

# 2SD638, 2SD639

## Silicon NPN epitaxial planer type

For medium-power general amplification

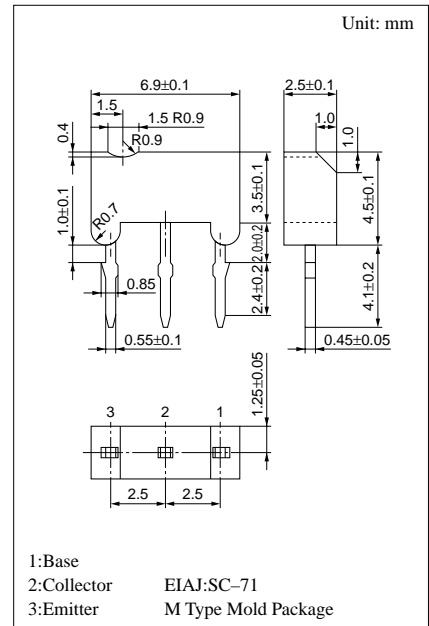
Complementary to 2SB643 and 2SB644

### 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	Rated	Unit
Collector to base voltage	$V_{CBO}$	30	V
2SD638			
2SD639	60		
Collector to emitter voltage	$V_{CEO}$	25	V
2SD638			
2SD639	50		
Emitter to base voltage	$V_{EBO}$	7	V
Peak collector current	$I_{CP}$	1	A
Collector current	$I_C$	0.5	A
Collector power dissipation	$P_C$	600	mW
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 ~ +150	°C



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

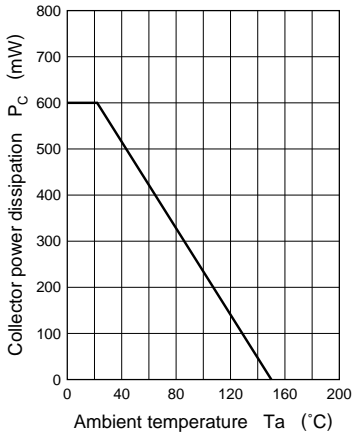
Parameter	Symbol	Conditions	min	typ	max	Unit
Collector cutoff current	$I_{CBO}$	$V_{CB} = 20V, I_E = 0$			0.1	$\mu A$
	$I_{CEO}$	$V_{CE} = 20V, I_B = 0$			1	$\mu A$
Collector to base voltage	$V_{CBO}$	$I_C = 10\mu A, I_E = 0$	30			V
			60			
Collector to emitter voltage	$V_{CEO}$	$I_C = 2mA, I_B = 0$	25			V
			50			
Emitter to base voltage	$V_{EBO}$	$I_E = 10\mu A, I_C = 0$	7			V
Forward current transfer ratio	$h_{FE1}^{*1}$	$V_{CE} = 10V, I_C = 10mA$	85	160	340	
	$h_{FE2}$	$V_{CE} = 10V, I_C = 500mA^{*2}$	40	90		
Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_C = 300mA, I_B = 30mA$		0.35	0.6	V
Transition frequency	$f_T$	$V_{CB} = 10V, I_E = -50mA, f = 200MHz$		200		MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10V, I_E = 0, f = 1MHz$		6	15	pF

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

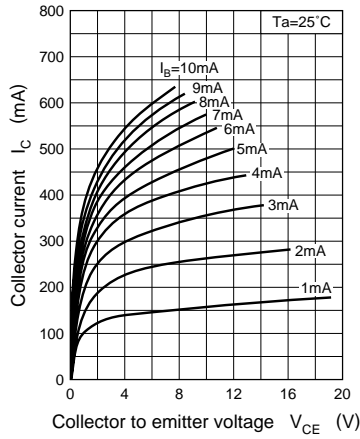
<sup>\*1</sup> $h_{FE1}$  Rank classification

Rank	Q	R	S
$h_{FE1}$	85 ~ 170	120 ~ 240	170 ~ 340

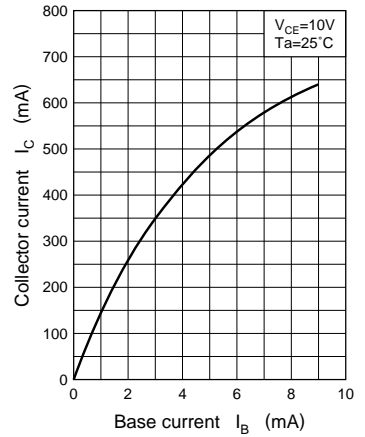
$P_C - T_a$



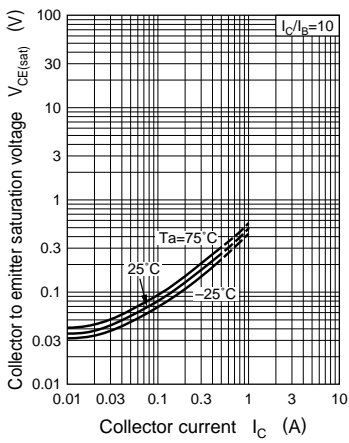
$I_C - V_{CE}$



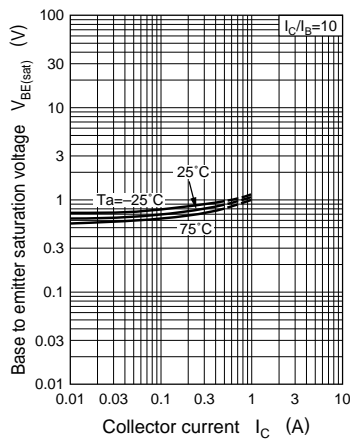
$I_C - I_B$



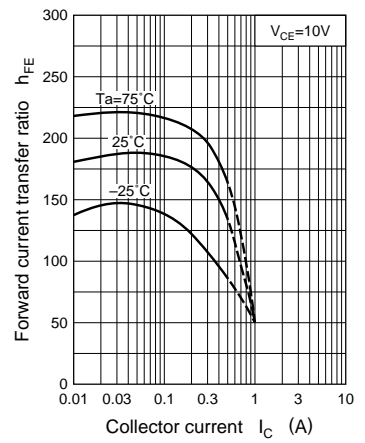
$V_{CE(sat)} - I_C$



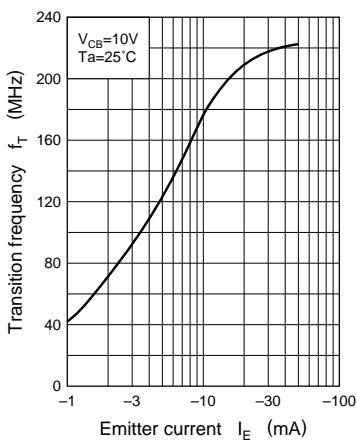
$V_{BE(sat)} - I_C$



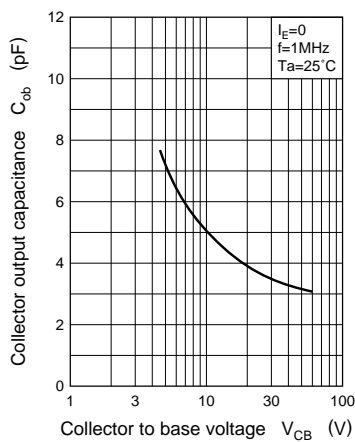
$h_{FE} - I_C$



$f_T - I_E$



$C_{ob} - V_{CB}$



$I_{CEO} - T_a$

