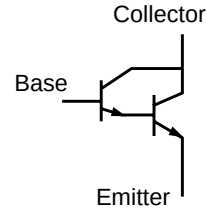
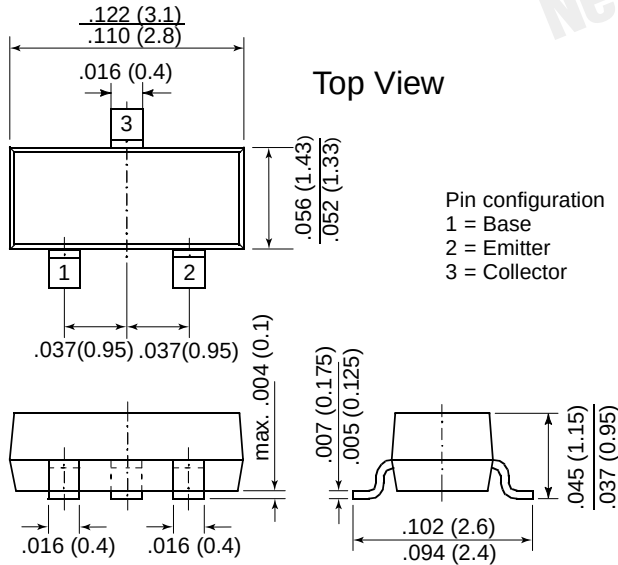


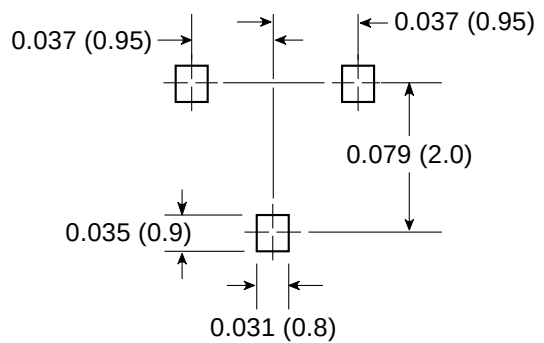
Darlington Transistors (NPN)



TO-236AB (SOT-23)



Mounting Pad Layout



Mechanical Data

Case: SOT-23 Plastic Package

Weight: approx. 0.008g

Marking Code:

1M for MMBTA13

1N for MMBTA14

Packaging Codes/Options:

E8/10K per 13" reel (8mm tape)

E9/3K per 7" reel (8mm tape)

Features

- NPN Silicon Darlington Transistor for switching and amplifier applications.
- High collector current • High current gain
- These transistors are also available in the TO-92 case with the type designation MPSA13 & MPSA14

Maximum Ratings and Thermal Characteristics (T_C = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CES}	30	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	I _C	300	mA
Power Dissipation at T _A = 25°C ⁽³⁾	P _{tot}	225 ⁽¹⁾ 300 ⁽²⁾	mW
Thermal Resistance Junction to Ambient Air ⁽³⁾	R _{θJA}	556 ⁽¹⁾ 417 ⁽²⁾	°C/W
Maximum Junction Temperature	T _j	150	°C
Storage Temperature Range	T _S	-55 to +150	°C

Notes:

(1) On FR-5 board

(2) On alumina substrate

(3) Valid provided that leads are kept at ambient temperature

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Minimum	Maximum	Unit
Collector-Emitter Breakdown Voltage at $I_C = 100\ \mu\text{A}$, $I_B = 0$	$V_{(BR)CEO}$	30	–	V
Emitter Cutoff Current $V_{EB} = 10\ \text{V}$, $I_C = 0$	I_{EBO}	–	100	nA
Collector Cutoff Current $V_{CB} = 30\ \text{V}$, $I_E = 0$	I_{CBO}	–	100	nA
Collector-Emitter Saturation Voltage at $I_C = 100\ \text{mA}$, $I_B = 0.1\ \text{mA}$	V_{CEsat}	–	1.5	V
Base-Emitter On Voltage at $I_C = 100\ \text{mA}$, $V_{CE} = 5.0\text{V}$	$V_{BE(on)}$	–	2.0	V
DC Current Gain at $V_{CE} = 5.0\ \text{V}$, $I_C = 10\ \text{mA}$	h_{FE}	5000	–	–
MMBTA13		10000	–	–
MMBTA14		10000	–	–
at $V_{CE} = 5.0\ \text{V}$, $I_C = 100\ \text{mA}$		20000	–	–
MMBTA13				
MMBTA14				
Gain-Bandwidth Product at $V_{CE} = 5.0\ \text{V}$, $I_C = 10\ \text{mA}$, $f = 100\ \text{MHz}$	f_T	125	–	MHz