

<For DTr1(NPN)>

Parameter	Value
V_{CEO}	50V
I_C	100mA
R_1	4.7k Ω

<For DTr2(PNP)>

Parameter	Value
V_{CEO}	-50V
I_C	-100mA
R_1	4.7k Ω

●Outline

EMT6 EMD6FHA (SC-107C)	UMT6 UMD6NFHA SOT-353 (SC-88)
SMT6 IMD6AFRA SOT-457 (SC-74)	

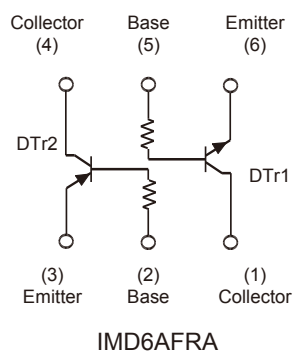
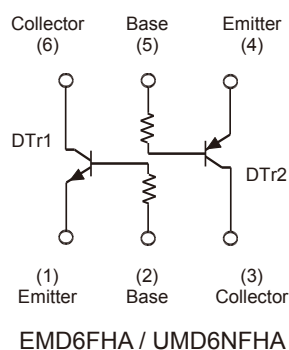
●Features

- 1) Both the DTC143T chip and DTA143T chip in one package.
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- 3) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of completely eliminating parasitic effects.
- 4) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 5) Lead Free/RoHS Compliant.

●Application

Inverter circuit, Interface circuit, Driver circuit

●Inner circuit



●Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
EMD6FHA	EMT6	1616	T2R	180	8	8,000	D6
UMD6NFHA	UMT6	2021	TR	180	8	3,000	D6
IMD6AFRA	SMT6	2928	T108	180	8	3,000	D6

●Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	DTr1(NPN)	DTr2(PNP)	Unit
Collector-base voltage		V_{CBO}	50	-50	V
Collector-emitter voltage		V_{CEO}	50	-50	V
Emitter-base voltage		V_{EBO}	5	-5	V
Collector current		I_C	100	-100	mA
Collector Power dissipation	EMD6FHA / UMD6NFHA	P_C^{*2}	150 (Total) ^{*3}		mW
	IMD6AFRA		300 (Total) ^{*4}		mW
Junction temperature		T_j	150		°C
Range of storage temperature		T_{stg}	-55 to +150		°C

●Electrical characteristics(Ta = 25°C) <For DTr1(NPN)>

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	BV_{CBO}	$I_C = 50\mu A$	50	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	$I_C = 1mA$	50	-	-	
Emitter-base breakdown voltage	BV_{EBO}	$I_E = 50\mu A$	5	-	-	
Collector cut-off current	I_{CBO}	$V_{CB} = 50V$	-	-	500	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 4V$	-	-	500	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C / I_B = 5mA / 0.25mA$	-	-	300	mV
DC current gain	h_{FE}	$V_{CE} = 5V, I_C = 1mA$	100	300	600	-
Input resistance	R_1	-	3.29	4.7	6.11	-
Transition frequency	f_T^{*1}	$V_{CE} = 10V, I_E = -5mA$ $f = 100MHz$	-	250	-	MHz

●Electrical characteristics(Ta = 25°C) <For DTr2(PNP)>

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	BV_{CBO}	$I_C = -50\mu A$	-50	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	$I_C = -1mA$	-50	-	-	
Emitter-base breakdown voltage	BV_{EBO}	$I_E = -50\mu A$	-5	-	-	
Collector cut-off current	I_{CBO}	$V_{CB} = -50V$	-	-	-500	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = -4V$	-	-	-500	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C / I_B = -5mA / -0.25mA$	-	-	-300	mV
DC current gain	h_{FE}	$V_{CE} = -5V, I_C = -1mA$	100	300	600	-
Input resistance	R_1	-	3.29	4.7	6.11	-
Transition frequency	f_T^{*1}	$V_{CE} = -10V, I_E = 5mA$ $f = 100MHz$	-	250	-	MHz

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference footprint

*3 120mW per element must not be exceeded.

*4 200mW per element must not be exceeded.

●Electrical characteristic curves(Ta = 25°C) <For DTr1(NPN)>

Fig.1 Grounded emitter propagation characteristics

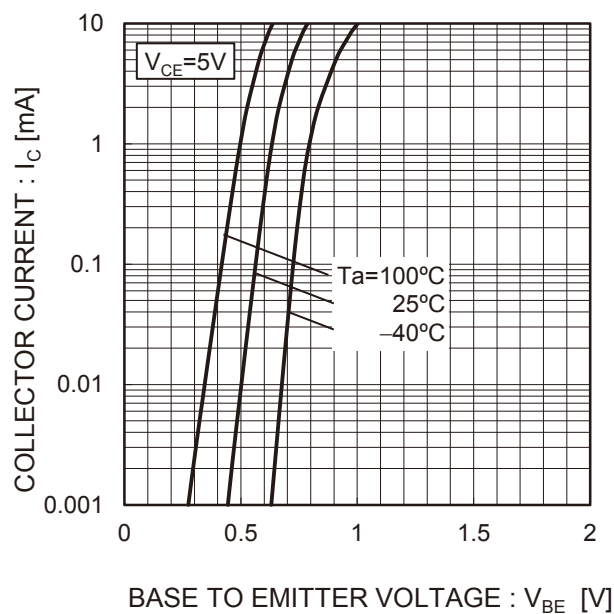


Fig.2 Grounded emitter output characteristics

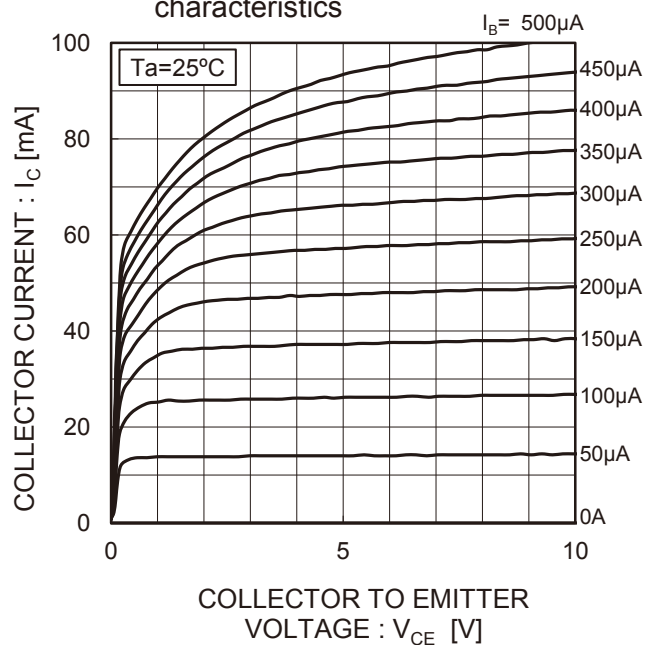


Fig.3 DC Current gain vs. Collector Current

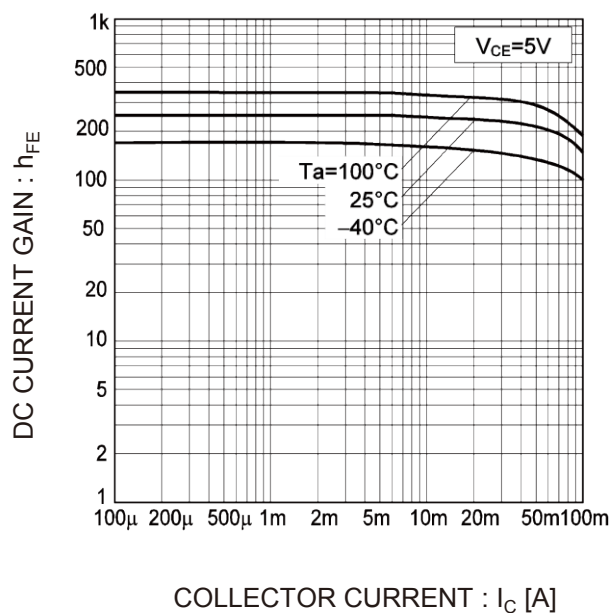
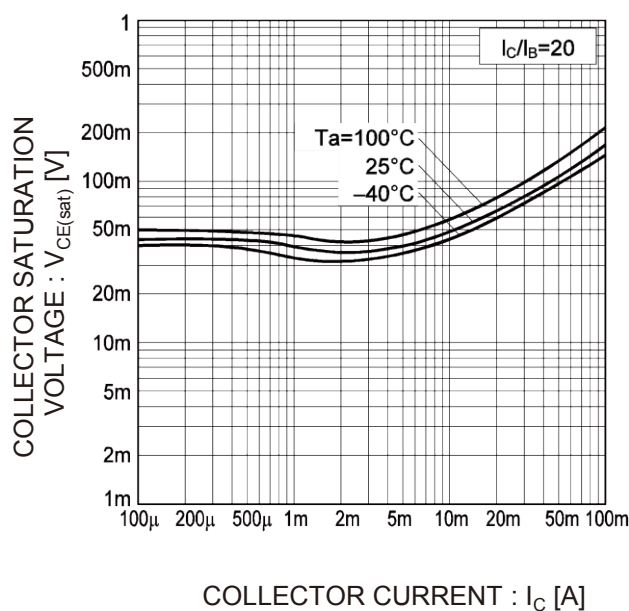


Fig.4 Collector-emitter saturation voltage vs. Collector Current



●Electrical characteristic curves(Ta = 25°C) <For DTr2(PNP)>

Fig.1 Grounded emitter propagation characteristics

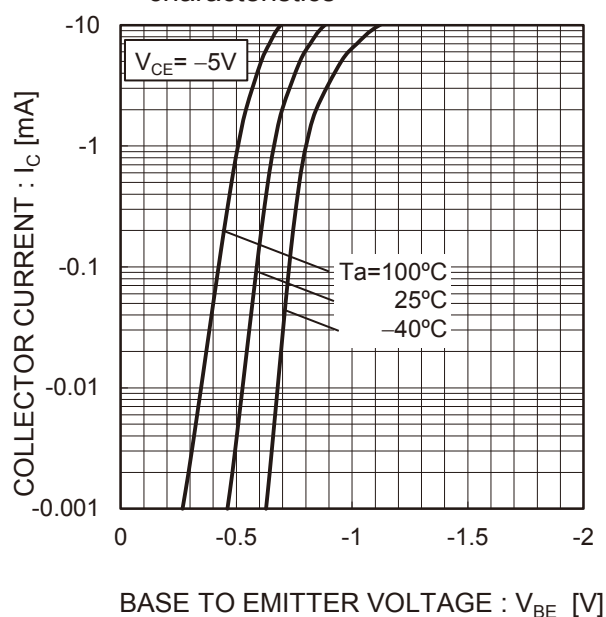


Fig.2 Grounded emitter output characteristics

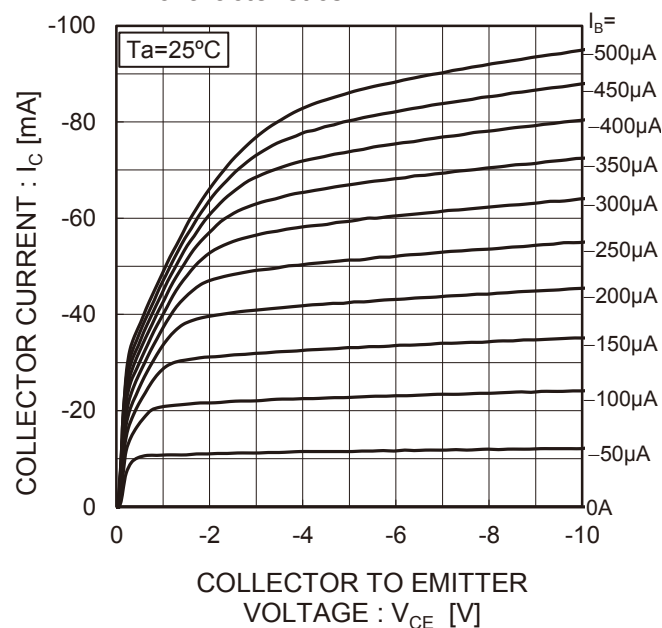


Fig.3 DC Current gain vs. Collector Current

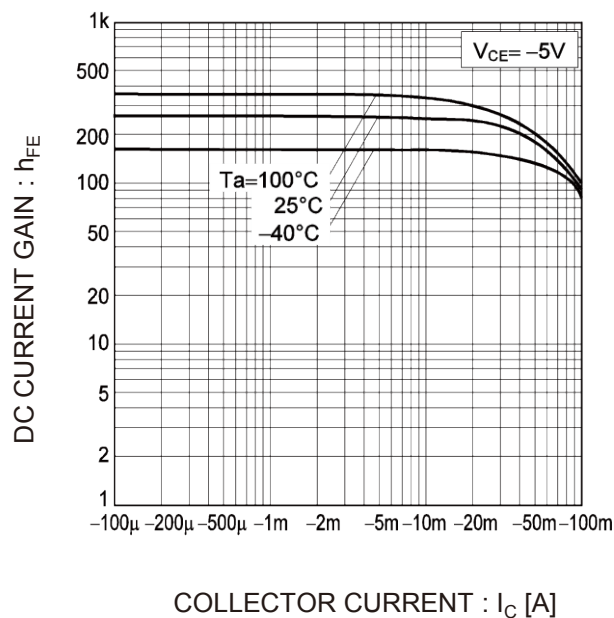
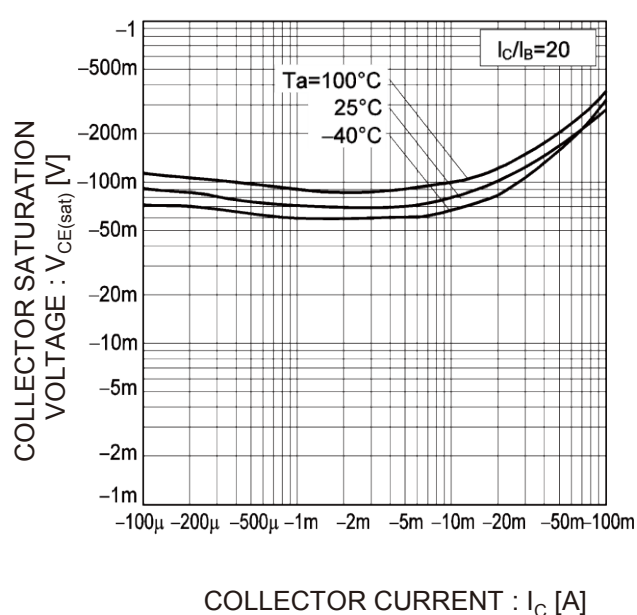
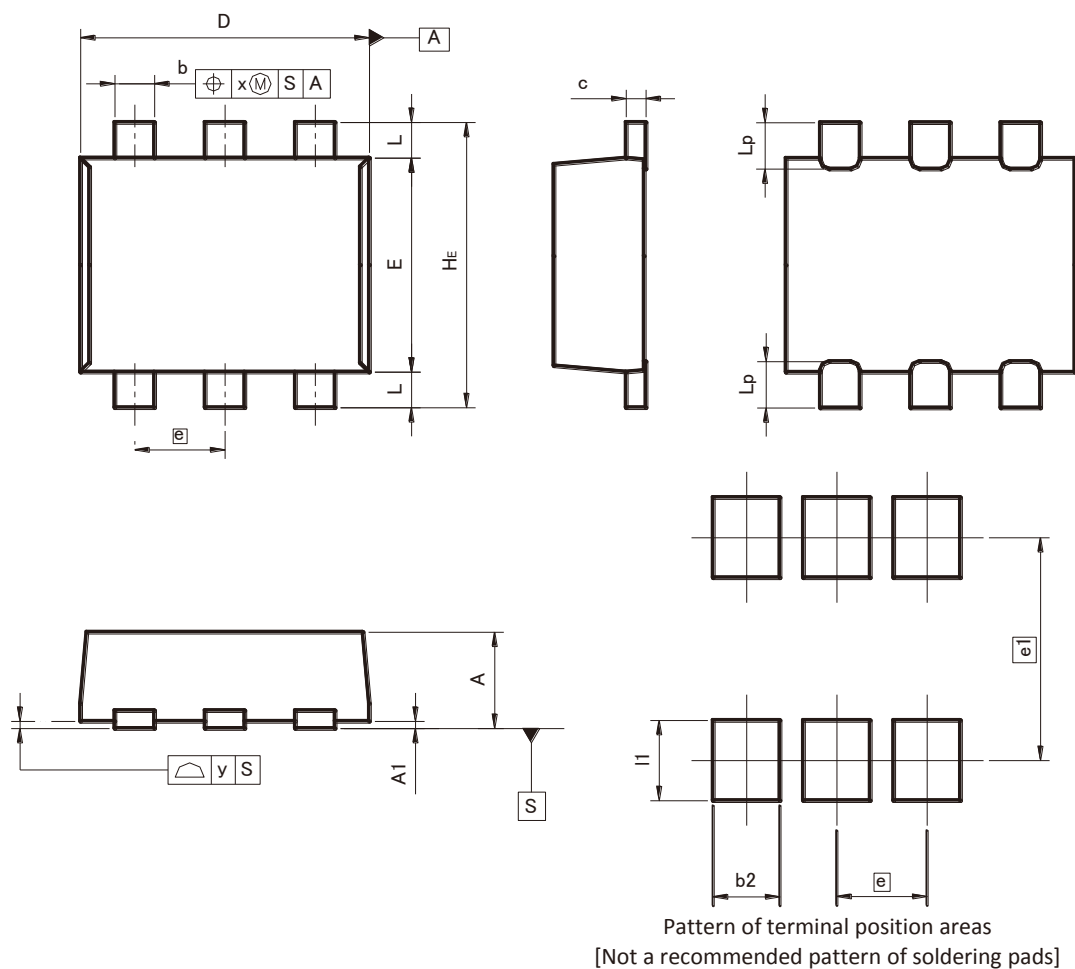


Fig.4 Collector-emitter saturation voltage vs. Collector Current



●Dimensions (Unit : mm)

EMT6



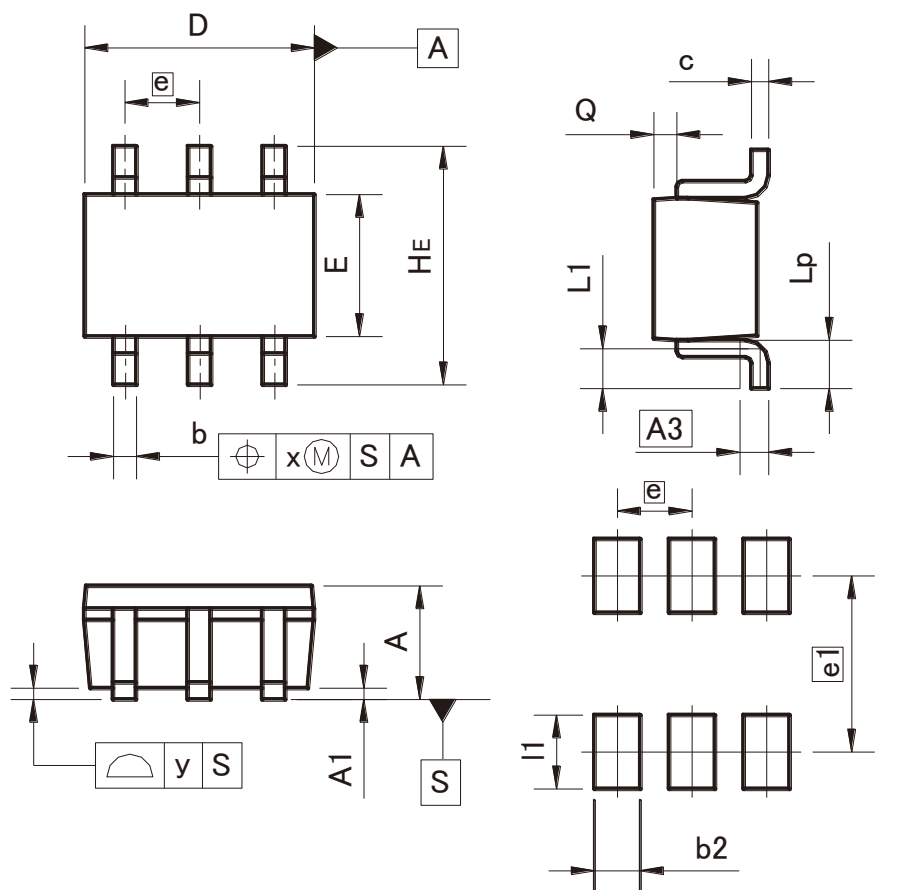
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	1.10	1.30	0.043	0.051
e	0.50		0.020	
HE	1.50	1.70	0.059	0.067
L	0.10	0.30	0.004	0.012
Lp	—	0.35	—	0.014
x	—	0.10	—	0.004
y	—	0.10	—	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	—	0.37	—	0.015
e1	1.25		0.049	
l1	—	0.45	—	0.018

Dimension in mm / inches

●Dimensions (Unit : mm)

UMT6



Pattern of terminal position areas
[Not a recommended pattern of soldering pads]

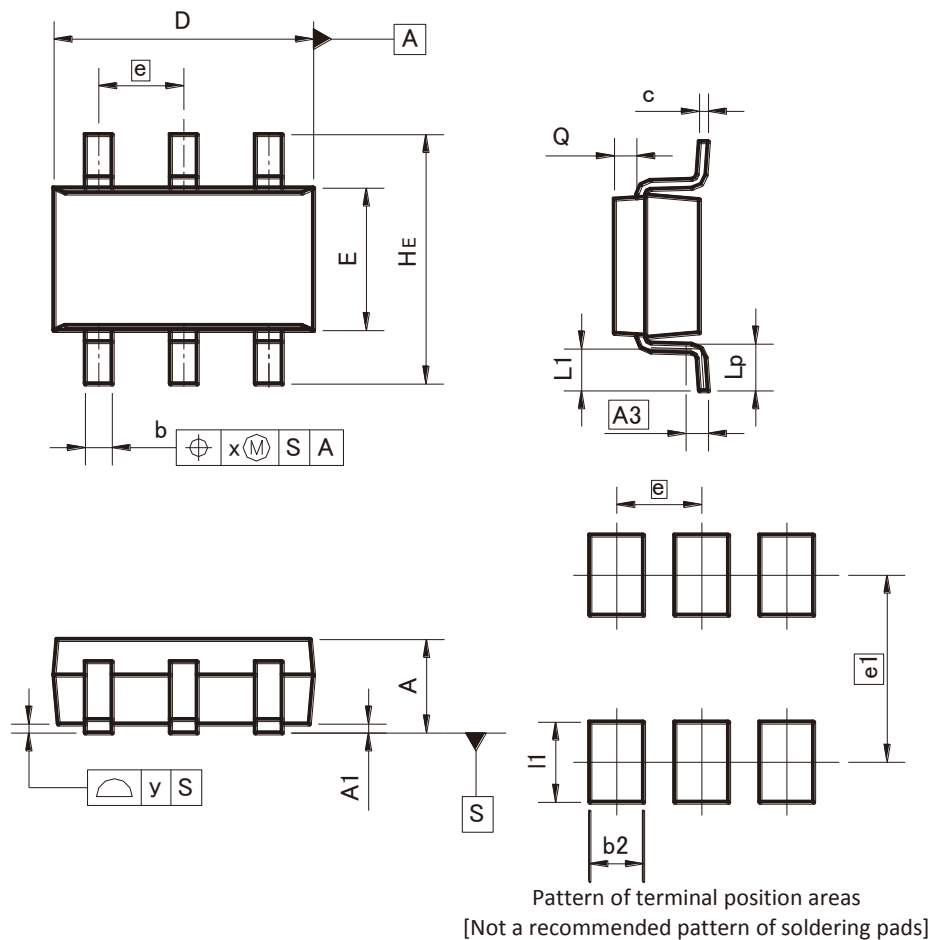
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.031	0.039
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.15	0.30	0.006	0.012
c	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.026	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.020
Lp	0.25	0.55	0.010	0.022
Q	0.10	0.30	0.004	0.012
x	—	0.10	—	0.004
y	—	0.10	—	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	—	0.40	—	0.016
e1	1.55		0.061	
l1	—	0.65	—	0.026

Dimension in mm / inches

●Dimensions (Unit : mm)

SMT6



DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.30	0.039	0.051
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.25	0.40	0.010	0.016
c	0.09	0.25	0.004	0.010
D	2.80	3.00	0.110	0.118
E	1.50	1.80	0.059	0.071
e	0.95		0.037	
HE	2.60	3.00	0.102	0.118
L1	0.30	0.60	0.012	0.024
Lp	0.40	0.70	0.016	0.028
Q	0.20	0.30	0.008	0.012
x	—	0.20	—	0.008
y	—	0.10	—	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2	—	0.60	—	0.024
e1	2.10		0.083	
l1	—	0.90	—	0.035

Dimension in mm / inches

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