

# 2SD638, 2SD639

Silicon NPN epitaxial planer type

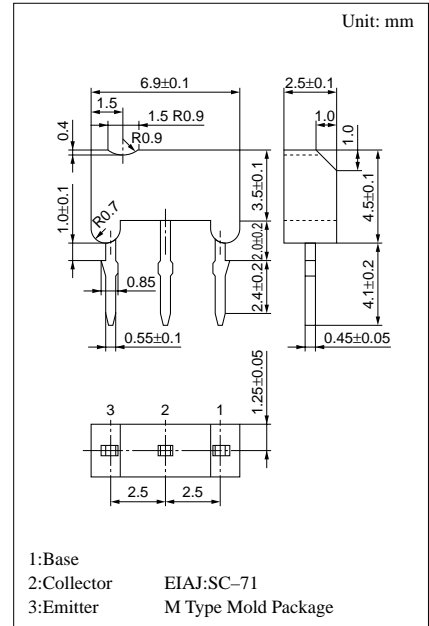
For medium-power general amplification  
Complementary to 2SB643 and 2SB644

## ■ Features

- Low collector to emitter saturation voltage  $V_{CE(sat)}$ .
- M type package allowing easy automatic and manual insertion as well as stand-alone fixing to the printed circuit board.

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

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V <sub>CBO</sub>	30	V
2SD638			
2SD639		60	
Collector to emitter voltage	V <sub>CEO</sub>	25	V
2SD638			
2SD639		50	
Emitter to base voltage	V <sub>EBO</sub>	7	V
Peak collector current	I <sub>CP</sub>	1	A
Collector current	I <sub>C</sub>	0.5	A
Collector power dissipation	P <sub>C</sub>	600	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 ~ +150	°C



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

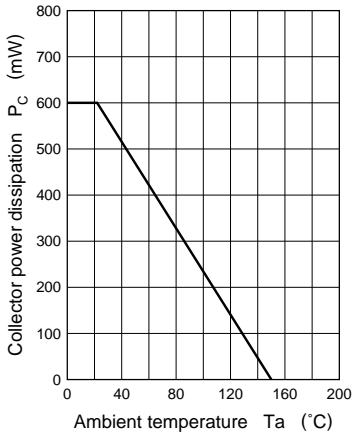
Parameter	Symbol	Conditions	min	typ	max	Unit
Collector cutoff current	I <sub>CBO</sub>	V <sub>CB</sub> = 20V, I <sub>E</sub> = 0			0.1	μA
	I <sub>CEO</sub>	V <sub>CE</sub> = 20V, I <sub>B</sub> = 0			1	μA
Collector to base voltage	V <sub>CBO</sub>	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0	30			V
			60			
Collector to emitter voltage	V <sub>CEO</sub>	I <sub>C</sub> = 2mA, I <sub>B</sub> = 0	25			V
			50			
Emitter to base voltage	V <sub>EBO</sub>	I <sub>E</sub> = 10μA, I <sub>C</sub> = 0	7			V
Forward current transfer ratio	h <sub>FE1</sub> <sup>*1</sup>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 10mA	85	160	340	
	h <sub>FE2</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 500mA <sup>*2</sup>	40	90		
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 300mA, I <sub>B</sub> = 30mA		0.35	0.6	V
Transition frequency	f <sub>T</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = -50mA, f = 200MHz		200		MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz		6	15	pF

<sup>\*2</sup> Pulse measurement

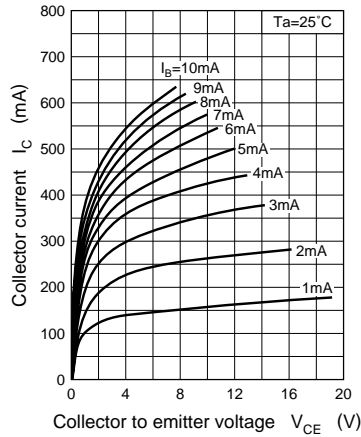
<sup>\*1</sup>h<sub>FE1</sub> Rank classification

Rank	Q	R	S
h <sub>FE1</sub>	85 ~ 170	120 ~ 240	170 ~ 340

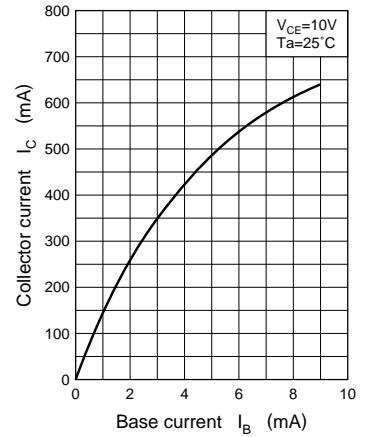
$P_C - T_a$



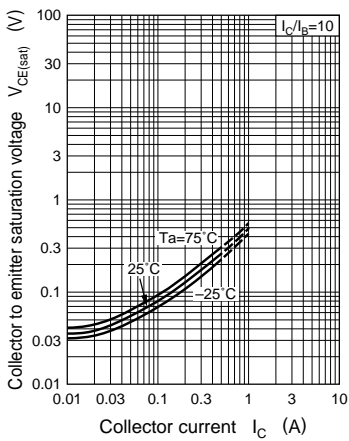
$I_C - V_{CE}$



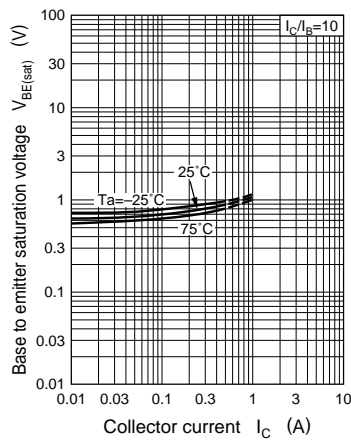
$I_C - I_B$



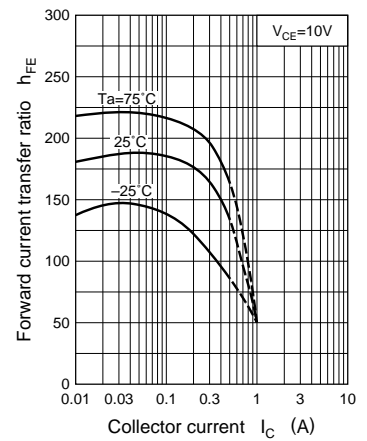
$V_{CE(sat)} - I_C$



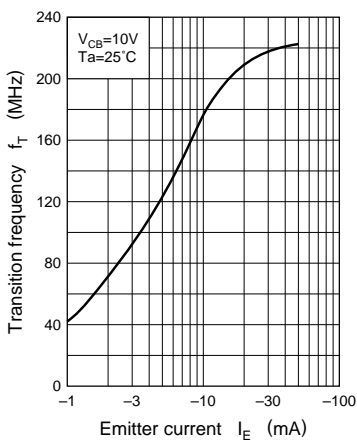
$V_{BE(sat)} - I_C$



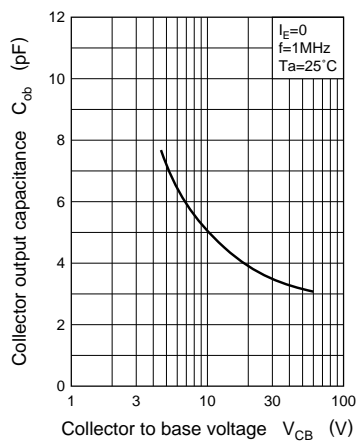
$h_{FE} - I_C$



$f_T - I_E$



$C_{ob} - V_{CB}$



$I_{CEO} - T_a$

