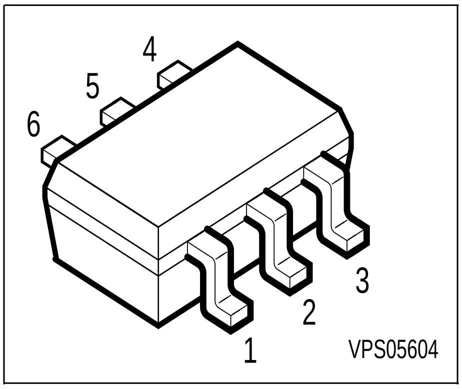
SIEMENS

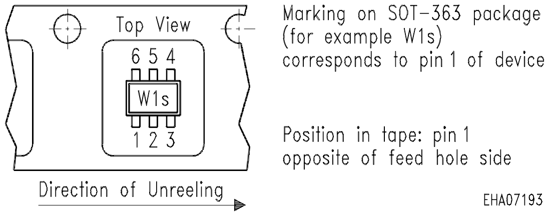
SMBT 3904PN

NPN Silicon Switching Transistor Array

Preliminary data

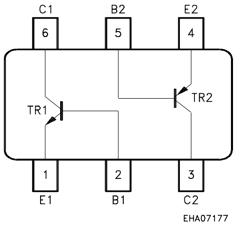
- High current gain
- Low collector-emitter saturation voltage
- Two (galvanic) internal isolated NPN/PNP Transistors in one package





Marking on SOT-363 package (for example W1s) corresponds to pin 1 of device

Position in tape: pin 1 opposite of feed hole side



Type	Marking	Ordering Code	Package	PIN Configuration			
				NPN-Transistor	1 = E	2 = B	6 = C
SMBT 3904PN	s3P	Q62702-C	SOT-363	**PNP-Transistor**	4 = E	5 = B	6 = C

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	40	V
Collector-base voltage	V_{CBO}	40	
Emitter-base voltage	V_{EBO}	6	
DC collector current	I_C	200	mA
Total power dissipation, T_S = 115 °C	P_{tot}	250	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	- 65...+150	

Thermal Resistance

Junction ambient (1)	R_{thJA}	≤ 275	K/W
Thermal resistance, chip case	R_{thJC}	≤ 140	

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1) Package mounted on pcb 40mm x 40mm x 1.5mm / 0.5cm

Electrical Characteristics at T_A=25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics per Transistor					
Collector-emitter breakdown voltage $I_C = 1$ mA, $I_B = 0$	$V_{(BR)CEO}$	40	-	-	V
Collector-base breakdown voltage $I_C = 10$ µA, $I_B = 0$	$V_{(BR)CBO}$	40	-	-	
Emitter-base breakdown voltage $I_E = 10$ µA, $I_C = 0$	$V_{(BR)EBO}$	6	-	-	
Collector cutoff current $V_{CB} = 30$ V, $I_E = 0$	I_{CBO}	-	-	50	nA
DC current gain 1)	h_{FE}				-
$I_C = 100$ µA, $V_{CE} = 1$ V		40	-	-	
$I_C = 1$ mA, $V_{CE} = 1$ V		70	-	-	
$I_C = 10$ mA, $V_{CE} = 1$ V		100	-	300	
$I_C = 50$ mA, $V_{CE} = 1$ V		60	-	-	
$I_C = 100$ mA, $V_{CE} = 1$ V		30	-	-	
Collector-emitter saturation voltage1)	V_{CEsat}				V
$I_C = 10$ mA, $I_B = 1$ mA		-	-	0.25	
$I_C = 50$ mA, $I_B = 5$ mA		-	-	0.4	
Base-emitter saturation voltage 1)	V_{BEsat}				
$I_C = 10$ mA, $I_B = 1$ mA		0.65	-	0.85	
$I_C = 50$ mA, $I_B = 5$ mA		-	-	0.95	

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1) Pulse test: $t < 300$µs; $D < 2$%

Electrical Characteristics at T_A=25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics per Transistor					
Transition frequency I_C = 10 mA, V_{CE} = 5 V, f = 100 MHz	f_T	250	-	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	-	4.5	pF
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	-	10	
Short-circuit input impedance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{11e}	2	-	12	kΩ
Open-circuit reverse voltage transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{12e}	0.1	-	10	10^{-4}
Short-circuit forward current transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{21e}	100	-	400	-
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{22e}	1	-	60	µs
Noise figure I_C = 100 µA, V_{CE} = 5 V, R_S = 1 kΩ, f = 1 kHz, Δ f = 200 Hz	F	-	-	5	dB
Delay time V_{CC} = 3 V, I_C = 10 mA, I_{B1} = 1 mA, $V_{BE(off)}$ = 0.5 V	t_d	-	-	35	ns
Rise time V_{CC} = 3 V, I_C = 10 mA, I_{B1} = 1 mA, $V_{BE(off)}$ = 0.5 V	t_r	-	-	35	
Storage time V_{CC} = 3 V, I_C = 10 mA, I_{B1}=I_{B2} = 1mA	t_{stg}	-	-	225	
Fall time V_{CC} = 3 V, I_C = 10 mA, I_{B1}=I_{B2} = 1mA	t_f	-	-	75	