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

2SD2114K / 2SD2144S

●Features

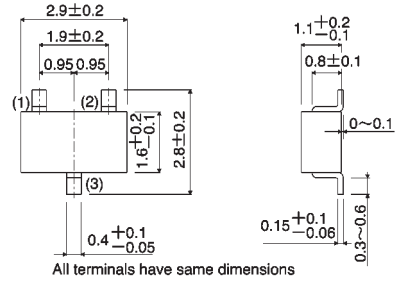
1) High DC current gain.
   h_{FE} = 1200 (Typ.)
2) High emitter-base voltage.
   V_{EBO} = 12V (Min.)
3) Low $V_{CE(sat)}$.
   $V_{CE(sat)}$ = 0.18V (Typ.)
   (I_C / I_B = 500mA / 20mA)

●Structure

Epitaxial planar type
NPN silicon transistor

●External dimensions (Units: mm)

2SD2114K



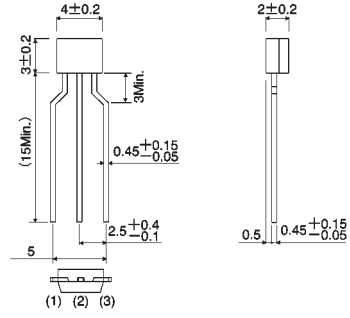
All terminals have same dimensions

ROHM : SMT3
EIAJ : SC-59

Abbreviated symbol: BB*

(1) Emitter
(2) Base
(3) Collector

2SD2144S



ROHM : SPT
EIAJ : SC-72

(1) Emitter
(2) Collector
(3) Base

* Denotes h_{FE}

(96-232-C107)

●Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Collector-base voltage		V_{CBO}	25	V
Collector-emitter voltage		V_{CEO}	20	V
Emitter-base voltage		V_{EBO}	12	V
Collector current		I_C	0.5	A (DC)
			1	A (Pulse) *
Collector power dissipation	2SD2114K	P_C	0.2	W
	2SD2144S		0.3	
Junction temperature		Tj	150	℃
Storage temperature		Tstg	−55～+150	℃

* Single pulse Pw=100ms

●Electrical characteristics (Ta = 25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage		BV_{CBO}	25	—	—	V	I_C=10 μA
Collector-emitter breakdown voltage		BV_{CEO}	20	—	—	V	I_C=1mA
Emitter-base breakdown voltage		BV_{EBO}	12	—	—	V	I_E=10 μA
Collector cutoff current		I_{CBO}	—	—	0.5	μA	V_{CB}=20V
Emitter cutoff current		I_{EBO}	—	—	0.5	μA	V_{EB}=10V
Collector-emitter saturation voltage		$V_{CE(sat)}$	—	0.18	0.4	V	I_C/I_B=500mA/20mA
DC current transfer ratio	2SD2114K	h_{FE}	820	—	2700	—	V_{CE}=3V, I_C=10mA
	2SD2144S		560	—	2700	—	
Transition frequency		f_T*	—	350	—	MHz	V_{CE}=10V, I_E=−50mA, f=100MHz
Output capacitance		Cob	—	8.0	—	pF	V_{CB}=10V, I_E=0A, f=1MHz
Output On-resistance		Ron	—	0.8	—	pF	I_B=1mA, Vi=100mV(rms), f=1kHz

* Measured using pulse current

●Packaging specifications and h_{FE}

Type	h_{FE}	Package	Taping	
		Code	T146	TP
		Basic ordering unit (pieces)	3000	5000
2SD2114K	VW		○	—
2SD2144S	UVW		—	○

h_{FE} values are classified as follows :

Item	U	V	W
h_{FE}	560～1200	820～1800	1200～2700

●Electrical characteristic curves

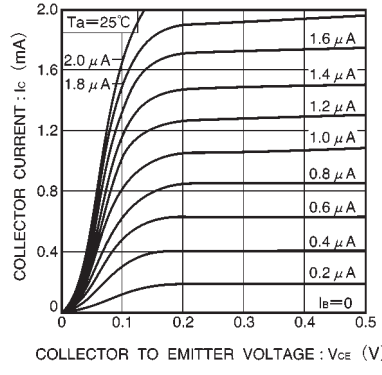


Fig.1 Grounded emitter output characteristics (Ⅰ)

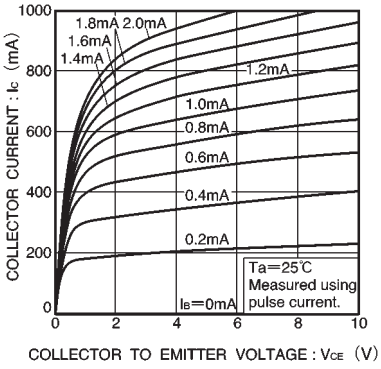


Fig.2 Grounded emitter output characteristics (Ⅱ)

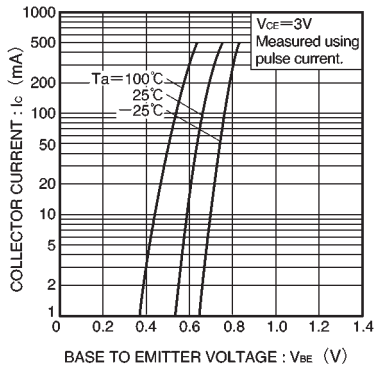


Fig.3 Grounded emitter propagation characteristics

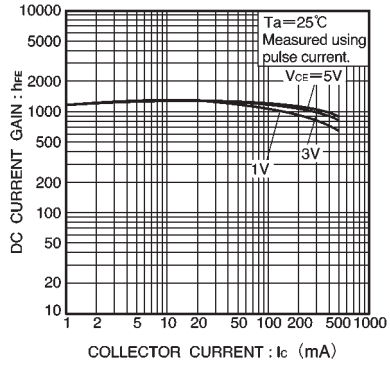


Fig.4 DC current gain vs. collector current (Ⅰ)

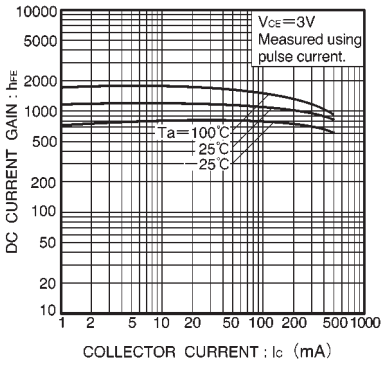


Fig.5 DC current gain vs. collector current (Ⅱ)

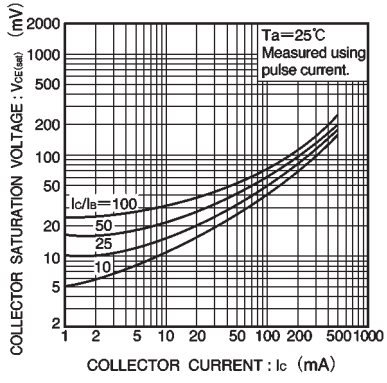


Fig.6 Collector-emitter saturation voltage vs. collector current (Ⅰ)

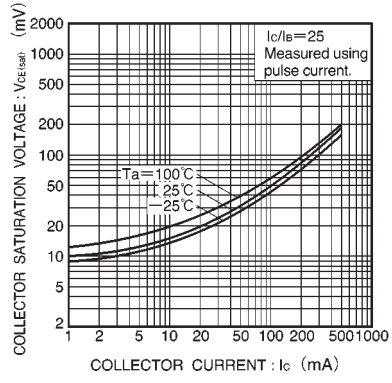


Fig.7 Collector-emitter saturation voltage vs. collector current (Ⅱ)

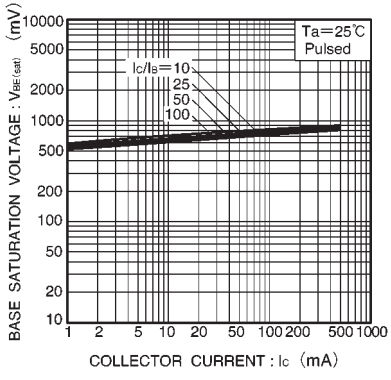


Fig.8 Base-emitter saturation voltage vs. collector current (Ⅰ)

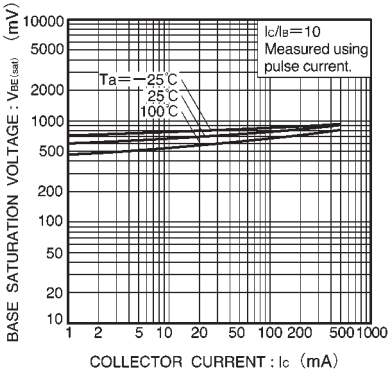


Fig.9 Base-emitter saturation voltage vs. collector current (Ⅱ)

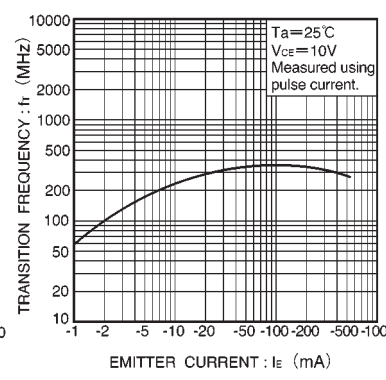


Fig.10 Gain bandwidth product vs. emitter current

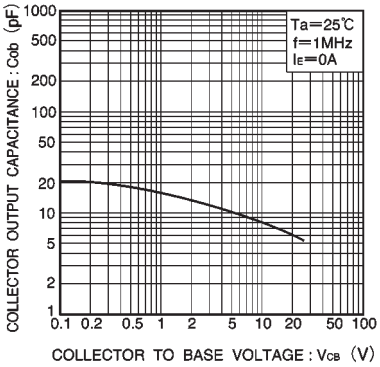


Fig.11 Collector output capacitance vs. collector-base voltage

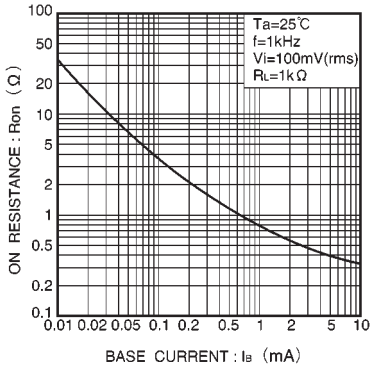
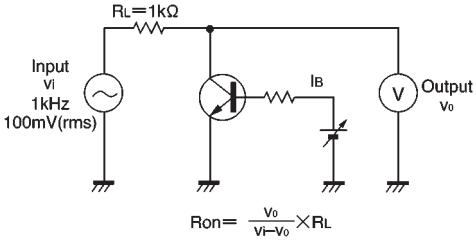


Fig.12 Output-on resistance vs. base current

●R_{on} measurement circuit



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