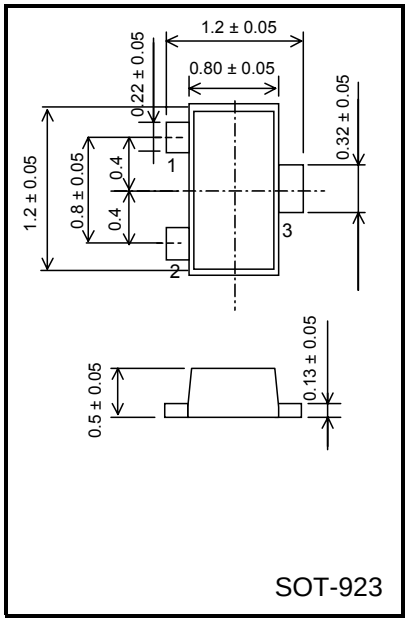
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

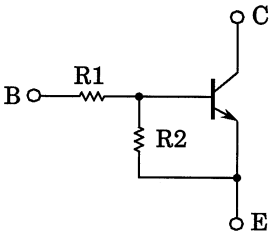
- Ultra-small package, suited to very high density mounting
- Incorporating a bias resistor into the transistor reduces the number of parts, so enabling the manufacture of ever more compact equipment and lowering assembly cost.
- A wide range of resistor values is available for use in various circuits.
- Lead (Pb) - free

Unit: mm



Weight: 0.0015 g (typ.)

Equivalent Circuit and Bias Resistor Values

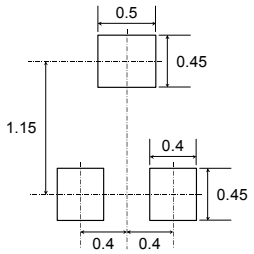


Type No.	R1 (kΩ)	R2 (kΩ)
3904S	47	47
3904	2.2	47

Maximum Ratings (Ta = 25°C)

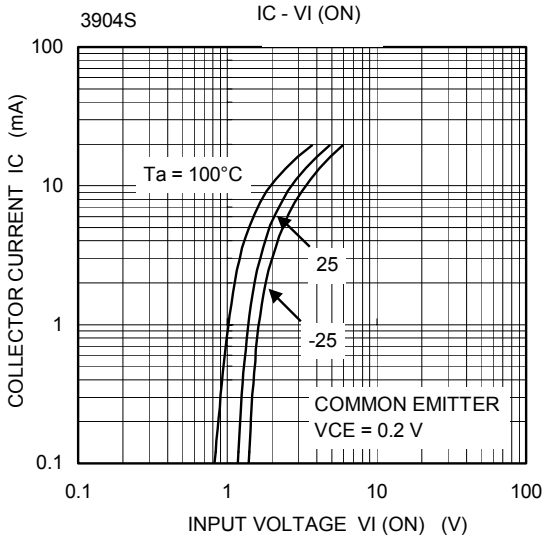
Characteristic		Symbol	Rating	Unit
Collector-base voltage	3904~3904S	V_{CBO}	50	V
Collector-emitter voltage	3904~3904S	V_{CEO}	50	V
Emitter-base voltage	3904S	V_{EBO}	10	V
	3904		5	
Collector current	3904~3904S	I_C	100	mA
Collector power dissipation	3904~3904S	P_C(Note)	150	mW
Junction temperature	3904~3904S	T_j	150	°C
Storage temperature range	3904~3904S	T_{stg}	−55~150	°C

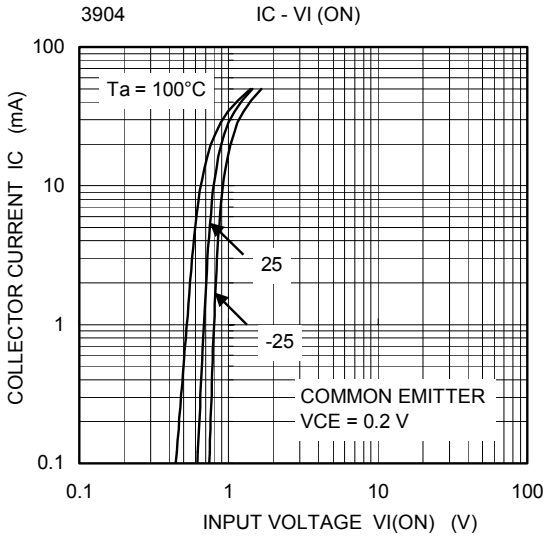
Note: Mounted on an FR4 board (25.4 mm × 25.4 mm × 1.6 mmt)

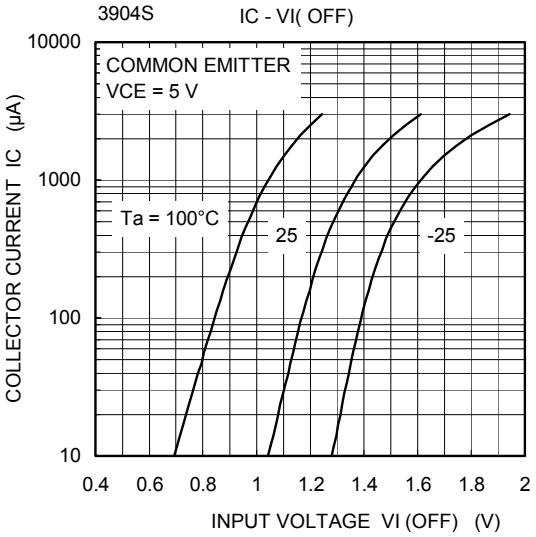


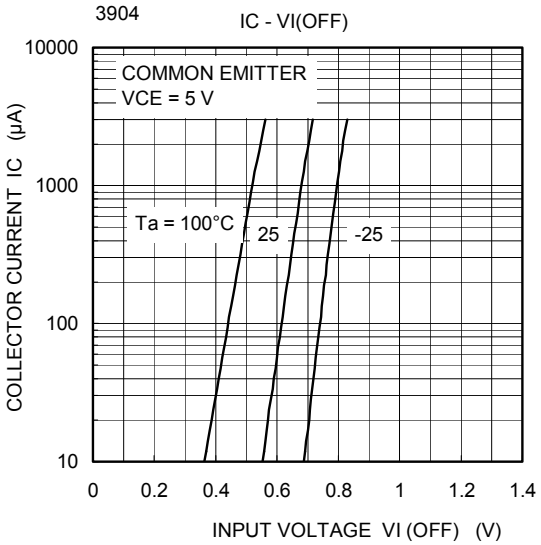
Electrical Characteristics (Ta = 25°C)

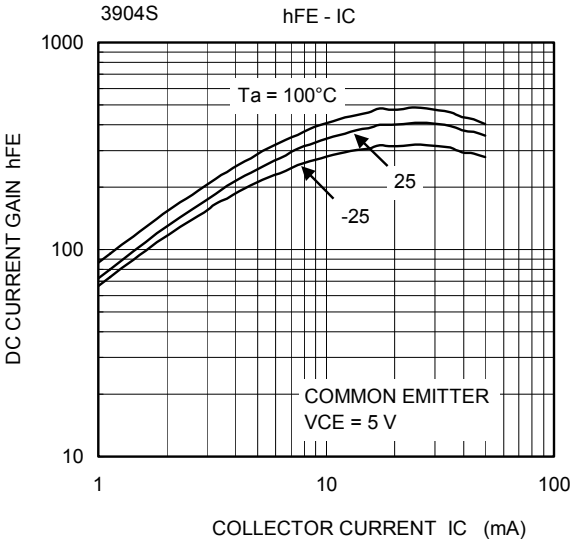
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	3904~3904S	I_{CBO}	—	V_{CB} = 50 V, I_E = 0	—	—	100	nA
		I_{CEO}		V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cutoff current	3904S	I_{EBO}	—	V_{EB} = 10 V, I_C = 0	0.082	—	0.15	mA
	3904			V_{EB} = 5 V, I_C = 0	0.078	—	0.145	
DC current gain	3904S	h_{FE}	—	V_{CE} = 5 V, I_C = 10 mA	80	—	—	
	3904				80	—	—	
Collector-emitter saturation voltage	3904~3904S	$V_{CE\ (sat)}$	—	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	3904S	$V_{I\ (ON)}$	—	V_{CE} = 0.2 V, I_C = 5 mA	1.5	—	5.0	V
	3904				0.6	—	1.1	
Input voltage (OFF)	3904S	$V_{I\ (OFF)}$	—	V_{CE} = 5 V, I_C = 0.1 mA	1.0	—	1.5	V
	3904				0.5	—	0.8	
Collector output capacitance	3904~3904S	C_{ob}	—	V_{CB} = 10 V, I_E = 0, f = 1 MH_z	—	0.7	—	pF
Input resistor	3904S	R1	—	—	32.9	47	61.1	kΩ
	3904				1.54	2.2	2.86	
Resistor ratio	3904S	R1/R2	—	—	0.8	1.0	1.2	
	3904				0.0376	0.0468	0.0562	

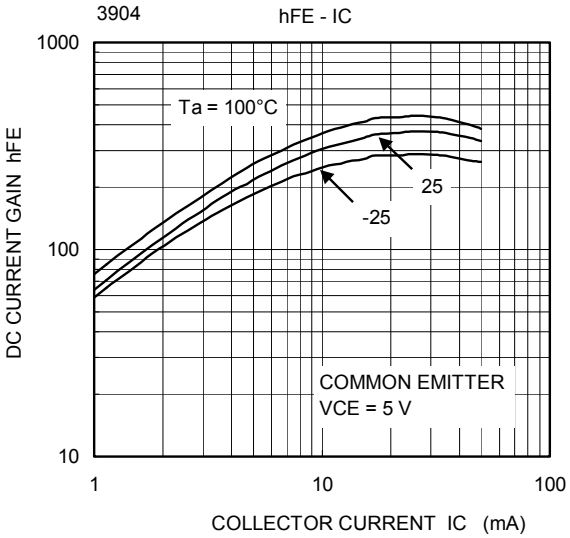

3904S
IC - VI (ON)
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI (ON) (V)
Ta = 100°C
25
-25
COMMON EMITTER
VCE = 0.2 V
100
10
1
0.1
0.1
1
10
100

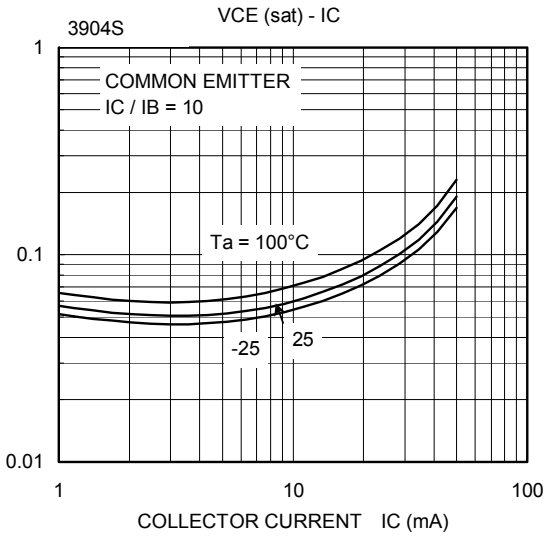

3904
IC - VI (ON)
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI(ON) (V)
Ta = 100°C
25
-25
COMMON EMITTER
VCE = 0.2 V
100
10
1
0.1
0.1
1
10
100

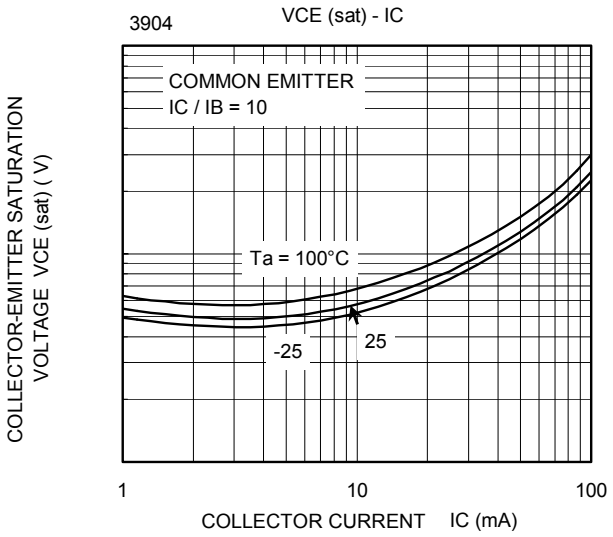

3904S
IC - VI(OFF)
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI (OFF) (V)
COMMON EMITTER
VCE = 5 V
Ta = 100°C
25
-25
10000
1000
100
10
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

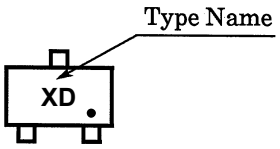

3904
IC - VI(OFF)
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI (OFF) (V)
COMMON EMITTER
VCE = 5 V
Ta = 100°C
25
-25
10000
1000
100
10
0
0.2
0.4
0.6
0.8
1
1.2
1.4


3904S
hFE - IC
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (mA)
Ta = 100°C
25
-25
COMMON EMITTER
VCE = 5 V
1000
100
10
1
10
100


3904
hFE - IC
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (mA)
Ta = 100°C
25
-25
COMMON EMITTER
VCE = 5 V
1000
100
10
1
10
100





Type Name	Marking
3904S	
3904