SIEMENS

SIEMENS AKTIENGESELLSCHAF

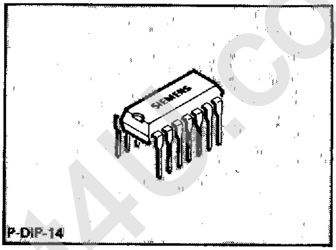
T-43-25

Transistor Array with 5 NPN Transistors

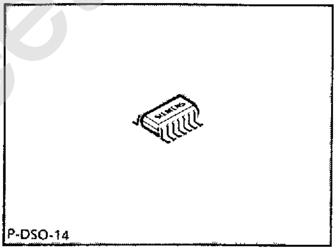
TCA 671
TCA 871
TCA 971
TCA 991
Bipolar IC

Features

- Versatile use
- Slight V_{BE} and B deviations
- High output current
- Good thermal matching
- TCA 971; G/TCA 991; G compatible with 3045/46/86 and 3146



Type	Ordering Code	Package
TCA 671	Q67000-T1	P-DIP-14
TCA 671 G	Q67000-A2366	P-DSO-14 (SMD)
TCA 871	Q67000-T2	P-DIP-14
TCA 871 G	Q67000-A2367	P-DSO-14 (SMD)
TCA 971	Q67000-T11	P-DIP-14
TCA 971 G	Q67000-A8075	P-DSO-14 (SMD)
TCA 991	Q67000-T12	P-DIP-14
TCA 991 G	Q67000-A8076	P-DSO-14 (SMD)



TCA 671, TCA 871, TCA 971, and TCA 991 are monolithic integrated transistor arrays each consisting of five NPN transistors. The arrays are well suited for switching and amplifying applications up to approx. 30 MHz. Due to a uniform design, the transistor characteristics show only slight deviations. The arrays are preferably intended for lamp drivers, amplifiers, pulse generators, and types TCA 971 and TCA 991 especially for discrete differential amplifiers.

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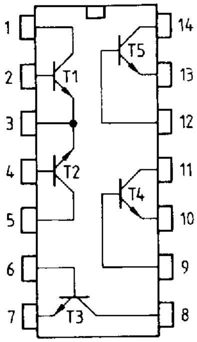
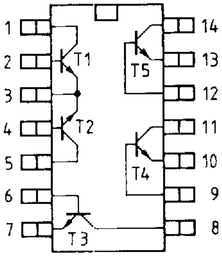
Pin Configurations
(top view)

TCA 671, TCA 871 substrate = pin 3
TCA 971, TCA 991 substrate = pin 13

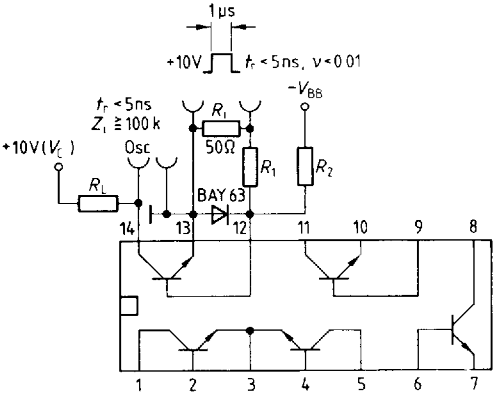
Substrate connection has to be on the most negative potential.



TCA 671 G, TCA 871 G, TCA 971 G, TCA 991 G



Test Circuit for Switching Times



Switching Times

I_C I_{B1}. $-I_{B2} \approx$ 10 : 1 . 1 mA; $R_1 = 5$ kΩ; $R_2 = 5$ kΩ; $V_{BB} = 3.5$ V; $R_L = 990$ Ω
t_{ON} 85 (< 150) ns t_{OFF} 480 (< 800) ns

I_C: I_{B1} $-I_{B2} \approx$ 100 : 10 : 10 mA, $R_1 = 500$ Ω; $R_2 = 700$ Ω, $V_{BB} = 5$ V; $R_L = 98$ Ω
t_{ON} 55 (< 150) ns t_{OFF} 450 (< 800) ns

Absolute Maximum Ratings

Parameter	Symbol	Limit Values TCA 671 TCA 971	Limit Values TCA 871 TCA 991	Unit
Collector-base breakdown voltage	V_{CB0}	45	35	V
Collector-emitter breakdown voltage	V_{CE0}	42	32	V
Emitter-base breakdown voltage	V_{EB0}	6	6	V
Collector-substrate voltage ($I_C = 100\ \mu A$)	V_{CS}	70	60	V
Collector current	I_C	200	200	mA
Base current	I_B	10	10	mA
Permissible power dissipation for a single transistor	P_{tot}	300	300	mW
Junction temperature	T_j	150	150	°C
Storage temperature range	T_{stg}	−40 to 125	−40 to 125	°C
Thermal resistance system – air TCA 671 G; TCA 871 G;	$R_{th\ SA}$	85	85	K/W
TCA 971 G; TCA 991 G	$R_{th\ SA}$	145	145	K/W

Operating Range

Ambient temperature	T_A	−25 to 85	−25 to 85	°C

Characteristics

$T_A = 25\,°C$

Parameter	Symbol	Limit Values TCA 671 TCA 971 min.	typ.	max.	Limit Values TCA 871 TCA 991 min.	typ.	max.	Unit
Differential base current for transistors T1 = T2 at $V_{CE} = 3$ V, $I_C = 1$ mA	I_{BD}		0.5	1		1		µA
Base-emitter voltage at $V_{CE} = 3$ V, $I_C = 1$ mA	V_{BE}		0.65			0.65		V
Differential base-emitter voltage for transistors T1 + T2 at $V_{CE} = 3$ V, $I_C = 1$ mA	V_{BED}		2	5		4		mV
Differential base-emitter voltage for transistors T3 to T5 at $V_{CE} = 3$ V, $I_C = 1$ mA	V_{BED}		4	10		6		mV
Temperature coefficient of base-emitter voltage at $V_{CE} = 3$ V, $I_C = 1$ mA	$\frac{\Delta V_{BE}}{\Delta T}$		−2			−2		mV/K
Transition frequency	f_T	300	550		300	550		MHz

Characteristics

$T_A = 25\,°C$

Parameter	Symbol	Limit Values TCA 671 TCA 971			Limit Values TCA 871 TCA 991			Unit
		min.	typ.	max.	min.	typ.	max.	
Collector-base breakdown voltage at $I_C = 100\ \mu A$, $I_E = 0$	V_{CB0}	45			35			V
Collector-emitter breakdown voltage at $I_C = 100\ \mu A$, $I_B = 0$	V_{CE0}	42			32			V
Collector-substrate breakdown voltage at $I_C = 100\ \mu A$, $I_{CS} = 0$	V_{CS}	70			60			V
Emitter-base breakdown voltage at $I_E = 100\ \mu A$, $I_C = 0$	V_{EB0}	6			6			V
Collector-emitter saturation voltage at $I_C = 50$ mA; $I_B = 5$ mA	$V_{CE\ Sat}$		200	350		200	350	mV
Collector-base cutoff current at $V_{CB} = 25$ V, $I_E = 0$	I_{CB0}		0.02	1		0.02	10	µA
Collector-emitter cutoff current at $V_{CE} = 25$ V, $I_B = 0$	I_{CE0}			1			10	µA
Static current gain	B							
at $V_{CE} = 3$ V, $I_C = 100\ \mu A$		40	80		40	80		
at $V_{CE} = 3$ V, $I_C = 1$ mA		100	140		100	140		
at $V_{CE} = 3$ V, $I_C = 10$ mA		100	160		100	160		
at $V_{CE} = 3$ V, $I_C = 100$ mA		40	100		40	100		

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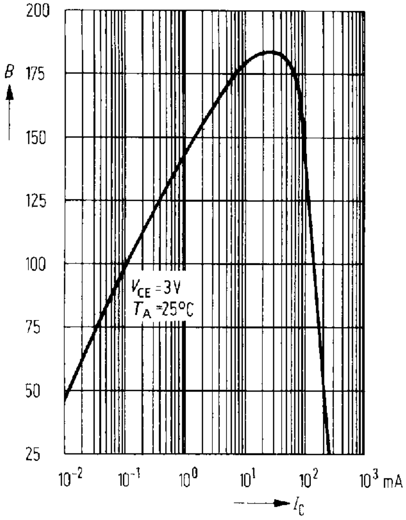
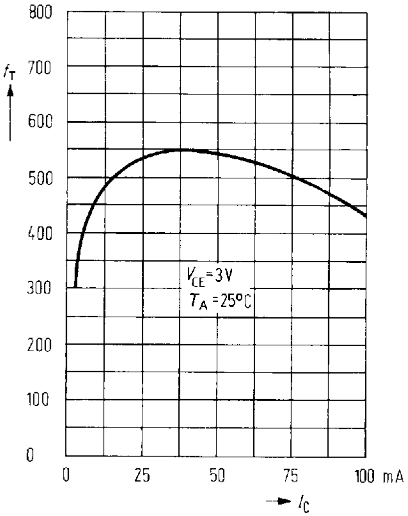
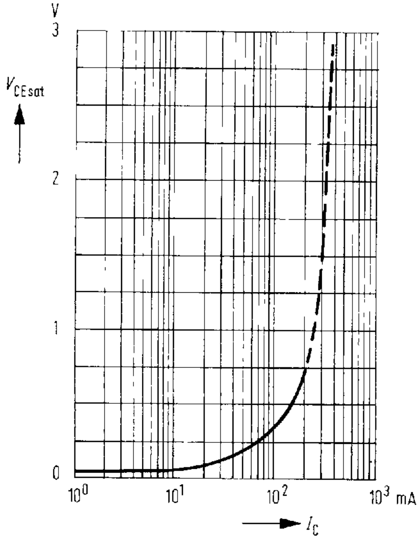
Current gain versus collector current
$V_{CE} = 3$ V, $T_A = 25$ °C



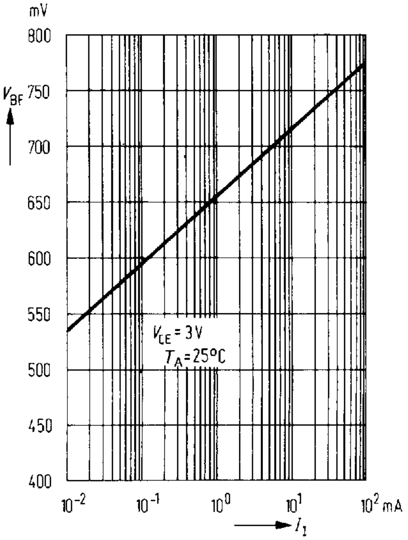
Transition frequency versus collector current
$V_{CE} = 3$ V, $T_A = 25$ °C



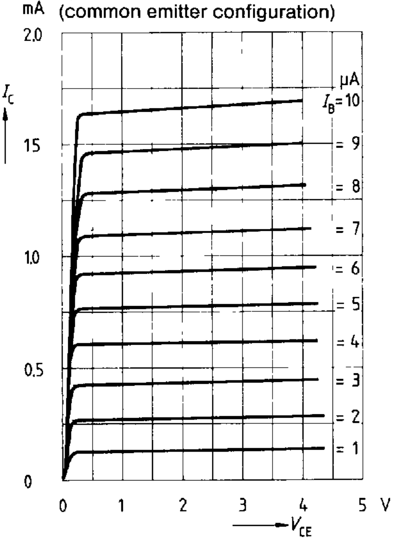
Collector-emitter saturation voltage versus collector current
$B = 20$



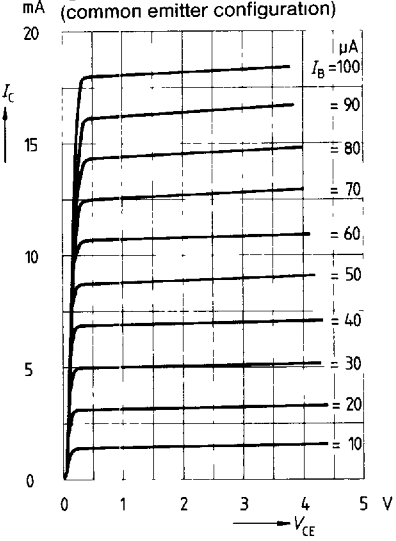
Base-emitter voltage versus input current
$V_{CE} = 3$ V; $T_A = 25$ °C



Output characteristics
Collector current versus collector-emitter voltage
I_B = parameter
(common emitter configuration)



Output characteristics
Collector current versus collector-emitter voltage
I_B = parameter
(common emitter configuration)



Output characteristics
Collector current versus collector-emitter voltage
I_B = parameter
(common emitter configuration)