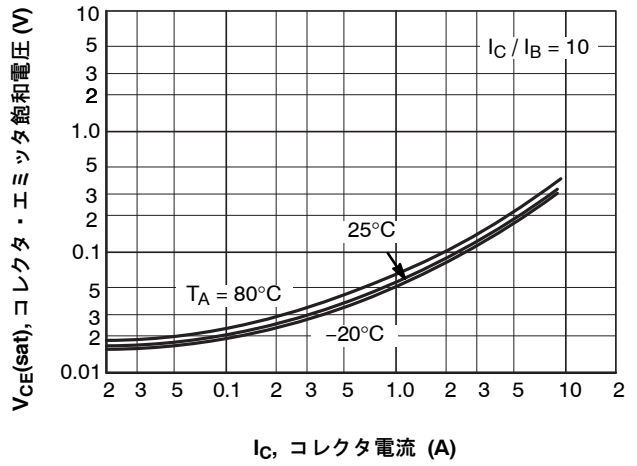


図 5. $V_{CE(sat)} - I_C$

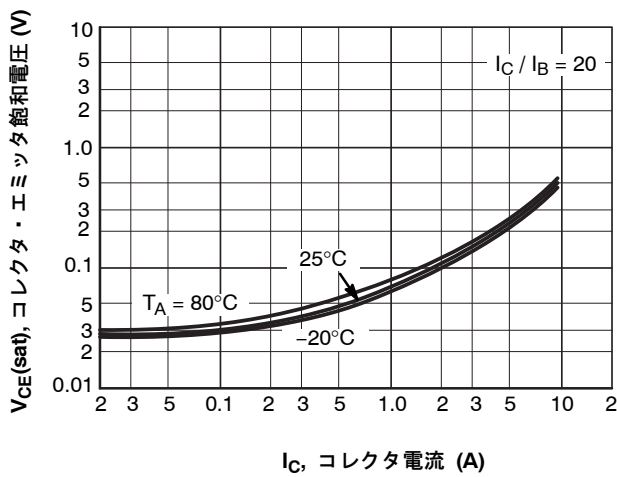


図 6. $V_{CE(sat)} - I_C$

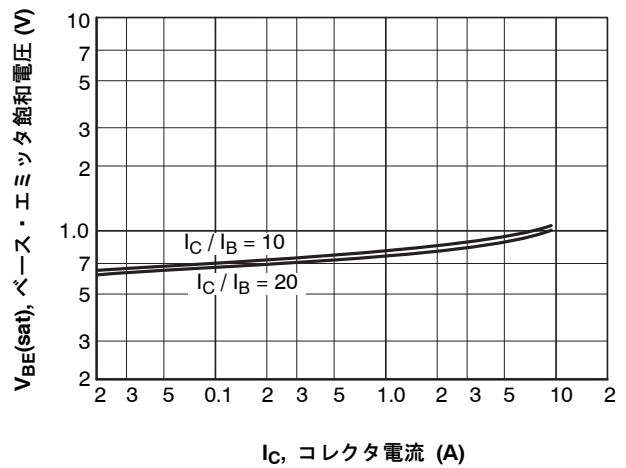


図 7. $V_{BE(sat)} - I_C$

TYPICAL CHARACTERISTICS (continued)

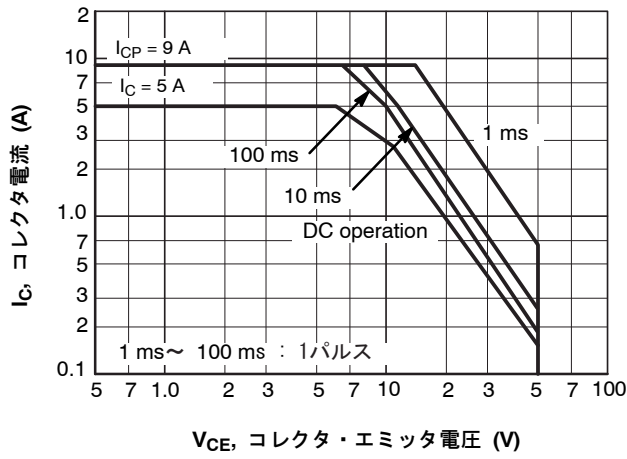


図 8. ASO

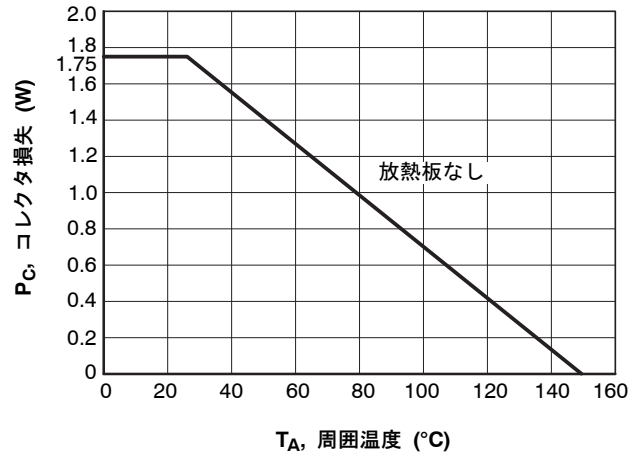


図 9. $P_C - T_A$

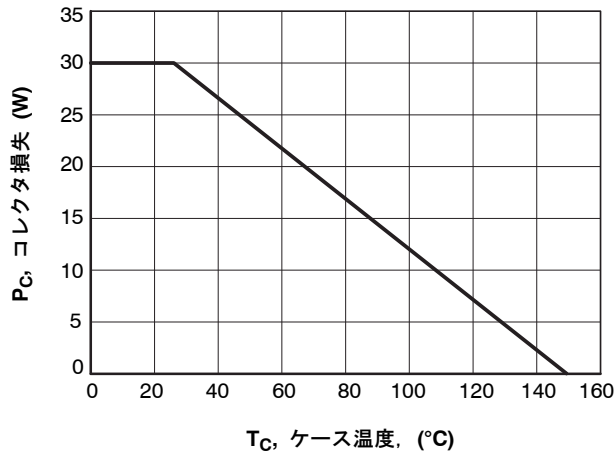
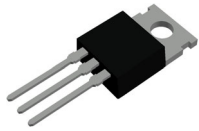


図 10. $P_C - T_C$

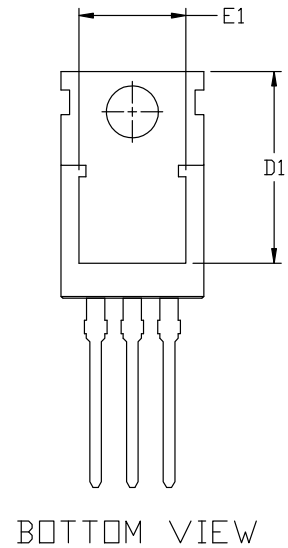
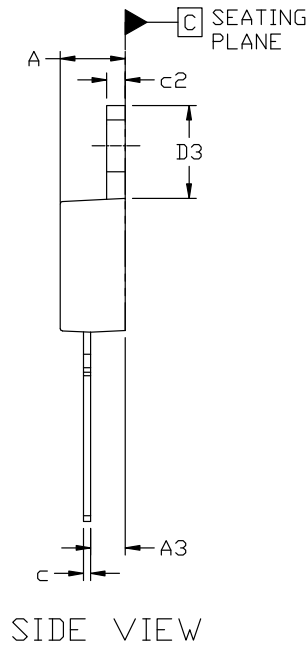
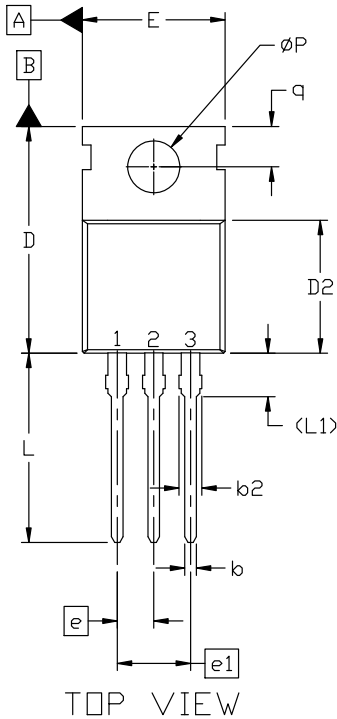
MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS



TO-220, 3L, 10.00x9.20x4.50, 2.45P
CASE 221AU
ISSUE B

DATE 18 JAN 2024



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	4.30	4.50	4.70
A3	2.20	2.40	2.60
b	0.70	0.80	0.90
b2	1.17	1.27	1.37
c	0.45	0.50	0.60
c2	1.20	1.30	1.40
D	15.50	15.70	15.90
D1	13.10	13.30	13.50
D2	9.00	9.20	9.40
D3	6.30	6.50	6.70
E	9.80	10.00	10.20
E1	---	---	8.90
e	2.54 BSC		
e1	5.08 BSC		
L	12.88	13.08	13.28
L1	2.80	3.00	3.20
øP	3.40	3.60	3.80
q	2.70	2.80	2.90

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
4. MAXIMUM WIDTH FOR F102 DEVICES = 1.37MM.
5. DIMENSION "A3" TO BE MEASURED IN THE REGION DEFINED BY L1.

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DESCRIPTION:	TO-220, 3L, 10.00x9.20x4.50, 2.45P	PAGE 1 OF 1

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