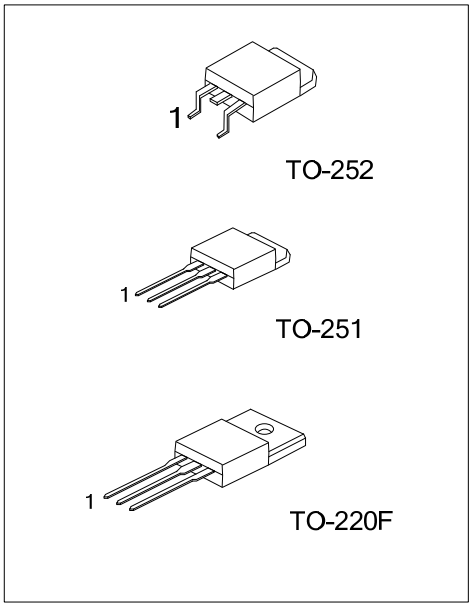
# 2SD1816

**NPN PLANAR TRANSISTOR**

## HIGH CURRENT SWITCHIG APPLICATIONS




### ■ FEATURES

* Low collector-to-emitter saturation voltage
* Good linearity of $h_{FE}$
* Small and slim package facilitating compactness of sets.
* High $f_T$
* Fast switching speed

### ■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 2SD1816L-x-TF3-T | 2SD1816G-x-TF3-T | TO-220F | B | C | E | Tube |
| 2SD1816L-x-TM3-T | 2SD1816G-x-TM3-T | TO-251 | B | C | E | Tube |
| 2SD1816L-x-TN3-T | 2SD1816G-x-TN3-T | TO-252 | B | C | E | Tube |
| 2SD1816L-x-TN3-R | 2SD1816G-x-TN3-R | TO-252 | B | C | E | Tape Reel |

2SD1816L-x-TM3-T

| | |
|---|---|
| (1)Packing Type | (1) T: Tube, R: Tape Reel |
| (2)Package Type | (2) TF3: TO-220F,TM3: TO-251, TN3: TO-252 |
| (3)Rank | (3) x: refer to Classification of $h_{FE1}$ |
| (4)Lead Plating | (4) G: Halogen Free ,L: Lead Free |


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## ■ ABSOLUTE MAXIMUM RATINGS (Ta =25℃ )

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Collector-Base Voltage | | $V_{CBO}$ | 120 | V |
| Collector-Emitter Voltage | | $V_{CEO}$ | 100 | V |
| Emitter-Base Voltage | | $V_{EBO}$ | 6 | V |
| Collector Current | DC | $I_C$ | 4 | A |
| | PULSE(Note 1) | | 8 | A |
| Collector Power Dissipation | TO-251/TO-252 | $P_D$ | 1 | W |
| | TO-220F | | 2 | W |
| Junction Temperature | | $T_J$ | +150 | °C |
| Storage Temperature | | $T_{STG}$ | -40 ~ +150 | °C |

Note1: Duty=1/2, Pw=20ms

Note2: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

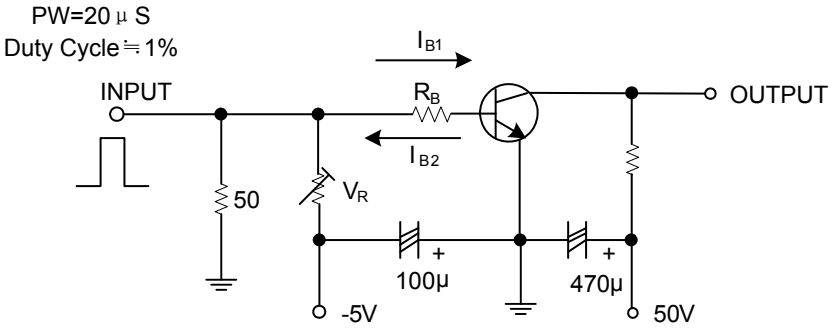
## ■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Collector Base Breakdown Voltage | $BV_{CBO}$ | $I_C$ =10μA, $I_E$ =0 | 120 | | | V |
| Collector Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$ =1mA, $R_B$=∞ | 100 | | | V |
| Emitter Base Breakdown Voltage | $BV_{EBO}$ | $I_E$ =10μA, $I_C$=0 | 6 | | | V |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | $I_C$ = 2A, $I_B$ =0.2A | | 0.9 | 1.2 | V |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C$ = 2A, $I_B$=0.2A | | 150 | 400 | mV |
| Collector Cut-Off Current | $I_{CBO}$ | $V_{CB}$ = 100 V, $I_E$ =0 | | | 1 | μA |
| Emitter Cut-Off Current | $I_{EBO}$ | $V_{EB}$ = 4V, $I_C$=0 | | | 1 | μA |
| DC Current Transfer Ratio | $h_{FE1}$ | $V_{CE}$ = 5V, $I_C$ = 0.5A | 70 | | 400 | |
| | $h_{FE2}$ | $V_{CE}$ =5V, $I_C$ = 3A | 40 | | | |
| Transition Frequency | $f_T$ | $V_{CE}$ =10V, $I_C$ =0.5A | | 180 | | MHz |
| Output Capacitance | $C_{ob}$ | $V_{CB}$ =10V, $I_E$ =0A, f =1MHz | | 40 | | pF |
| Turn-on Time | $t_{ON}$ | See test circuit | | 100 | | ns |
| Storage Time | $t_{STG}$ | See test circuit | | 900 | | ns |
| Fall Time | $t_F$ | See test circuit | | 50 | | ns |

## ■ CLASSIFICATION of $h_{FE1}$

| RANK | R | S | T | Q |
|---|---|---|---|---|
| RANGE | 100 - 200 | 140 - 280 | 200 - 400 | 70 -140 |

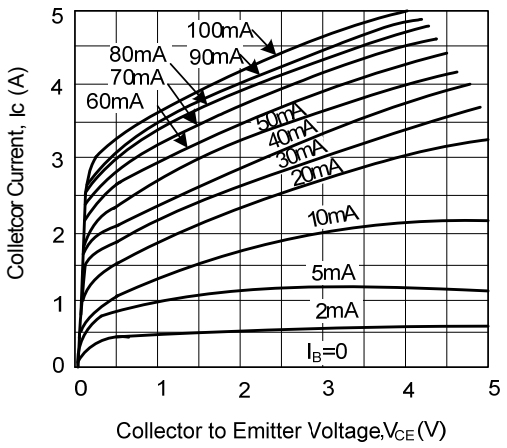
## ■ TEST CIRCUIT



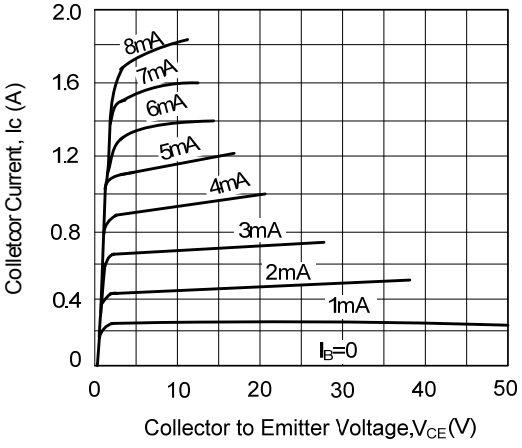

Ic=10, $I_{B1}$= -10, $I_{B2}$=2A
Unit (resistance: Ω, capacitance: F)

## ■ TYPICAL CHARACTERISTICS

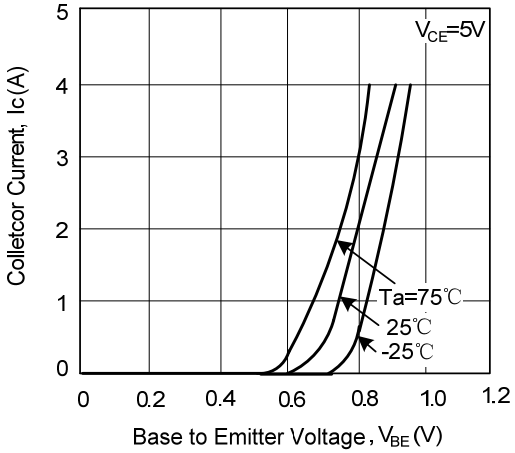
Ic-$V_{CE}$



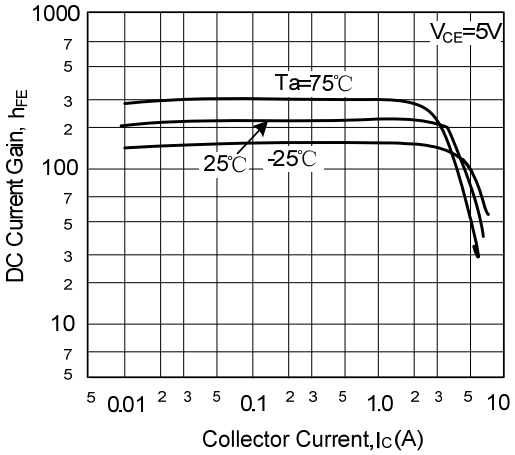

Ic-$V_{CE}$



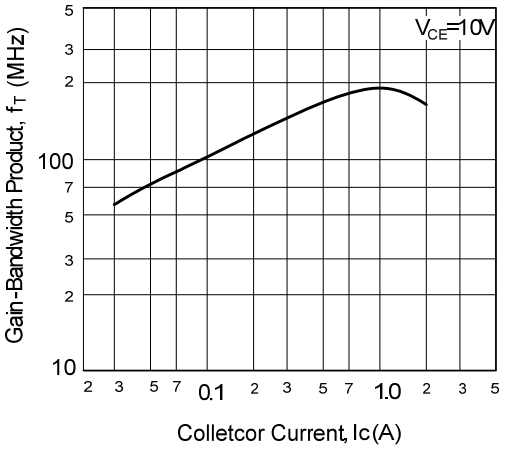

Ic-$V_{BE}$



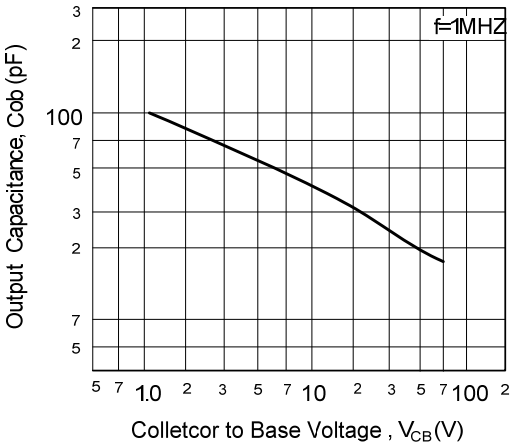

$h_{FE}$-Ic




$f_T$-I c

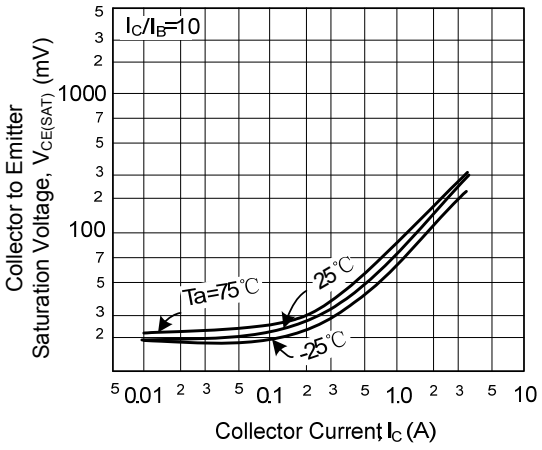



Cob-$V_{CB}$

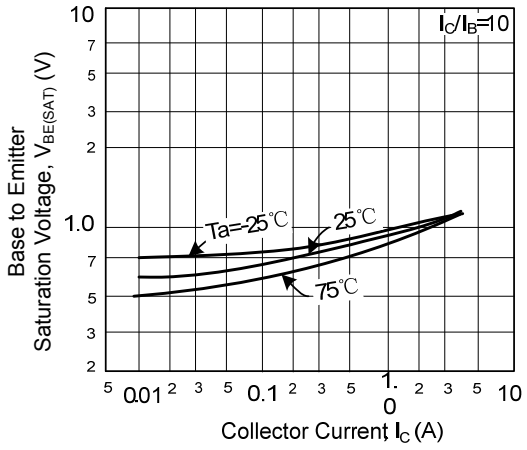


## ■ TYPICAL CHARACTERISTICS(Cont.)

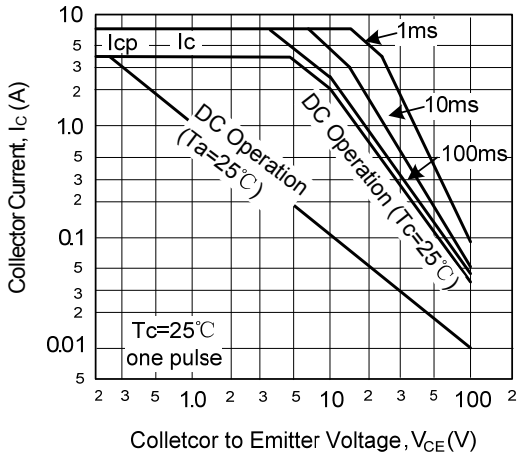
$V_{CE(SAT)}$ - Ic



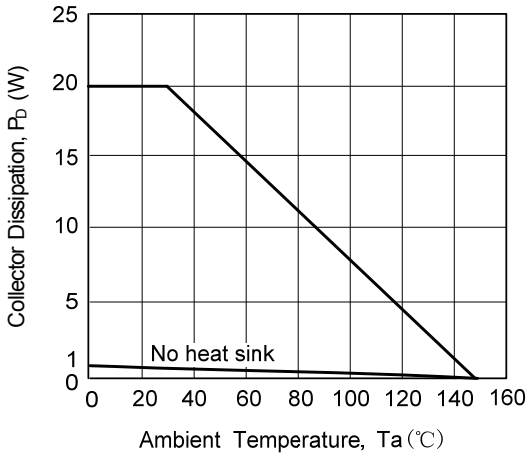

$V_{CE(SAT)}$ - Ic




A S O




PD-Ta




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