



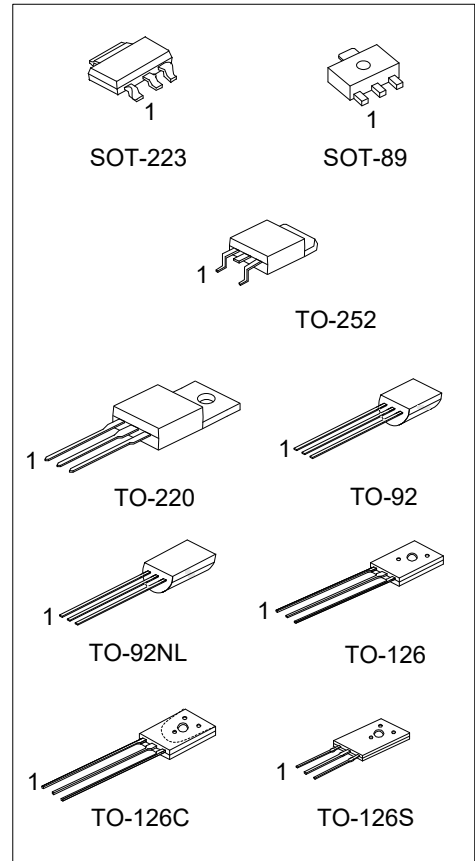
2SB649/A

PNP SILICON TRANSISTOR

BIPOLAR POWER GENERAL PURPOSE TRANSISTOR

■ APPLICATIONS

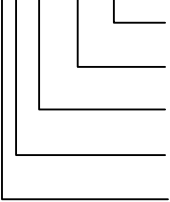
- * Low frequency power amplifier complementary pair with UTC 2SD669/A



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2SB649XL-x-AA3-R	2SB649xG-x-AA3-R	SOT-223	B	C	E	Tape Reel
2SB649XL-x-AB3-R	2SB649xG-x-AB3-R	SOT-89	B	C	E	Tape Reel
2SB649XL-x-TA3-R	2SB649xG-x-TA3-R	TO-220	B	C	E	Tube
2SB649xL-x-TN3-R	2SB649xG-x-TN3-R	TO-252	B	C	E	Tape Reel
2SB649xL-x-T60-K	2SB649xG-x-T60-K	TO-126	E	C	B	Bulk
2SB649xL-x-T6C-K	2SB649xG-x-T6C-K	TO-126C	E	C	B	Bulk
2SB649xL-x-T6S-K	2SB649xG-x-T6S-K	TO-126S	E	C	B	Bulk
2SB649xL-x-T92-B	2SB649xG-x-T92-B	TO-92	E	C	B	Tape Box
2SB649xL-x-T92-K	2SB649xG-x-T92-K	TO-92	E	C	B	Bulk
2SB649xL-x-T9N-B	2SB649xG-x-T9N-B	TO-92NL	E	C	B	Tape Box
2SB649xL-x-T9N-K	2SB649xG-x-T9N-K	TO-92NL	E	C	B	Bulk

Note: Pin Assignment: B: Base C: Collector E: Emitter

2SB649xG-x-AA3-R  (1)Packing Type (2)Package Type (3)Rank (4)Green Package (5) Collector-Emitter Voltage	(1) B: Tape Box, K: Bulk, R: Tape Reel (2) AA3: SOT-223, AB3: SOT-89, TN3: TO-252, T60: TO-126, T6C: TO-126C, T6S: TO-126S, T92: TO-92, T9N: TO-92NL (3) x: refer to Classification of h_{FE1} (4) G: Halogen Free and Lead Free, L: Lead Free (5) A: -160V, Blank: -120V
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MARKING

PACKAGE	MARKING	
	2SB649	2SB649A
SOT-223	2SB649 L: Lead Free G: Halogen Free Date Code 1	2SB649A L: Lead Free G: Halogen Free Date Code 1
SOT-89	Date Code L: Lead Free G: Halogen Free 1	Date Code L: Lead Free G: Halogen Free 1
TO-220	UTC 2SD649 L: Lead Free G: Halogen Free Date Code Lot Code 1	UTC 2SD649A L: Lead Free G: Halogen Free Date Code Lot Code 1
TO-252	UTC 2SB649 L: Lead Free G: Halogen Free Date Code Lot Code 1	UTC 2SB649A L: Lead Free G: Halogen Free Date Code Lot Code 1
TO-92	UTC 2SB649 L: Lead Free G: Halogen Free Date Code 1	UTC 2SB649 L: Lead Free G: Halogen Free Date Code 1
TO-92NL	UTC 2SB649 L: Lead Free G: Halogen Free Date Code 1	UTC 2SB649A L: Lead Free G: Halogen Free Date Code 1
TO-126 TO-126C TO-126S	UTC 2SB649 Date Code L: Lead Free G: Halogen Free 1	UTC 2SB649A Date Code L: Lead Free G: Halogen Free 1

■ **ABSOLUTE MAXIMUM RATINGS** ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATING	UNIT
Collector-Base Voltage		V_{CB0}	-180	V
Collector-Emitter Voltage	2SB649	V_{CE0}	-120	V
	2SB649A		-160	V
Emitter-Base Voltage		V_{EB0}	-5	V
Collector Current		I_C	-1.5	A
Collector Peak Current		$I_{C(PEAK)}$	-3	A
Power Dissipation ($T_A=25^\circ\text{C}$)	SOT-223	P_D	1	W
	SOT-89		0.5	W
	TO-220		2	W
	TO-252		2	W
	TO-126/TO-126S		1.3	W
	TO-126C		1	W
	TO-92/TO-92NL		0.6	W
Power Dissipation ($T_C=25^\circ\text{C}$)	SOT-223		8.33	W
	SOT-89		3.29	W
	TO-220		30	W
	TO-252		27.78	W
	TO-126/TO-126S		20	W
	TO-126C		12.5	W
	TO-92/TO-92NL		1.56	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-40 ~ +150	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	SOT-223	θ_{JC}	15	$^\circ\text{C/W}$
	SOT-89		38	$^\circ\text{C/W}$
	TO-220		4.16	$^\circ\text{C/W}$
	TO-252		4.5	$^\circ\text{C/W}$
	TO-126/TO-126S		6.25	$^\circ\text{C/W}$
	TO-126C		10	$^\circ\text{C/W}$
	TO-92/TO-92NL		80	$^\circ\text{C/W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ **ELECTRICAL CHARACTERISTICS** ($T_A=25^\circ\text{C}$, unless otherwise specified)

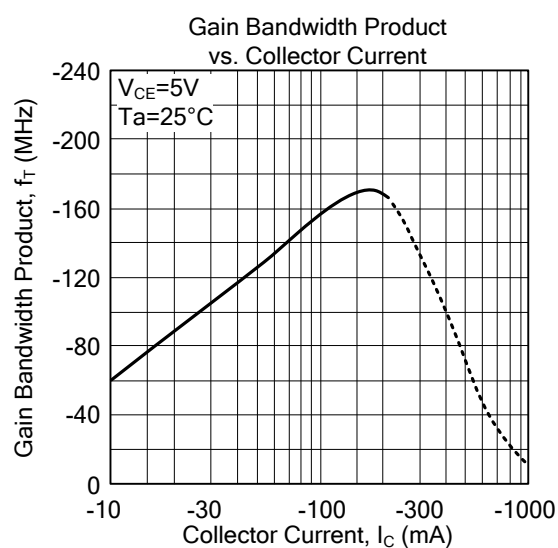
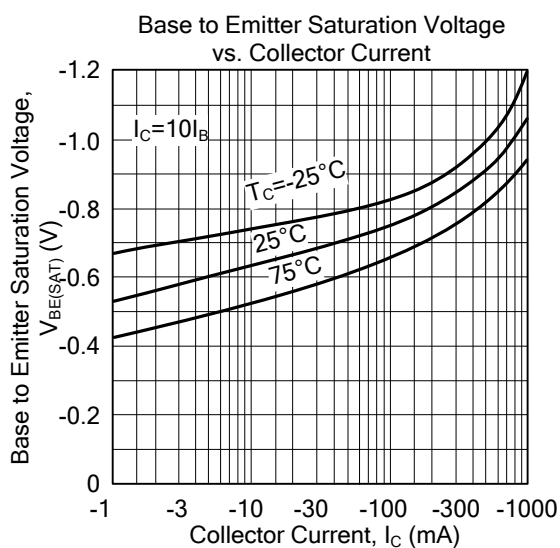
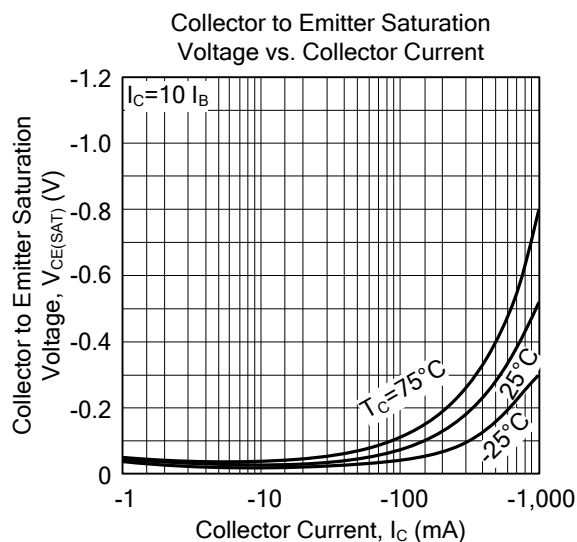
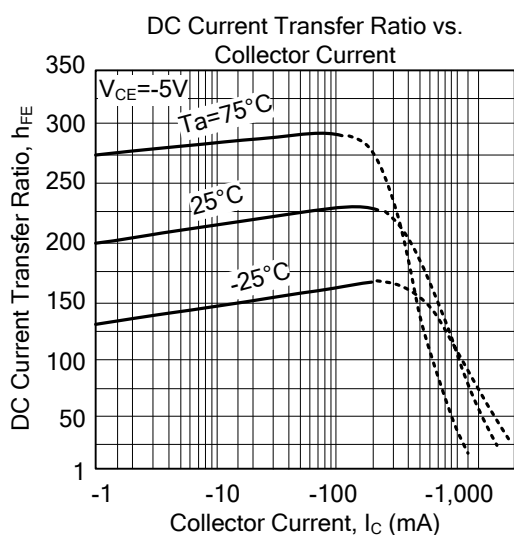
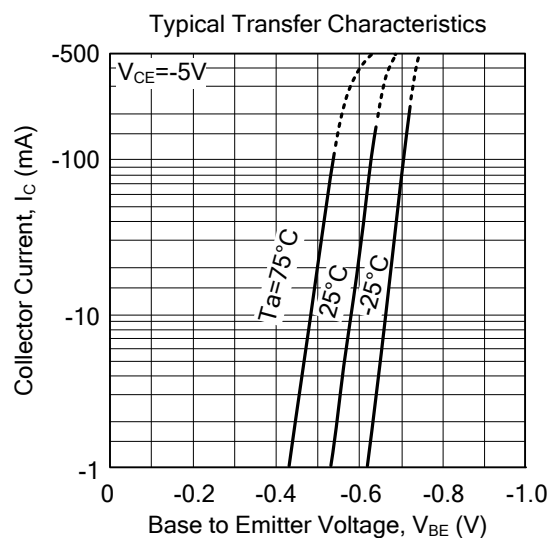
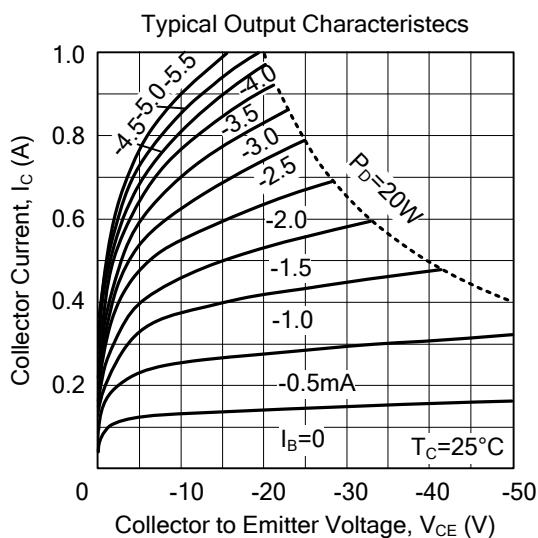
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector to Base Breakdown Voltage		BV _{CBO}	I _C =-1mA, I _E =0	-180			V
Collector to Emitter Breakdown Voltage	2SB649	BV _{CEO}	I _C =-10mA, R _{BE} =∞	-120			V
	2SB649A			-160			
Emitter to Base Breakdown Voltage		BV _{EBO}	I _E =-1mA, I _C =0	-5			V
Collector Cut-off Current		I _{CBO}	V _{CB} =-160V, I _E =0			-10	μA
DC Current Gain	2SB649	h _{FE1}	V _{CE} =-5V, I _C =-150mA (note)	60		320	
		h _{FE2}	V _{CE} =-5V, I _C =-500mA (note)	30			
	2SB649A	h _{FE1}	V _{CE} =-5V, I _C =-150mA (note)	60		200	
		h _{FE2}	V _{CE} =-5V, I _C =-500mA (note)	30			
Collector-Emitter Saturation Voltage		V _{CE(SAT)}	I _C =-600mA, I _B =-50mA			-0.5	V
Base-Emitter Voltage		V _{BE}	V _{CE} =-5V, I _C =-150mA			-1.5	V
Current Gain Bandwidth Product		f _T	V _{CE} =-5V, I _C =-150mA		140		MHz
Output Capacitance		C _{ob}	V _{CB} =-10V, I _E =0, f=1MHz		27		pF

Note: Pulse test.

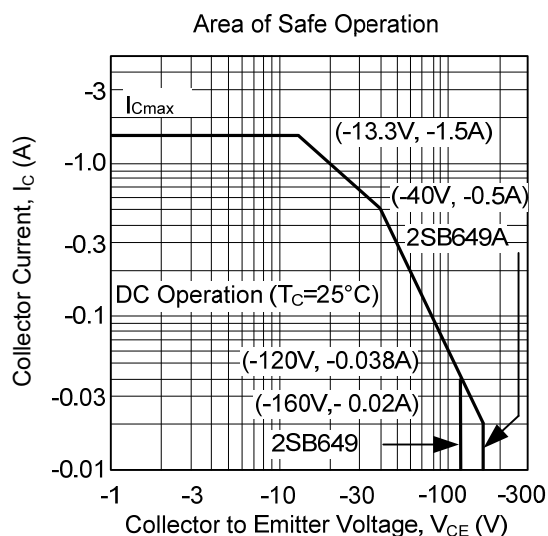
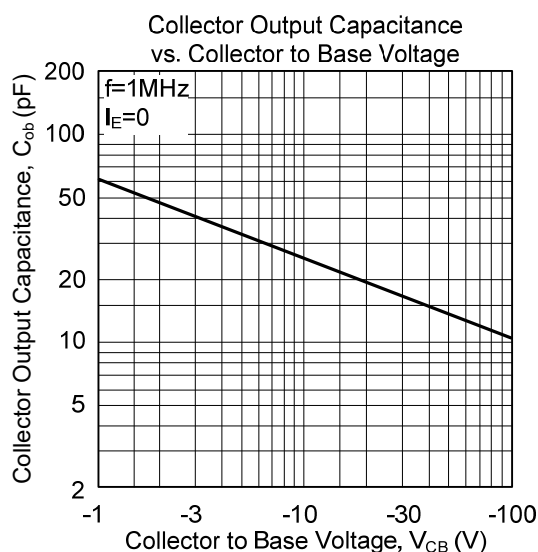
■ **CLASSIFICATION OF h_{FE1}**

RANGE	RANK		
	B	C	D
2SB649	60-120	100-200	160-320
2SB649A	60-120	100-200	-

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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