

**Silicon NPN Power Transistors**

**2SD1413**

**DESCRIPTION**

- With TO-220Fa package
- High DC current gain
- Low saturation voltage
- Complement to type 2SB1023
- DARLINGTON

**APPLICATIONS**

- Power amplifier and switching applications
- Hammer drive,pulse motor drive applications

**PINNING**

PIN	DESCRIPTION
1	Base
2	Collector
3	Emitter

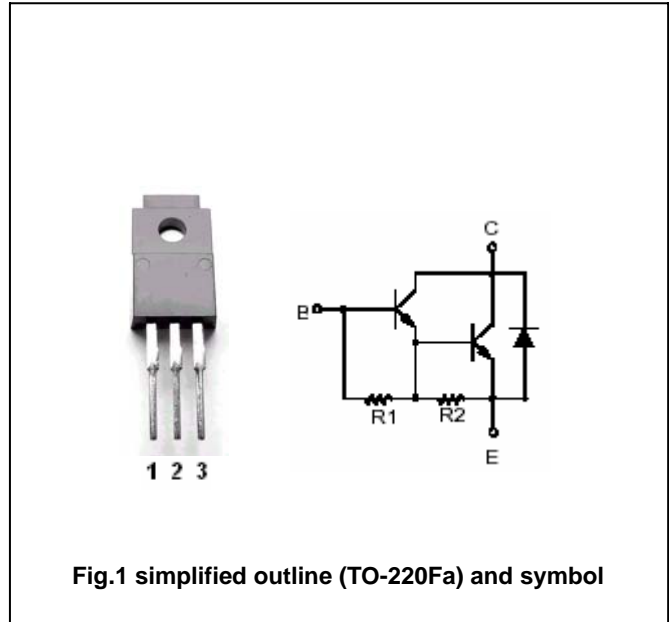


Fig.1 simplified outline (TO-220Fa) and symbol

**Absolute maximum ratings(Ta=25°C)**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$V_{CBO}$	Collector-base voltage	Open emitter	60	V
$V_{CEO}$	Collector -emitter voltage	Open base	40	V
$V_{EBO}$	Emitter-base voltage	Open collector	5	V
$I_C$	Collector current		3	A
$I_B$	Base current		0.5	A
$P_C$	Collector power dissipation	$T_C=25^\circ\text{C}$	20	W
$T_j$	Junction temperature		150	°C
$T_{stg}$	Storage temperature		-55~150	°C

## Silicon NPN Power Transistors

## 2SD1413

## CHARACTERISTICS

T<sub>j</sub>=25°C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
V <sub>(BR)CEO</sub>	Collector-emitter breakdown voltage	I <sub>C</sub> =25mA; I <sub>B</sub> =0	40			V
V <sub>CEsat</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =2A ; I <sub>B</sub> =4mA			1.5	V
V <sub>BEsat</sub>	Base-emitter saturation voltage	I <sub>C</sub> =2A ; I <sub>B</sub> =4mA			2.0	V
I <sub>CBO</sub>	Collector cut-off current	V <sub>CB</sub> =60V; I <sub>E</sub> =0			20	μ A
I <sub>EBO</sub>	Emitter cut-off current	V <sub>EB</sub> =5V; I <sub>C</sub> =0			2.5	mA
h <sub>FE-1</sub>	DC current gain	I <sub>C</sub> =1A ; V <sub>CE</sub> =2V	2000			
h <sub>FE-2</sub>	DC current gain	I <sub>C</sub> =3A ; V <sub>CE</sub> =2V	1000			

## Switching times

t <sub>on</sub>	Turn-on time	I <sub>B1</sub> =-I <sub>B2</sub> =6mA V <sub>CC</sub> =30V , R <sub>L</sub> =10 Ω		0.1		μ s
t <sub>stg</sub>	Storage time			1.0		μ s
t <sub>f</sub>	Fall time			0.2		μ s

PACKAGE OUTLINE

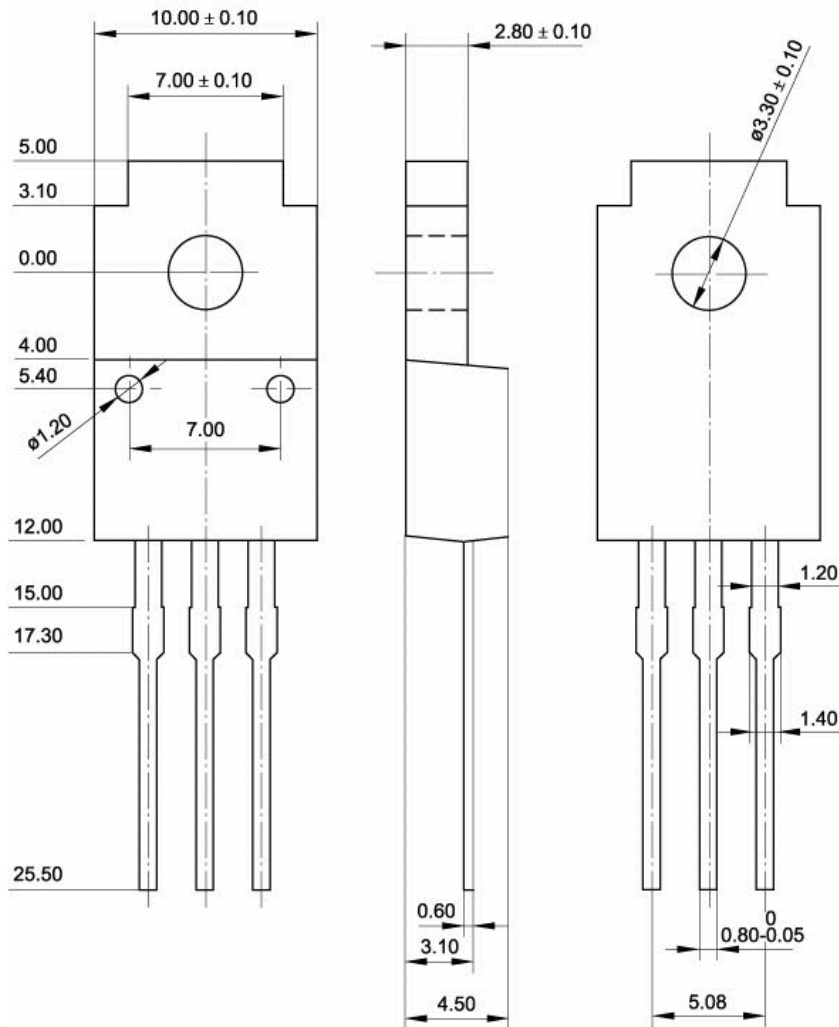


Fig.2 Outline dimensions (unindicated tolerance:  $\pm 0.15$  mm)