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

2SD2114K / 2SD2144S

●Features

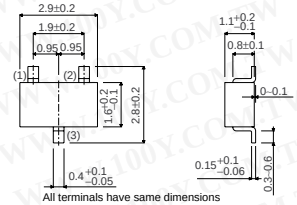
1) High DC current gain.
h_{FE} = 1200 (Typ.)
2) High emitter-base voltage.
V_{EBO} =12V (Min.)
3) Low $V_{CE\ (sat)}$.
$V_{CE\ (sat)}$ = 0.18V (Typ.)
(I_C / I_B = 500mA / 20mA)

●Structure

Epitaxial planar type
NPN silicon transistor

●External dimensions (Unit : mm)

2SD2114K

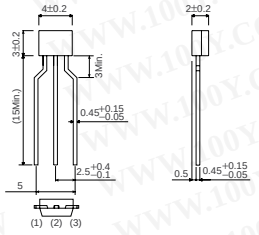


ROHM : SMT3
EIAJ : SC-59

Abbreviated symbol: BB*

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

2SD2144S



ROHM : SPT
EIAJ : SC-72

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

* Denotes h_{FE}

●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	°C
Storage temperature		Tstg	−55 to +150	°C

* 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=10μA
Collector-emitter breakdown voltage	BV_{CEO}	20	–	–	V	I_C=1mA
Emitter-base breakdown voltage	BV_{EBO}	12	–	–	V	I_E=10μA
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	h_{FE}	820	–	2700	–	V_{CE}=3V, I_C=10mA
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	–	Ω	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	VW		–	○

h_{FE} values are classified as follows :

Item	V	W
h_{FE}	820 to 1800	1200 to 2700

●**Electrical characteristic curves**

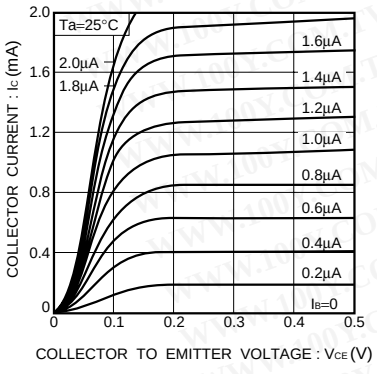


Fig.1 Grounded emitter output characteristics (I)

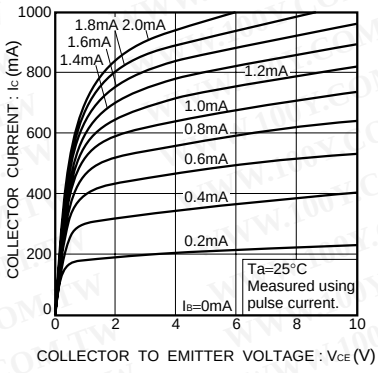


Fig.2 Grounded emitter output characteristics (II)

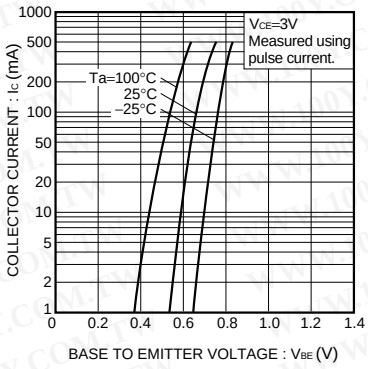


Fig.3 Grounded emitter propagation characteristics

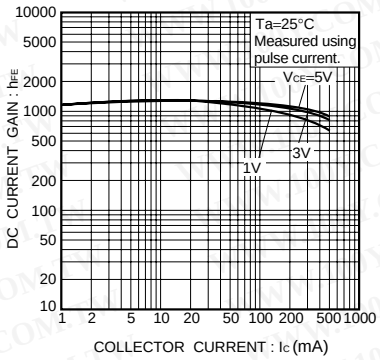


Fig.4 DC current gain vs. collector current (I)

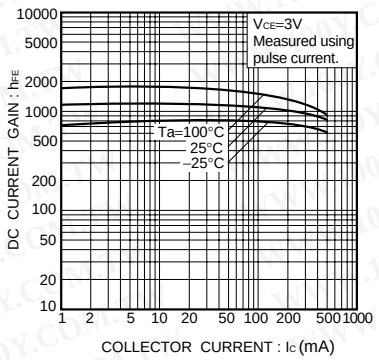


Fig.5 DC current gain vs. collector current (II)

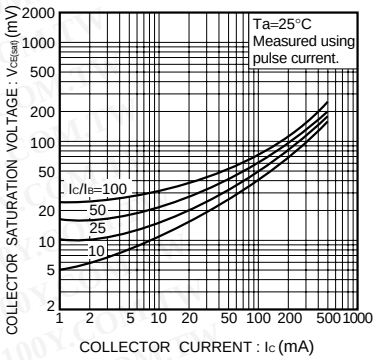


Fig.6 Collector-emitter saturation voltage vs. collector current (I)

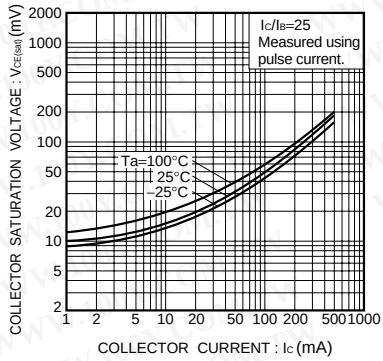


Fig.7 Collector-emitter saturation voltage vs. collector current (II)

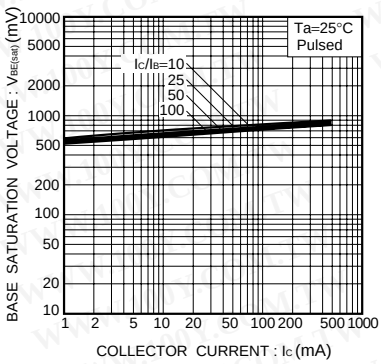


Fig.8 Base-emitter saturation voltage vs. collector current (I)

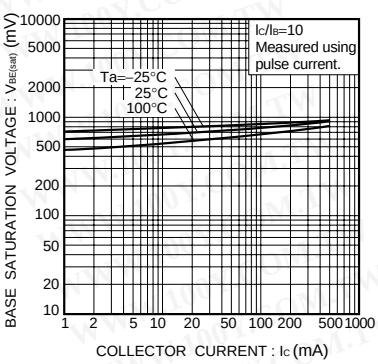


Fig.9 Base-emitter saturation voltage vs. collector current (II)

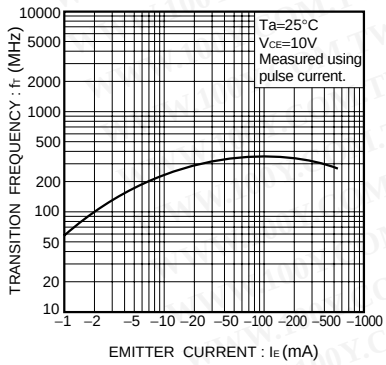


Fig.10 Gain bandwidth product vs. emitter current

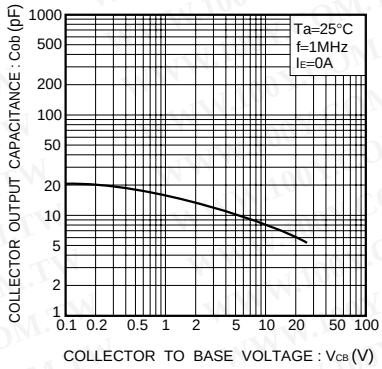


Fig.11 Collector output capacitance vs. collector-base voltage

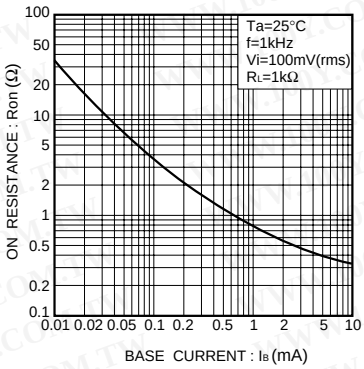
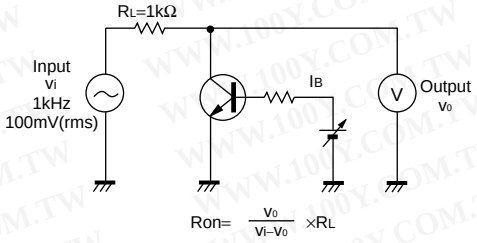


Fig.12 Output-on resistance vs. base current

●**Ron measurement circuit**



$$Ron = \frac{V_0}{V_i - V_0} \times R_L$$

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