

# High-current Gain Medium Power Transistor (20V, 0.5A)

## 2SD2114K / 2SD2144S

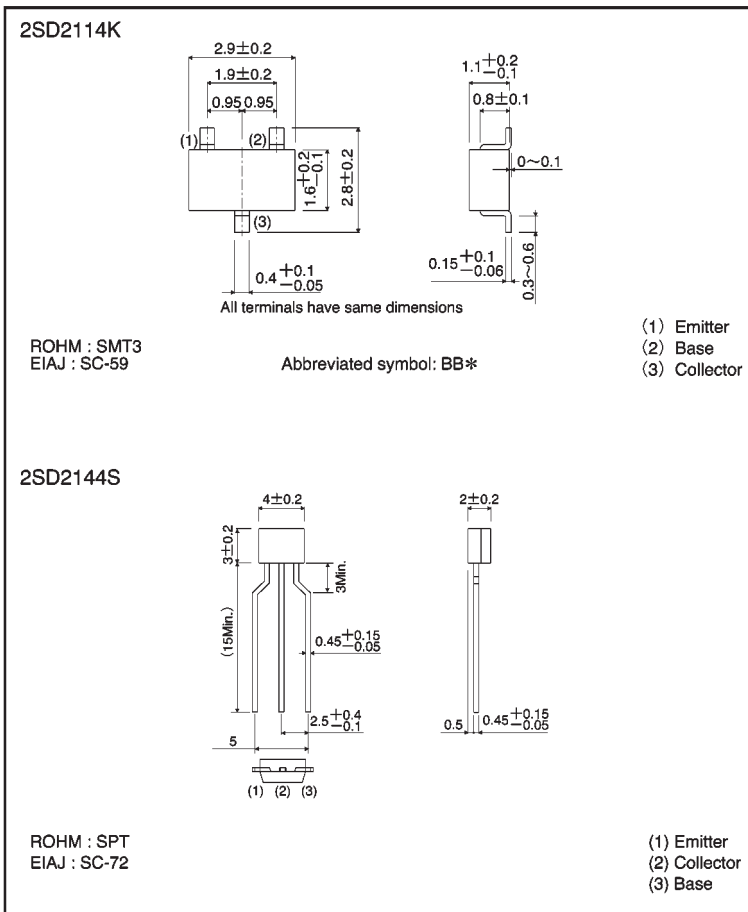
●Features

- 1) High DC current gain.  
 $h_{FE} = 1200$  (Typ.)
- 2) High emitter-base voltage.  
 $V_{EBO} = 12V$  (Min.)
- 3) Low  $V_{CE(sat)}$ .  
 $V_{CE(sat)} = 0.18V$  (Typ.)  
 $(I_C / I_B = 500mA / 20mA)$

●Structure

Epitaxial planar type  
 NPN silicon transistor

●External dimensions (Units: mm)



\* Denotes  $h_{FE}$

● Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Collector-base voltage	V <sub>CB0</sub>	25	V
Collector-emitter voltage	V <sub>CE0</sub>	20	V
Emitter-base voltage	V <sub>EB0</sub>	12	V
Collector current	I <sub>c</sub>	0.5	A (DC)
		1	A (Pulse) *
Collector power dissipation	2SD2114K	P <sub>c</sub>	W
	2SD2144S		
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55~+150	°C

\* Single pulse Pw=100ms

● Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	
Collector-base breakdown voltage	BV <sub>CB0</sub>	25	—	—	V	I <sub>c</sub> =10 μA	
Collector-emitter breakdown voltage	BV <sub>CE0</sub>	20	—	—	V	I <sub>c</sub> =1mA	
Emitter-base breakdown voltage	BV <sub>EB0</sub>	12	—	—	V	I <sub>E</sub> =10 μA	
Collector cutoff current	I <sub>CB0</sub>	—	—	0.5	μA	V <sub>CB</sub> =20V	
Emitter cutoff current	I <sub>EB0</sub>	—	—	0.5	μA	V <sub>EB</sub> =10V	
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	—	0.18	0.4	V	I <sub>c</sub> /I <sub>B</sub> =500mA/20mA	
DC current transfer ratio	2SD2114K	h <sub>FE</sub>	820	—	2700	—	V <sub>CE</sub> =3V, I <sub>c</sub> =10mA
	2SD2144S		560	—	2700	—	
Transition frequency	f <sub>T</sub> *	—	350	—	MHz	V <sub>CE</sub> =10V, I <sub>E</sub> =-50mA, f=100MHz	
Output capacitance	C <sub>ob</sub>	—	8.0	—	pF	V <sub>CB</sub> =10V, I <sub>E</sub> =0A, f=1MHz	
Output On-resistance	R <sub>on</sub>	—	0.8	—	pF	I <sub>B</sub> =1mA, V <sub>i</sub> =100mV(rms), f=1kHz	

\* Measured using pulse current

● Packaging specifications and h<sub>FE</sub>

Type	h <sub>FE</sub>	Package	Taping	
		Code	T146	TP
		Basic ordering unit (pieces)	3000	5000
2SD2114K	VW	○	—	—
2SD2144S	UVW	—	○	—

h<sub>FE</sub> values are classified as follows :

Item	U	V	W
h <sub>FE</sub>	560~1200	820~1800	1200~2700

● Electrical characteristic curves

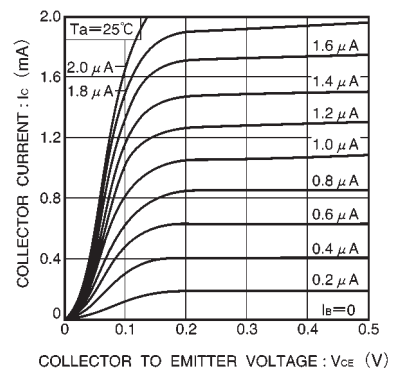


Fig.1 Grounded emitter output characteristics ( I )

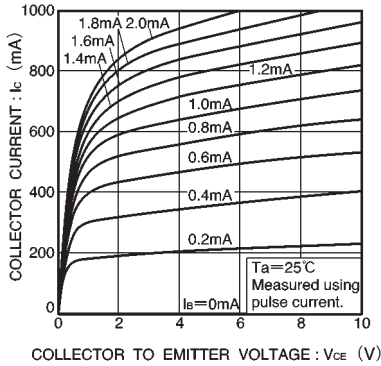


Fig.2 Grounded emitter output characteristics ( I )

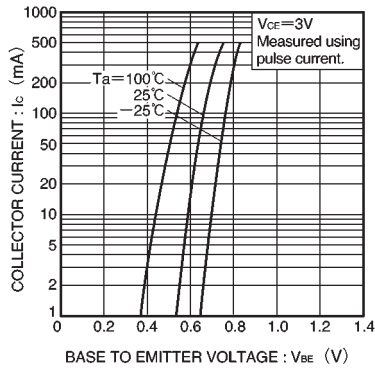


Fig.3 Grounded emitter propagation characteristics

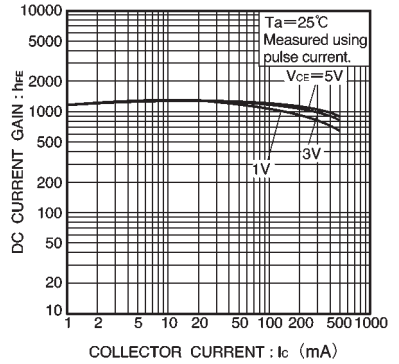


Fig.4 DC current gain vs. collector current ( I )

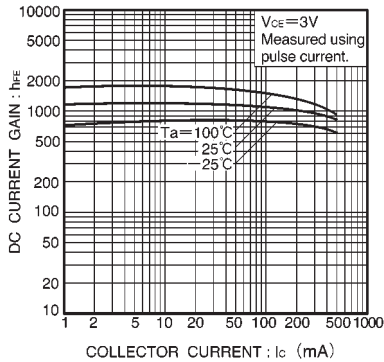


Fig.5 DC current gain vs. collector current ( II )

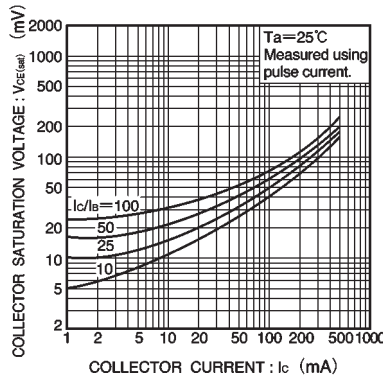


Fig.6 Collector-emitter saturation voltage vs. collector current ( I )

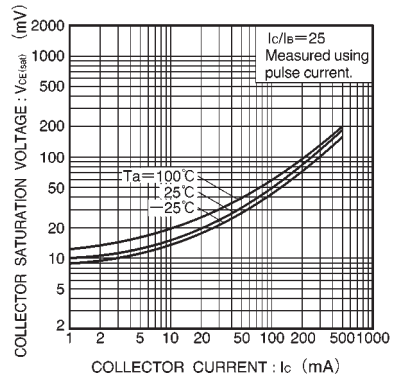


Fig.7 Collector-emitter saturation voltage vs. collector current ( II )

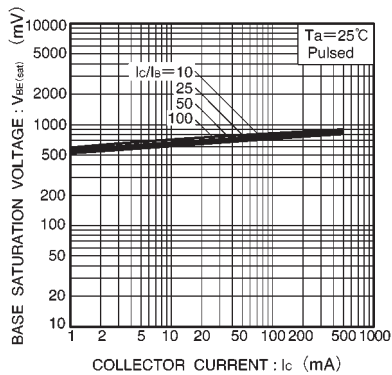


Fig.8 Base-emitter saturation voltage vs. collector current ( I )

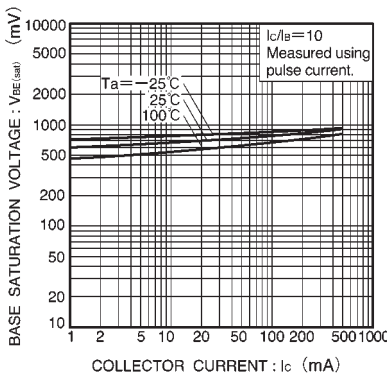


Fig.9 Base-emitter saturation voltage vs. collector current ( II )

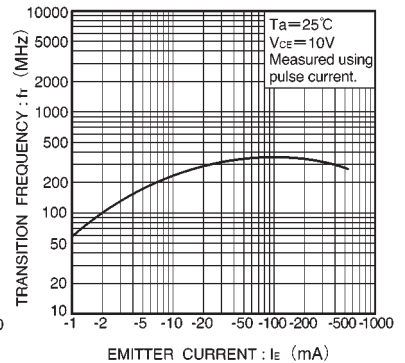


Fig.10 Gain bandwidth product vs. emitter current

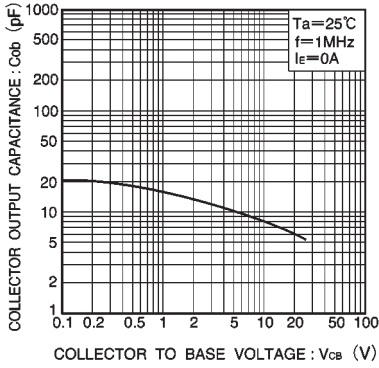


Fig.11 Collector output capacitance vs. collector-base voltage

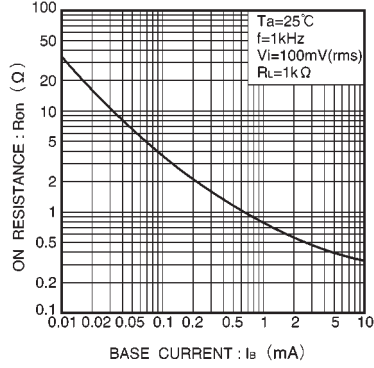


Fig.12 Output-on resistance vs. base current

●  $R_{on}$  measurement circuit

