

**NEC**

**SILICON POWER TRANSISTORS**  
**2SA1615, 1615-Z**

**PNP SILICON EPITAXIAL TRANSISTOR**  
**FOR HIGH-SPEED SWITCHING**

The 2SA1615 and 1615-Z are available for the large current control in small dimension due to the low saturation and are ideal for high-efficiency DC/DC converters due to the fast switching speed.

**FEATURES**

- Large current capacity:  
I<sub>C(DC)</sub>: -10 A, I<sub>C(pulse)</sub>: -15 A
- High h<sub>FE</sub> and low collector saturation voltage:  
h<sub>FE</sub> = 200 MIN. (@V<sub>CE</sub> = -2.0 V, I<sub>C</sub> = -0.5 A)  
V<sub>CE(sat)</sub> ≤ -0.25 V (@I<sub>C</sub> = -4.0 A, I<sub>B</sub> = -0.05 A)

**QUALITY GRADES**

- Standard  
Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25°C)**

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V <sub>CBO</sub>	-30	V
Collector to emitter voltage	V <sub>CEO</sub>	-20	V
Emitter to base voltage	V <sub>EBO</sub>	-10	V
Collector current (DC)	I <sub>C(DC)</sub>	-10	A
Collector current (pulse)	I <sub>C(pulse)</sub> *	-15	A
Base current (DC)	I <sub>B(DC)</sub>	-0.5	A
Total power dissipation	P <sub>T</sub> (T <sub>a</sub> = 25°C)**	1.0	W
Total power dissipation	P <sub>T</sub> (T <sub>c</sub> = 25°C)	15	W
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

\* PW ≤ 10 ms, duty cycle ≤ 50%

\*\* Printing board mounted



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = -20\text{ V}, I_E = 0$			-1.0	$\mu\text{A}$
Emitter cutoff current	$I_{EBO}$	$V_{EB} = -8.0\text{ V}, I_C = 0$			-1.0	$\mu\text{A}$
DC current gain	$h_{FE1}^*$	$V_{CE} = -2.0\text{ V}, I_C = -0.5\text{ A}$	200		600	
DC current gain	$h_{FE2}^*$	$V_{CE} = -2.0\text{ V}, I_C = -4.0\text{ A}$	160			
Collector saturation voltage	$V_{CE(sat)}^*$	$I_C = -4.0\text{ A}, I_B = -0.05\text{ A}$		-0.2	-0.25	V
Base saturation voltage	$V_{BE(sat)}^*$	$I_C = -4.0\text{ A}, I_B = -0.05\text{ A}$		-0.9	-1.2	V
Gain bandwidth product	$f_T$	$V_{CE} = -5.0\text{ V}, I_E = 1.5\text{ A}$		180		MHz
Output capacity	$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$		220		pF
Turn-on time	$t_{on}$	$I_C = -5.0\text{ A}, I_{B1} = -I_{B2} = 0.125\text{ A}, R_L = 2.0\ \Omega, V_{CC} \cong -10\text{ V}$		80		ns
Storage time	$t_{stg}$			300		ns
Fall time	$t_f$			60		ns

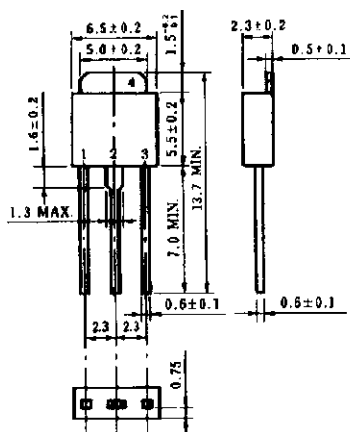
\* Pulse test  $PW \leq 350\ \mu\text{s}$ , duty cycle  $\leq 2\%$

$h_{FE}$  CLASSIFICATION

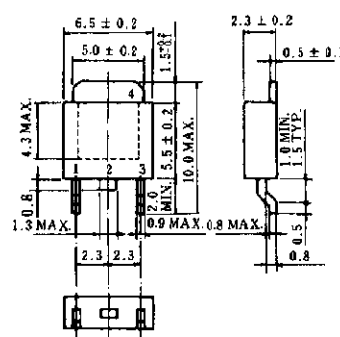
Marking	L	K
$h_{FE2}$	200 to 400	300 to 600

PACKAGE DRAWING (UNIT: mm)

2SA1615



2SA1615-Z

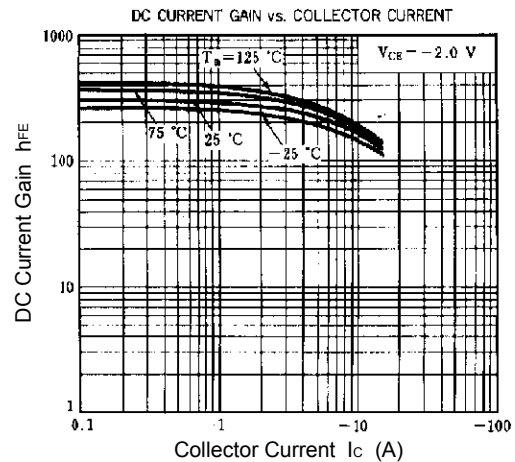
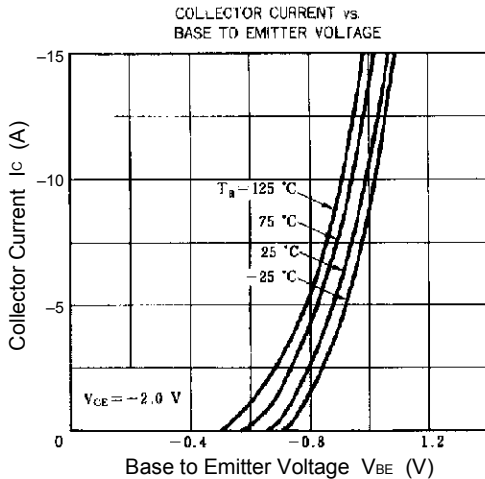
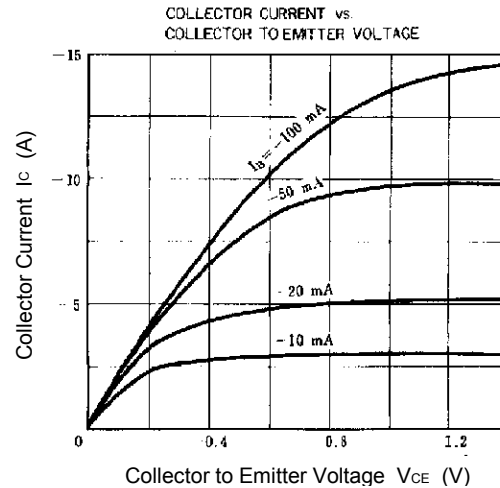
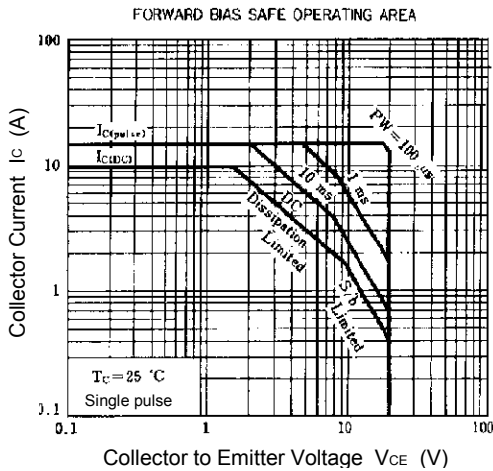
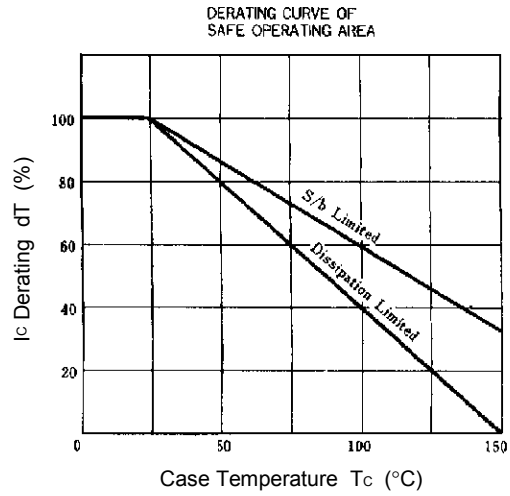
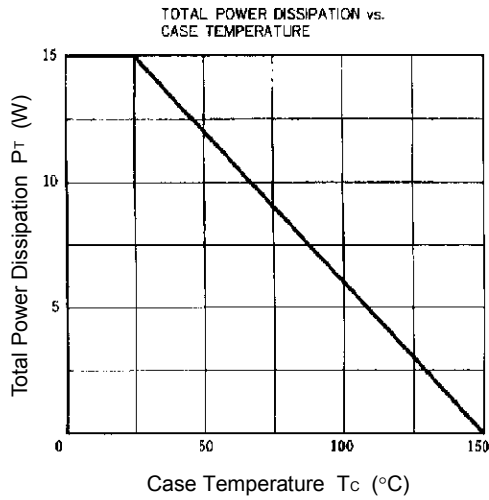


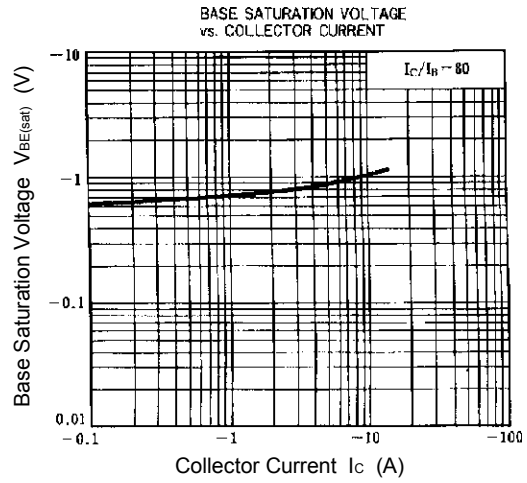
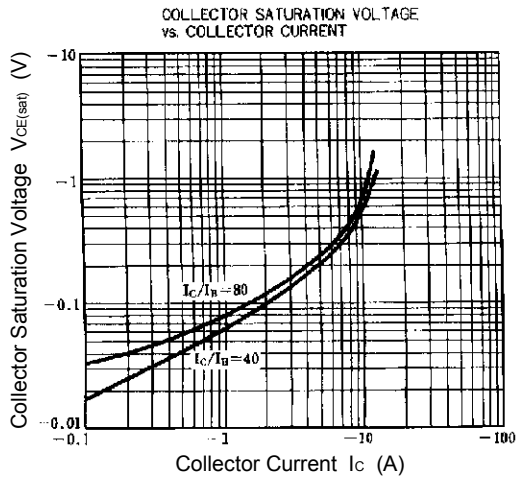
Electrode Connection

- 1. Base
- 2. Collector
- 3. Emitter
- 4. Collector (fin)

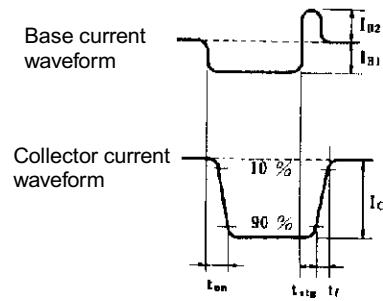
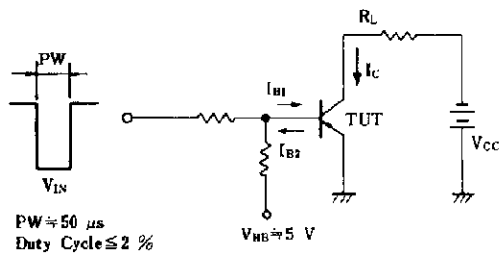


TYPICAL CHARACTERISTICS (Ta = 25 °C)





SWITCHING TIME ( $t_{on}$ ,  $t_{stg}$ ,  $t_f$ ) TEST CIRCUIT



[MEMO]



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