

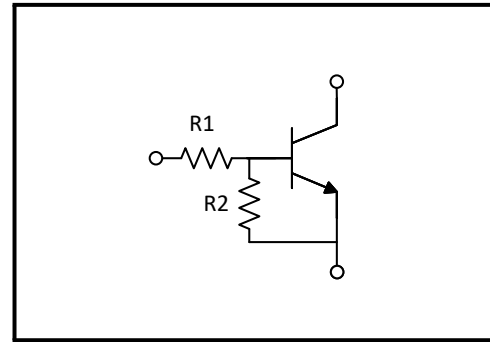
DTC143xx

NPN resistor-equipped transistors

Features

- 100 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs

Equivalent Circuit



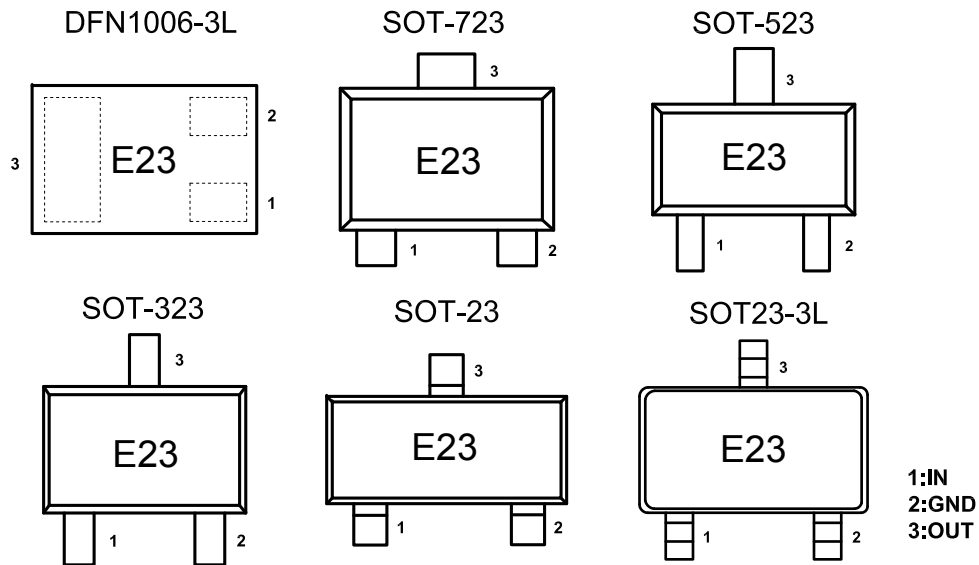
Applications

- Digital applications in automotive and industrial segments
- Control of IC inputs
- Switching loads

General description

NPN Resistor-Equipped Transistor (RET) family in Surface-Mounted Device (SMD) plastic packages.

Pin Connections and Marking



Ordering information

Order code	Package	Marking	Base qty	R1(KΩ)	R2(KΩ)
DTC143	DFN1006-3	E23	10K	4.7	47
DTC143ZM	SOT-723	E23	8K	4.7	47
DTC143ZE	SOT-523	E23	3K	4.7	47
DTC143ZUA	SOT-323	E23	3K	4.7	47
DTC143ZCA	SOT-23	E23	3K	4.7	47
DTC143ZKA	SOT23-3L	E23	3K	4.7	47

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Revision: 2022-Jan-1-A



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Electrical Characteristics (T_A=+25°C, unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V _{CEO}	collector-emitter voltage	open base	–	–	50	V
I _O	output current	–	–	–	100	mA
R1	bias resistor 1 (input)	–	3.3	4.7	6.1	kΩ
R2/R1	bias resistor ratio	–	8	10	12	

Absolute Maximum Ratings @T_A=25°C unless otherwise noted

Symbol	Parameter	Value	Unit
V _{CBO}	collector-base voltage(open emitter)	50	V
V _{CEO}	collector-emitter voltage(open base)	50	V
V _{EBO}	emitter-base voltage(open collector)	5	V
V _I	Input Voltage (positive)	+30	V
	Input Voltage (negative)	-5	V
I _O	output current	100	mA
I _{CM}	peak collector current(single pulse;tp≤1ms)	100	mA
P _D	Maximum Power Dissipation	250	mW
T _J	Junction Temperature	150	°C
T _A	ambient temperature	-55 to +150	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C

Electrical Characteristics (T_A=+25°C, unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
I _{CBO}	collector-base cut-off current	V _{CB} =50V; I _E = 0 A	–	–	100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} =30V; I _B =0A	–	–	1	uA
		V _{CE} =30V; I _B =0A; T _J = 150°C	–	–	5	
I _{EBO}	emitter-base cut-off current	V _{EB} =5V; I _C = 0 A	–	–	170	uA
h _{FE}	DC current gain	V _{CE} =5V, I _C =10mA	100	–	–	
V _{CE(sat)}	collector-emitter saturation voltage	I _C =5mA, I _B =0.25mA	–	–	0.1	V
V _{I(off)}	off-state input voltage	V _{CE} =5V, I _C =100uA	–	0.6	0.5	V
V _{I(on)}	on-state input voltage	V _{CE} =0.3V, I _C =5mA	1.3	0.9	–	V
R1	bias resistor 1 (input)	–	3.3	4.7	6.1	kΩ
R2/R1	bias resistor ratio	–	8	10	12	
C _C	collector capacitance	V _{CB} =10V; I _E =I _E =0A, f=1MHz	–	–	2.5	pF
f _T	Transition frequency	V _{CE} =5V, I _C =10mA, f=100MHZ	–	230	–	MHZ

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Typical Performance Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Figure 1 : Power derating curves

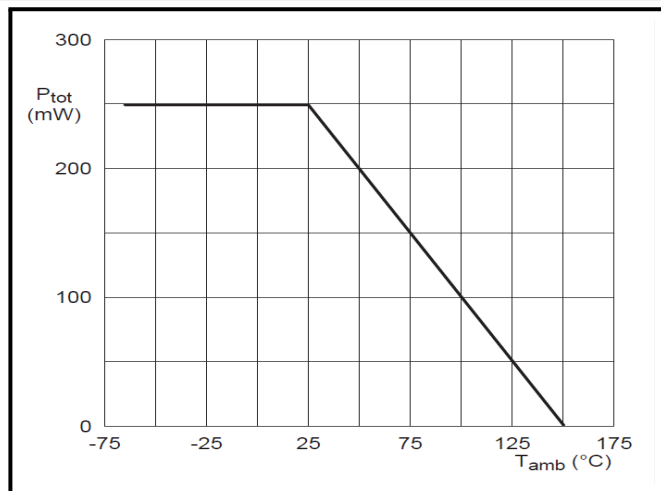


Figure 2 : DC current gain as a function of collector

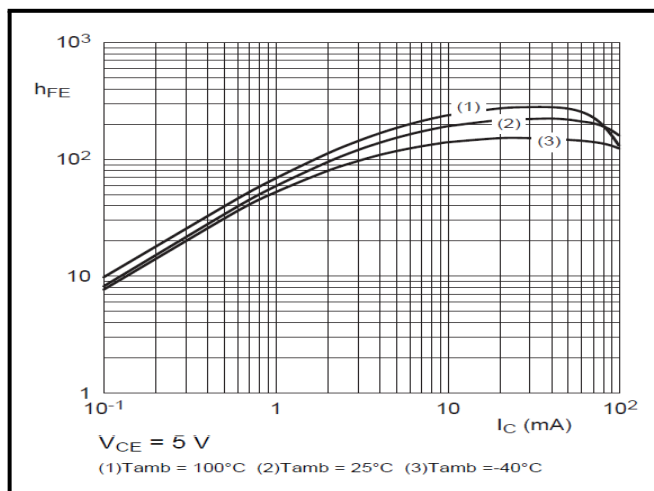


Figure 3 : V_{CEsat} — I_C

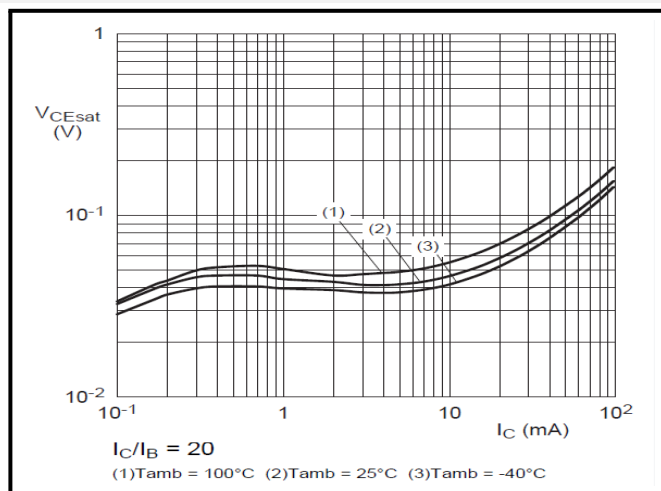


Figure 4 : $V_{I(on)}$ — I_C

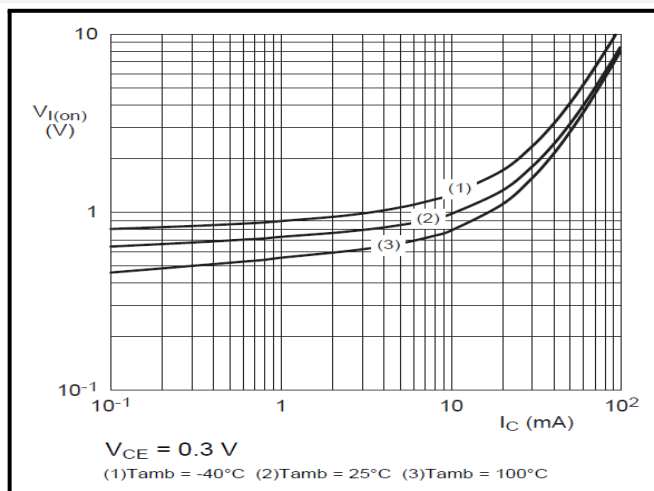


Figure 5 : $V_{I(off)}$ — I_C

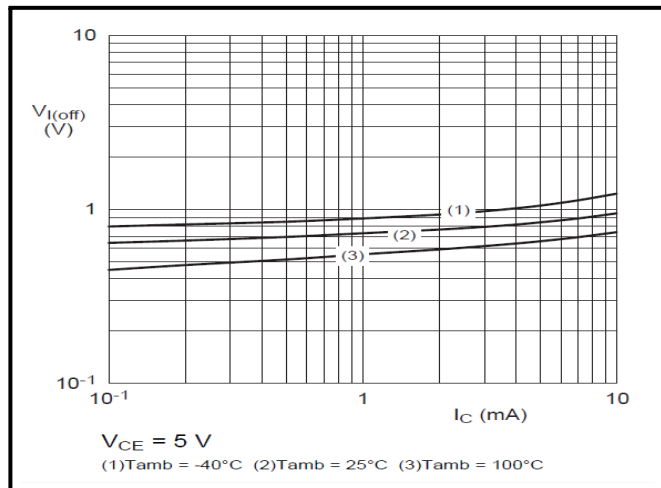
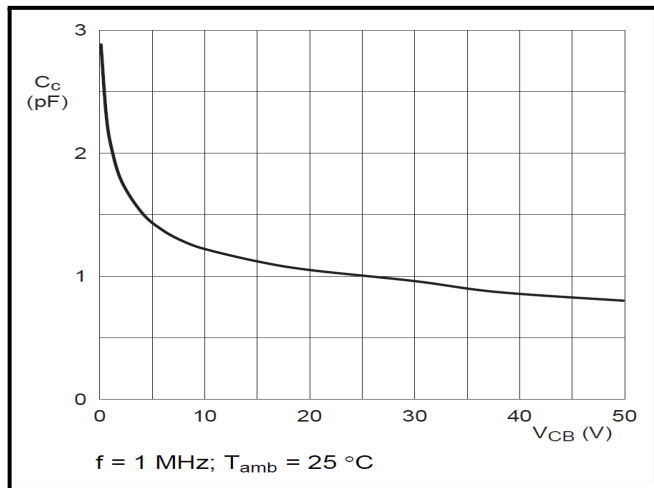


Figure 6 : C_C — V_{CB}



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Typical Performance Characteristics($T_J = 25^\circ\text{C}$, unless otherwise noted)

Figure 7 : $f_T - I_C$

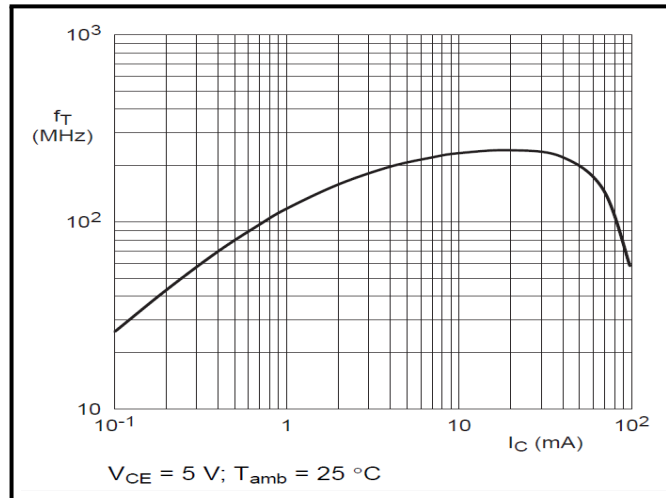
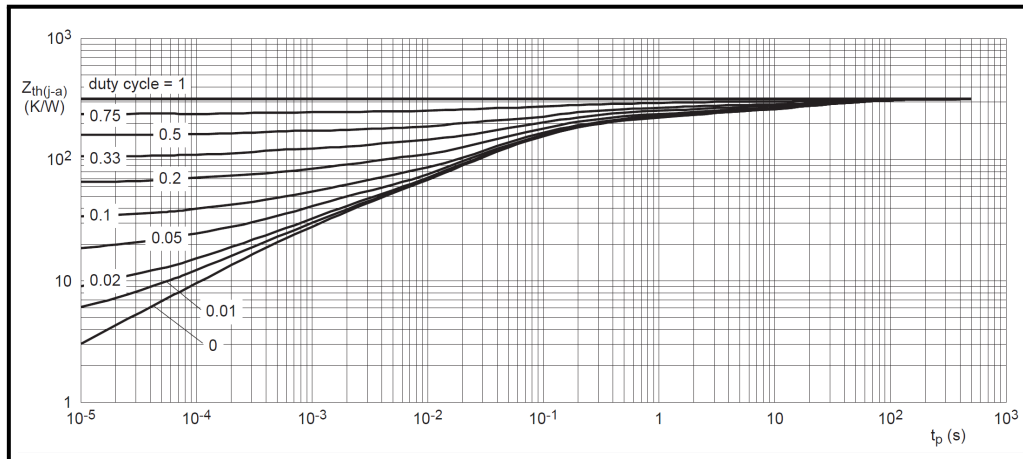


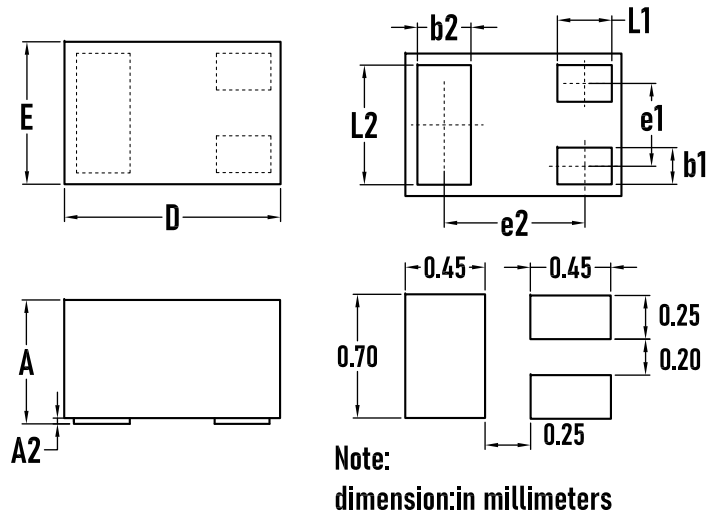
Figure 8 : Transient thermal impedance from junction to ambient as a function of pulse duration



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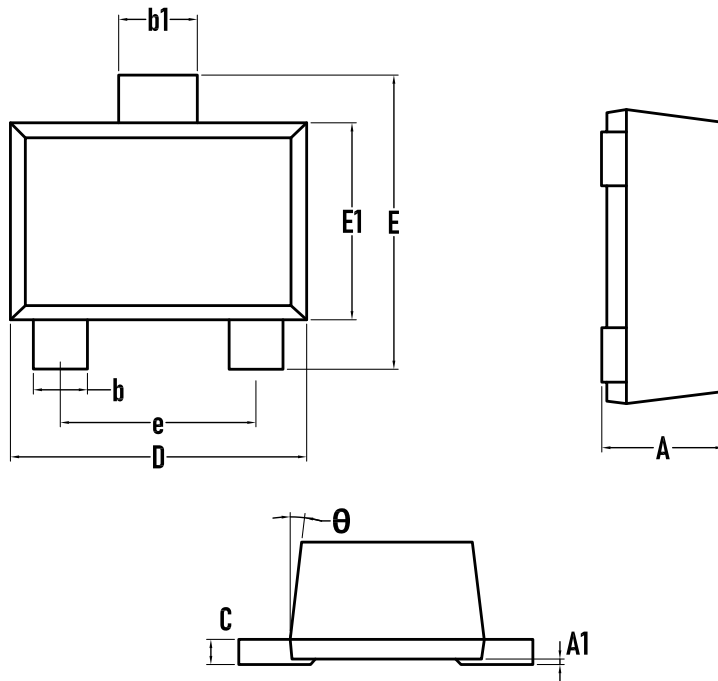
NPN resistor-equipped transistors

Outline Drawing - DFN1006-3L



SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.40	—	050
A2	0.00	—	.05
b1	0.10	0.15	0.20
b2	0.20	0.25	0.30
D	0.95	1.00	1.05
E	0.55	0.60	0.65
e1	0.350BSC		
e2	0.675BSC		
L1	0.20	0.30	0.40
L2	0.40	0.50	0.60

Outline Drawing – SOT-723



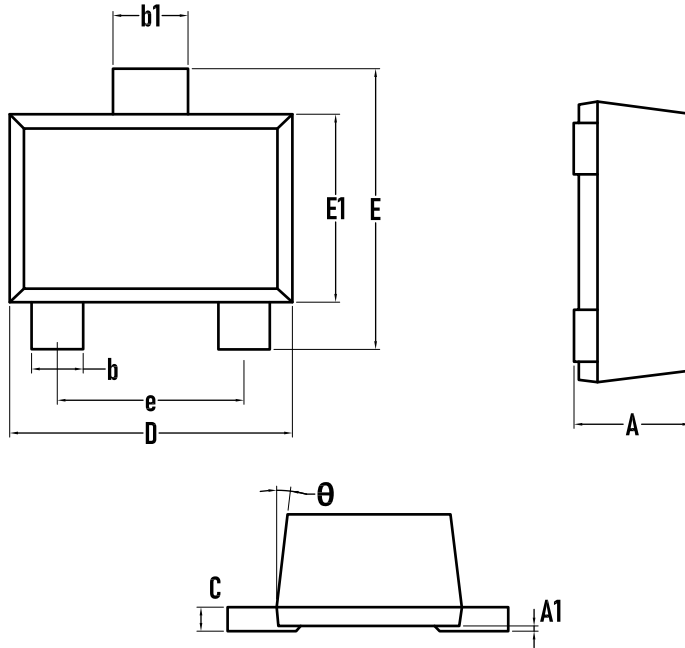
SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.430	—	0.500
A1	0.000	—	0.050
b	0.170	0.220	0.270
b1	0.270	—	0.370
C	0.080	—	0.150
D	1.150	—	1.250
E	1.150	—	1.250
E1	0.750	—	0.850
e	0.800TYP.		
θ	7° REF.		



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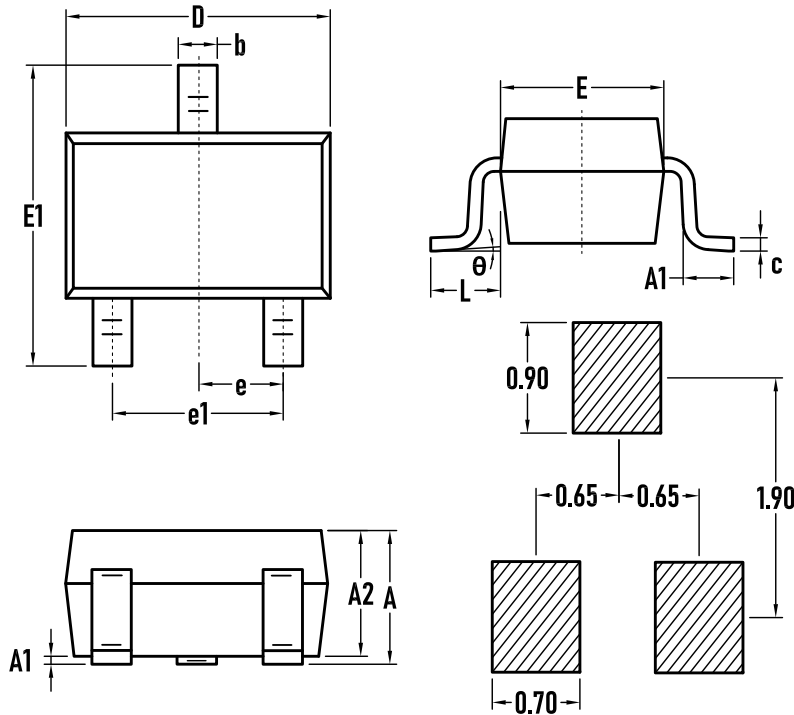
NPN resistor-equipped transistors

Outline Drawing - SOT-523



SYMBOL	MILLIMETER		
	MIN	TYP	MAX
A	0.70	0.80	0.90
A1	0.00	0.05	0.10
A2	0.70	0.75	0.80
b1	0.15	0.22	0.29
b2	0.25	0.32	0.39
D	1.50	1.60	1.70
E	1.45	1.60	1.75
E1	0.70	0.80	0.90
e	0.50(TPY.)		
e1	0.90	1.00	1.10
L	0.26	0.36	0.46
L1	0.40(REF)		
θ	0°	4°	8°

Outline Drawing - SOT-323



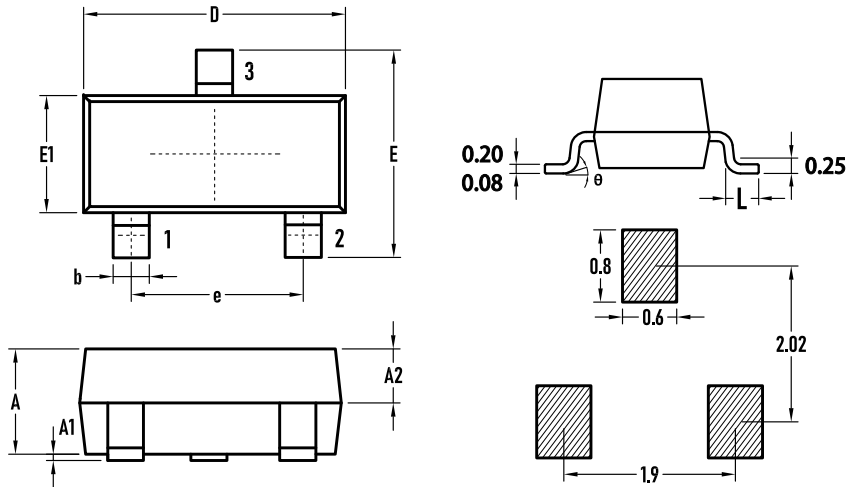
SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.95	1.00	—
A1	0.02	0.06	0.10
A2	—	0.60	—
D	2.85	2.90	2.95
b	0.37	0.40	0.43
E1	2.35	2.40	2.45
E	1.25	1.30	1.35
e	1.85	1.90	1.95
L	0.35	0.40	0.48
θ	0	—	6°



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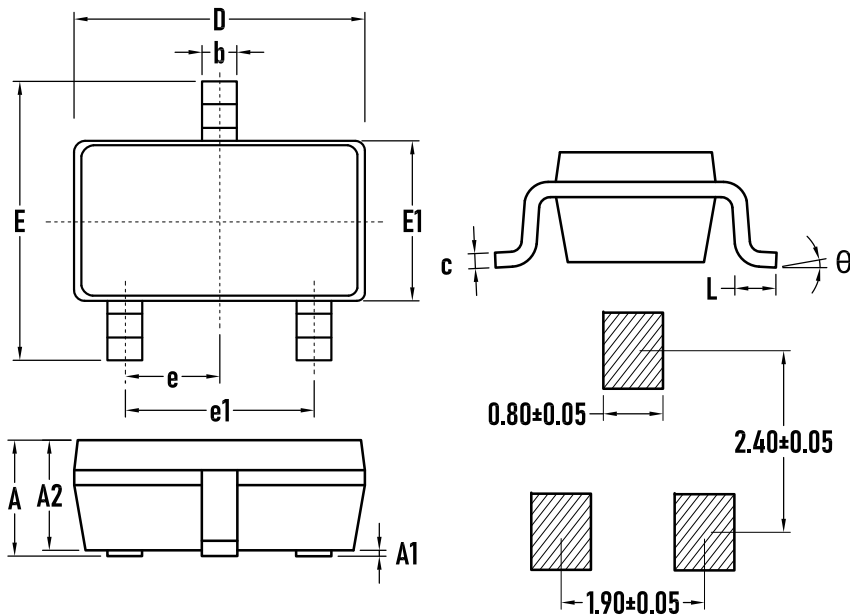
NPN resistor-equipped transistors

Outline Drawing - SOT-23



SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.95	1.00	—
A1	0.02	0.06	0.10
A2	—	0.60	—
D	2.85	2.90	2.95
b	0.37	0.40	0.43
E	2.35	2.40	2.45
E1	1.25	1.30	1.35
e	1.85	1.90	1.95
L	0.35	0.40	0.48
θ	0	—	6°

Outline Drawing - SOT23-3L



SYMBOL	MILLIMETER		Inches	
	MIN.	MAX.	MIN.	MAX.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

