

# 2SD1321

Silicon NPN Triple-Diffused Planar Darlington Type

Medium Speed Power Switching

### ■ Features

- 60V Zener diode built-in between C and B
- Very small fluctuation in breakdown voltages
- Large energy handling capability
- High speed switching
- "N Type" package configuration with a cooling fin for direct soldering on PC board of a small-size electronic equipment

### ■ Absolute Maximum Ratings (Tc=25°C)

Item	Symbol	Value	Unit
Collector-base voltage	$V_{CB0}$	60 ± 10	V
Collector-emitter voltage	$V_{CE0}$	60 ± 10	V
Emitter-base voltage	$V_{EB0}$	7	V
Peak collector current	$I_{CP}$	12	A
Collector current	$I_C$	8	A
Collector power dissipation	$P_C$	Tc = 25 °C	45
		Ta = 25 °C	1.3
Junction temperature	$T_J$	150	°C
Storage temperature	$T_{stg}$	-55 ~ +150	°C

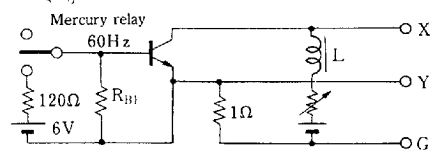
### ■ Electrical Characteristics (Tc=25°C)

Item	Symbol	Condition	min	typ	max.	Unit	
Collector cutoff current	$I_{CB}$	$V_{CB}=50V, I_E=0$			100	μA	
Emitter cutoff current	$I_{EB0}$	$V_{EB}=7V, I_C=0$			2	mA	
Collector-emitter voltage	$V_{CE0}$	$I_C=5mA, I_B=0$	50		70	V	
DC current gain	$h_{FE1}^{*1}$	$V_{CE}=3V, I_C=4A$	1000		10000		
	$h_{FE2}$	$V_{CE}=3V, I_C=8A$	500				
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=4A, I_B=8mA$			1.5	V	
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=4A, I_B=8mA$			2	V	
Transition frequency	$f_T$	$V_{CE}=10V, I_C=0.5A, f=1MHz$		20		MHz	
Turn-on time	$t_{on}$	$I_C=4A, I_{B1}=8mA, I_{B2}=-8mA$ $V_{CC}=50V$		0.5		μs	
Storage time	$t_{stg}$				4		μs
Fall time	$t_f$				1		μs
Energy handling capability	$E_{cb}^{*2}$	$I_C=1A, L=100mH, R_{\theta F}=100\Omega$	50			mJ	

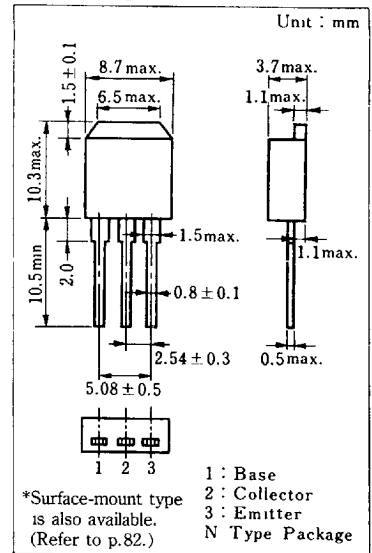
#### \*1 $h_{FE1}$ Classifications

Class	R	Q	P
$h_{FE1}$	1000 ~ 2500	2000 ~ 5000	4000 ~ 10000

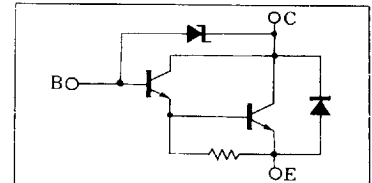
#### \*2 $E_{cb}$ Test method



### ■ Package Dimensions

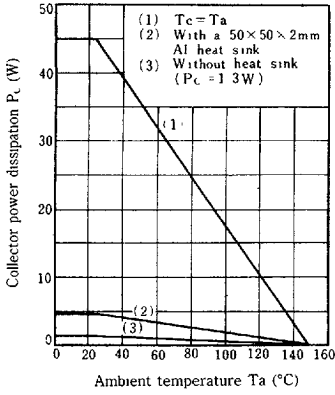


### ■ Inner Circuit

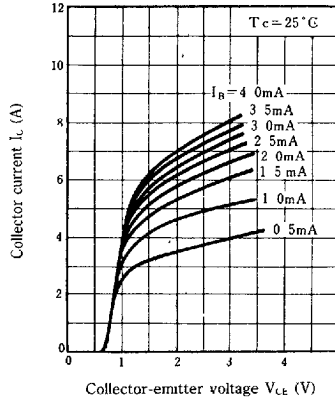


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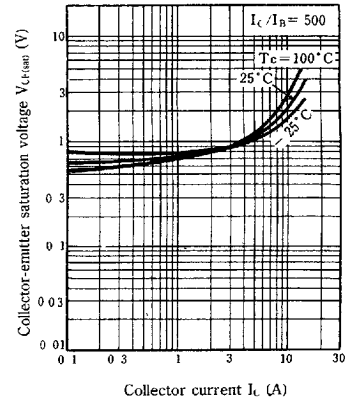
**P<sub>C</sub> - T<sub>a</sub>**



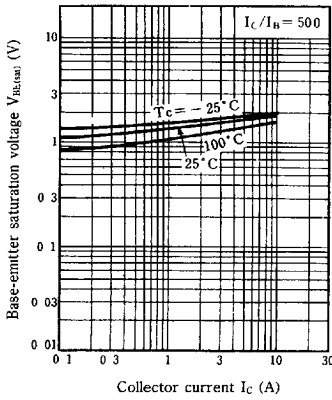
**I<sub>C</sub> - V<sub>CE</sub>**



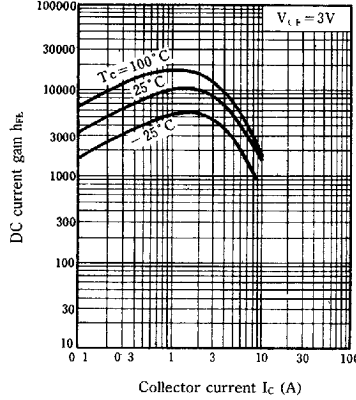
**V<sub>CE(sat)</sub> - I<sub>C</sub>**



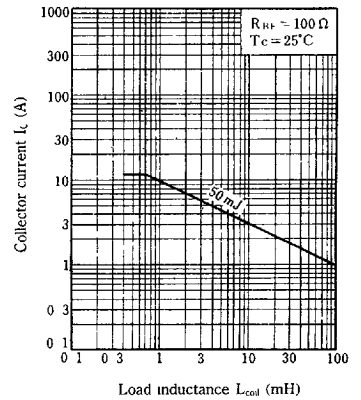
**V<sub>BE(sat)</sub> - I<sub>C</sub>**



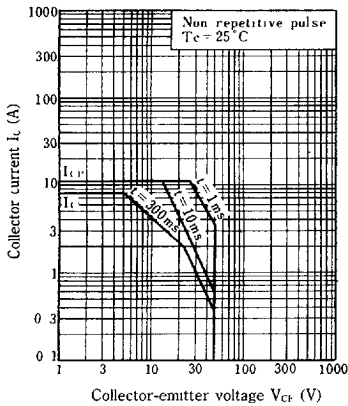
**h<sub>FE</sub> - I<sub>C</sub>**



**I<sub>C</sub> - L<sub>coil</sub>**



**Area of safe operation (ASO)**



**R<sub>th(t)-t</sub>**

