

# 2SC2059K

## 2SC4099

## 2SC4649

# Transistor, NPN

### Features

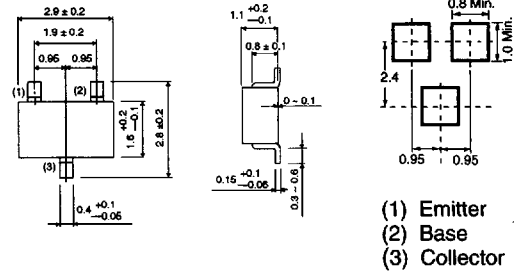
- available in SMT3 (SMT, SC-59), UMT3 (UMT, SC-70), and EMT3 (EMT, SC-75) packages
- package marking: 2SC2059K, 2SC4099, 2SC4649; J★, where ★ is h<sub>FE</sub> code
- high transition frequency, typically f<sub>T</sub> = 500 MHz at 1 mA
- low output capacitance, typically C<sub>ob</sub> = 1.4 pF at 6 V
- low base resistance for high gain
- excellent noise response

### Applications

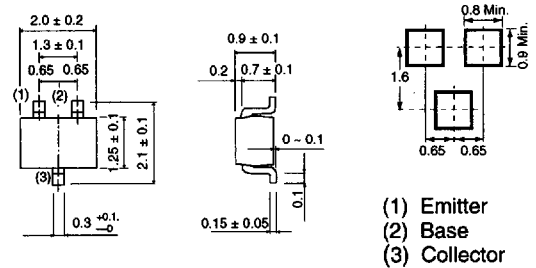
- radio frequency amplifier

### Dimensions (Units : mm)

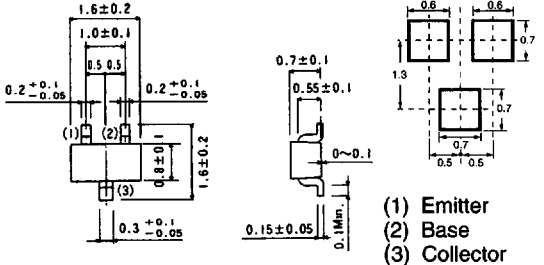
#### 2SC2059K (SMT3)



#### 2SC4099 (UMT3)



#### 2SC4649 (EMT3)



**Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Limits	Unit
Collector-to-base voltage	$V_{CB0}$	25	V
Collector-to-emitter voltage	$V_{CEO}$	20	V
Emitter-to-base voltage	$V_{EBO}$	4	V
Collector current	$I_C$	20	mA
Collector dissipation	$P_C$	150	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 ~ +150	$^\circ\text{C}$

**Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Collector-to-base breakdown voltage	$BV_{CB0}$	25			V	$I_C = 10 \mu\text{A}$
Collector-to-emitter breakdown voltage	$BV_{CEO}$	20			V	$I_C = 1 \text{ mA}$
Emitter-to-base breakdown voltage	$BV_{EBO}$	4			V	$I_E = 10 \mu\text{A}$
Collector cutoff current	$I_{CB0}$			0.5	$\mu\text{A}$	$V_{CB} = 20 \text{ V}$
Emitter cutoff current	$I_{EBO}$			0.5	$\mu\text{A}$	$V_{EB} = 3 \text{ V}$
DC current gain	$h_{FE}$	39		180		$V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$
Collector-to-emitter saturation voltage	$V_{CE(sat)}$		0.1		V	$I_C/I_B = 10 \text{ mA}/1 \text{ mA}$
Transition frequency	$f_T$	300	500		MHz	$V_{CE} = 6 \text{ V}, I_E = -1 \text{ mA}, f = 100 \text{ MHz}$
Output capacitance	$C_{ob}$		1.4		pF	$V_{CB} = 6 \text{ V}, I_E = 0 \text{ A}, f = 1 \text{ MHz}$

**$h_{FE}$  rankings**

Item	M	N	P
$h_{FE}$	39 ~ 82	56 ~ 120	82 ~ 180

Electrical characteristic curves

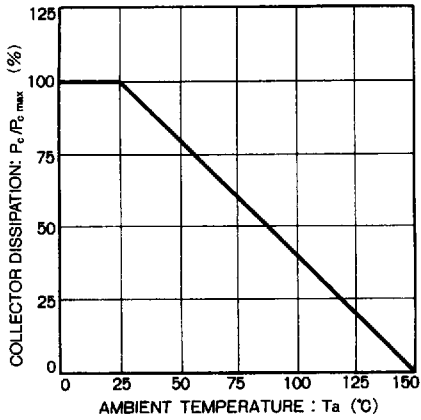


Figure 1

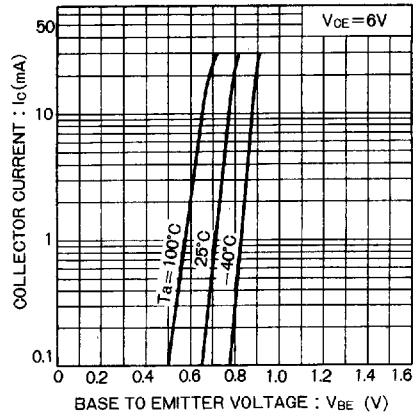


Figure 2

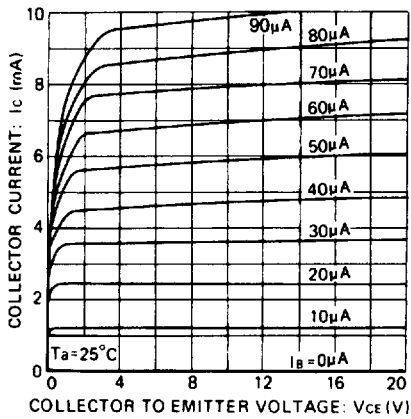


Figure 3

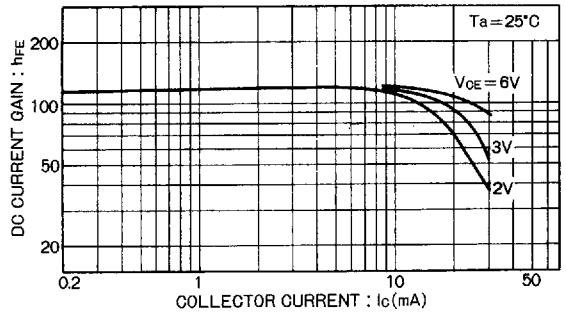


Figure 4

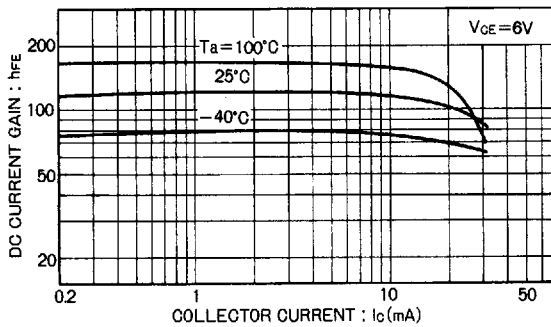


Figure 5

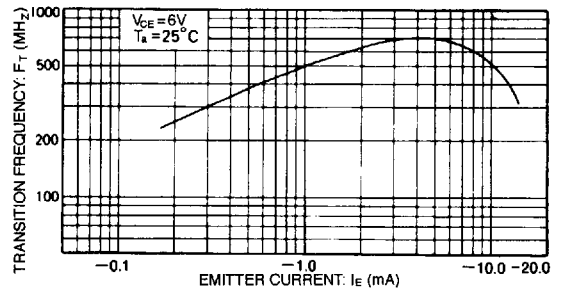


Figure 6

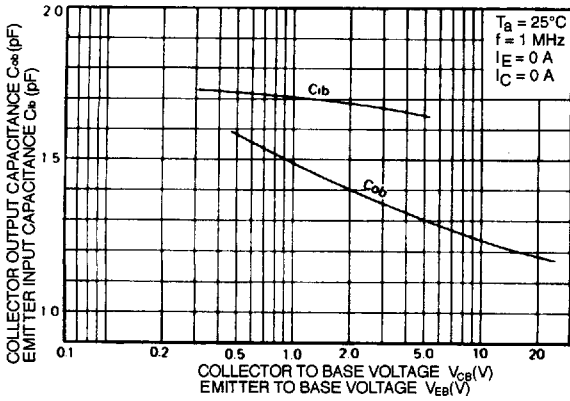


Figure 7

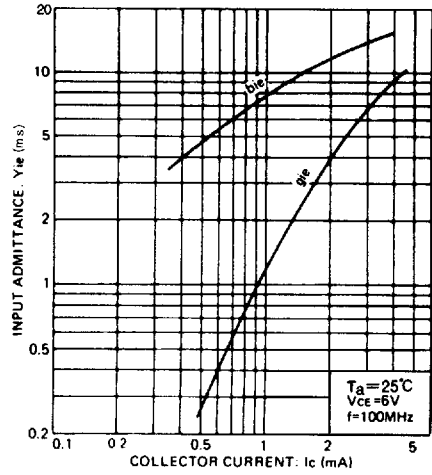


Figure 8

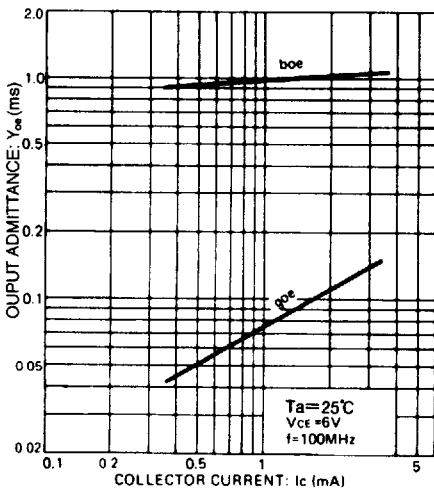


Figure 9

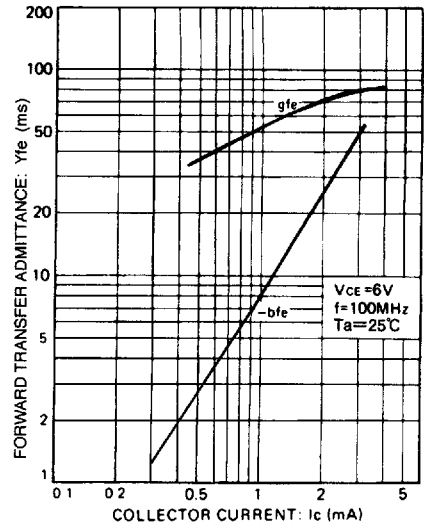
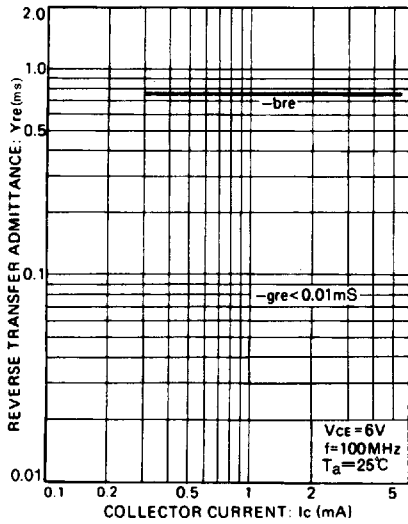


Figure 10

**2SC2059K, 2SC4099, 2SC4649 Transistor, NPN, 2SC series**



**Figure 11**

**Ordering information**

Package	Tape			
	Code	T146	T106	TL
Basic order quantity	3000	3000	3000	
2SC2059K	★			
2SC4099		★		
2SC4649				★

★ = Standard, ☆ = Semi-standard, \* = Special order