

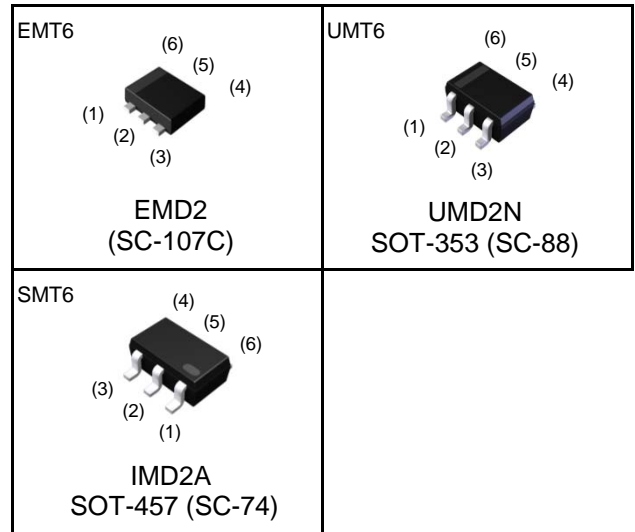
<For DTr1(NPN)>

Parameter	Value
V_{CC}	50V
$I_{C(MAX.)}$	100mA
R_1	22k Ω
R_2	22k Ω

<For DTr2(PNP)>

Parameter	Value
V_{CC}	-50V
$I_{C(MAX.)}$	-100mA
R_1	22k Ω
R_2	22k Ω

●Outline



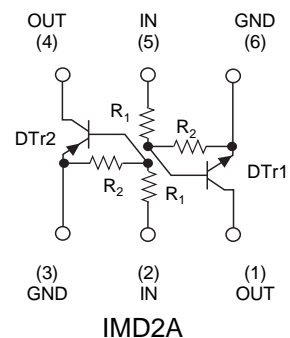
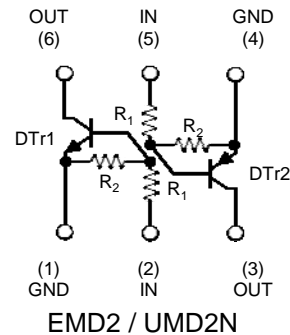
●Features

- 1) Both the DTC124E chip and DTA124E 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
EMD2	EMT6	1616	T2R	180	8	8,000	D2
UMD2N	UMT6	2021	TR	180	8	3,000	D2
IMD2A	SMT6	2928	T108	180	8	3,000	D2

●Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	DTr1(NPN)	DTr2(PNP)	Unit
Supply voltage		V _{CC}	50	-50	V
Input voltage		V _{IN}	-10 to +40	-40 to +10	V
Output current		I _O	30	-30	mA
Collector current		I _{C(MAX.)} ^{*1}	100	-100	mA
Power dissipation	EMD2 / UMD2N	P _D ^{*2}	150 (Total) ^{*3}		mW
	IMD2A		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
Input voltage	V _{I(off)}	V _{CC} = 5V, I _O = 100μA	-	-	0.5	V
	V _{I(on)}	V _O = 0.2V, I _O = 5mA	3.0	-	-	
Output voltage	V _{O(on)}	I _O / I _I = 10mA / 0.5mA	-	0.1	0.3	V
Input current	I _I	V _I = 5V	-	-	0.36	mA
Output current	I _{O(off)}	V _{CC} = 50V, V _I = 0V	-	-	0.5	μA
DC current gain	G _I	V _O = 5V, I _O = 5mA	56	-	-	-
Input resistance	R ₁	-	15.4	22	28.6	kΩ
Resistance ratio	R ₂ /R ₁	-	0.8	1	1.2	-
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
Input voltage	V _{I(off)}	V _{CC} = -5V, I _O = -100μA	-	-	-0.5	V
	V _{I(on)}	V _O = -0.2V, I _O = -5mA	-3.0	-	-	
Output voltage	V _{O(on)}	I _O / I _I = -10mA / -0.5mA	-	-0.1	-0.3	V
Input current	I _I	V _I = -5V	-	-	-0.36	mA
Output current	I _{O(off)}	V _{CC} = -50V, V _I = 0V	-	-	-0.5	μA
DC current gain	G _I	V _O = -5V, I _O = -5mA	56	-	-	-
Input resistance	R ₁	-	15.4	22	28.6	kΩ
Resistance ratio	R ₂ /R ₁	-	0.8	1	1.2	-
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 Input voltage vs. output current (ON characteristics)

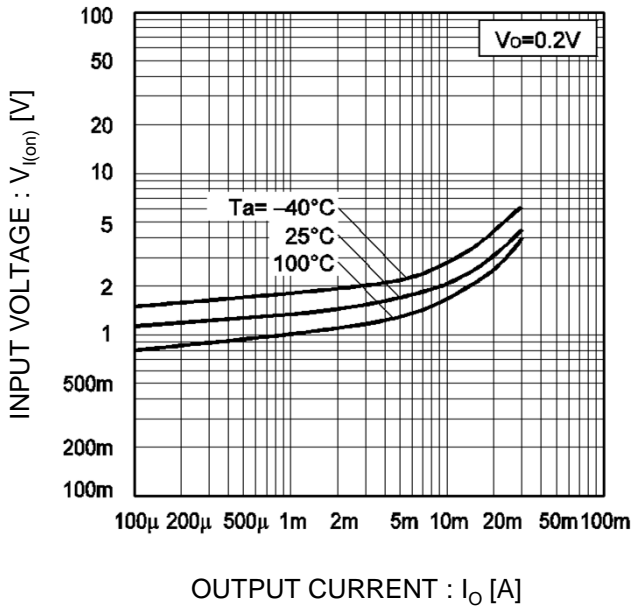


Fig.2 Output current vs. input voltage (OFF characteristics)

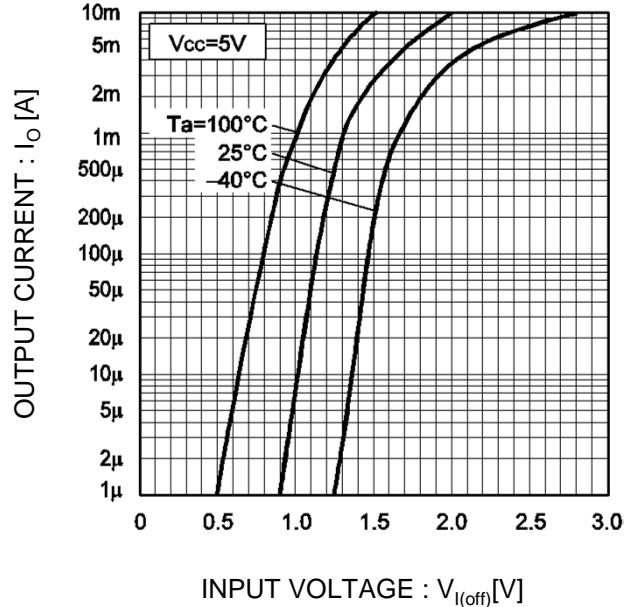


Fig.3 Output current vs. output voltage

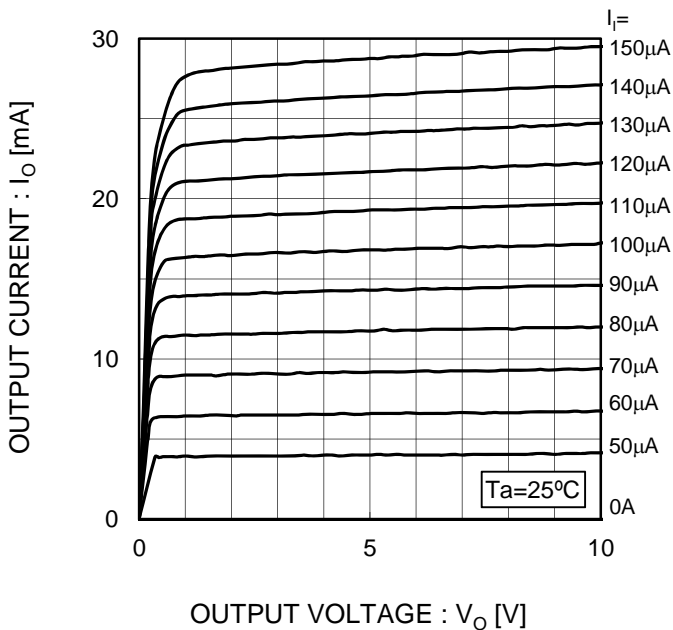
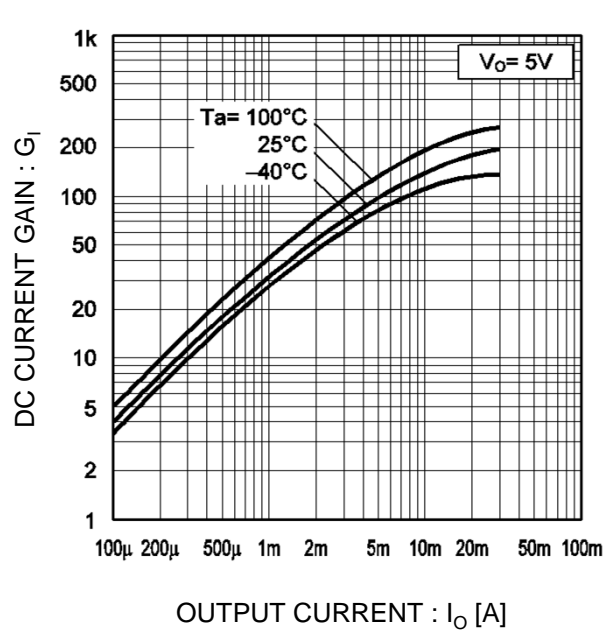
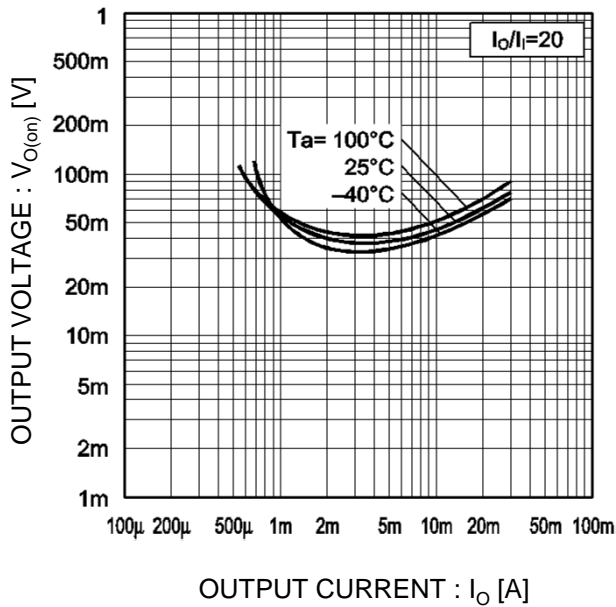


Fig.4 DC current gain vs. output current



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

Fig.5 Output voltage vs. output current



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

Fig.6 Input voltage vs. output current (ON characteristics)

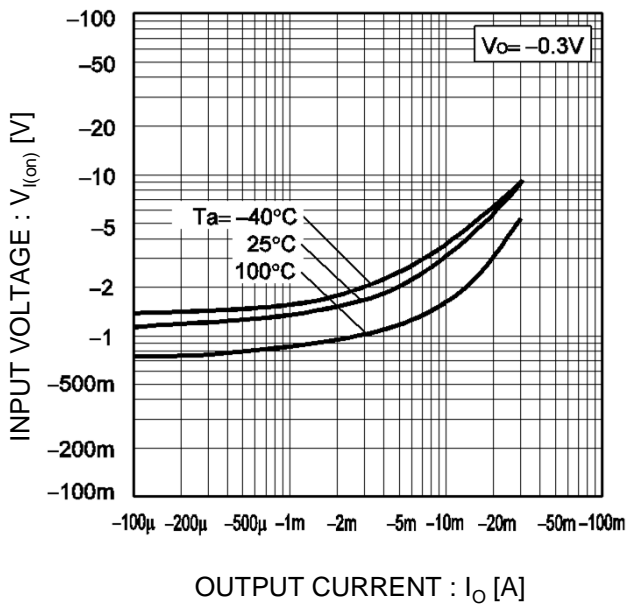
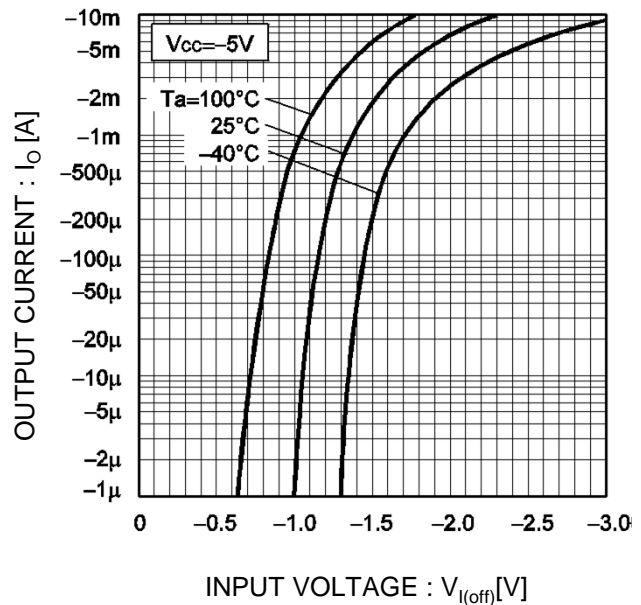


Fig.7 Output current vs. input voltage (OFF characteristics)



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

Fig.8 Output current vs. output voltage

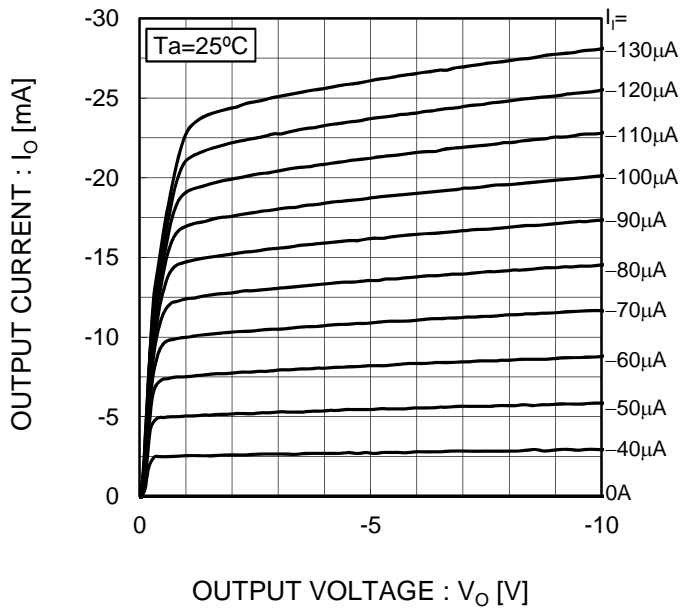


Fig.9 DC current gain vs. output current

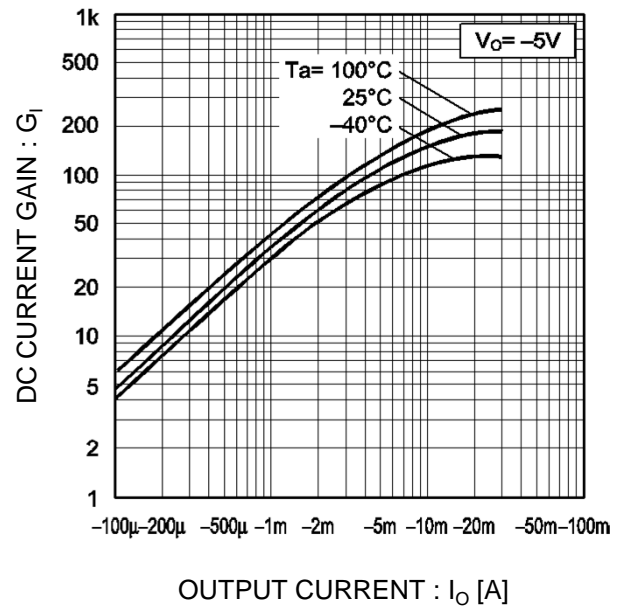
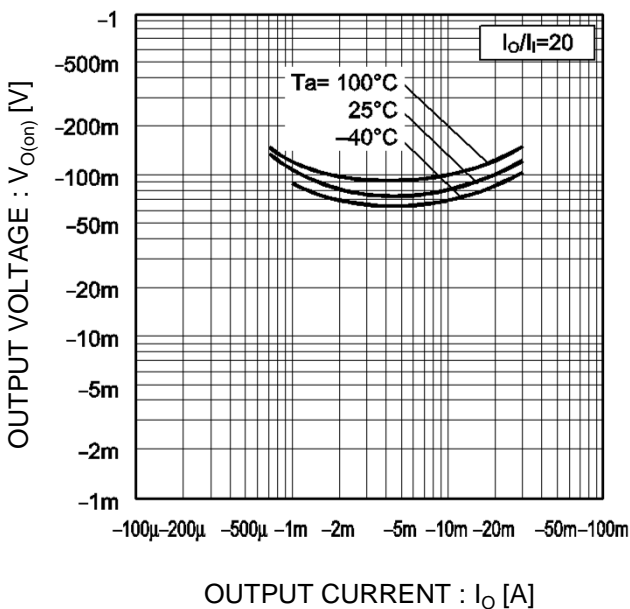
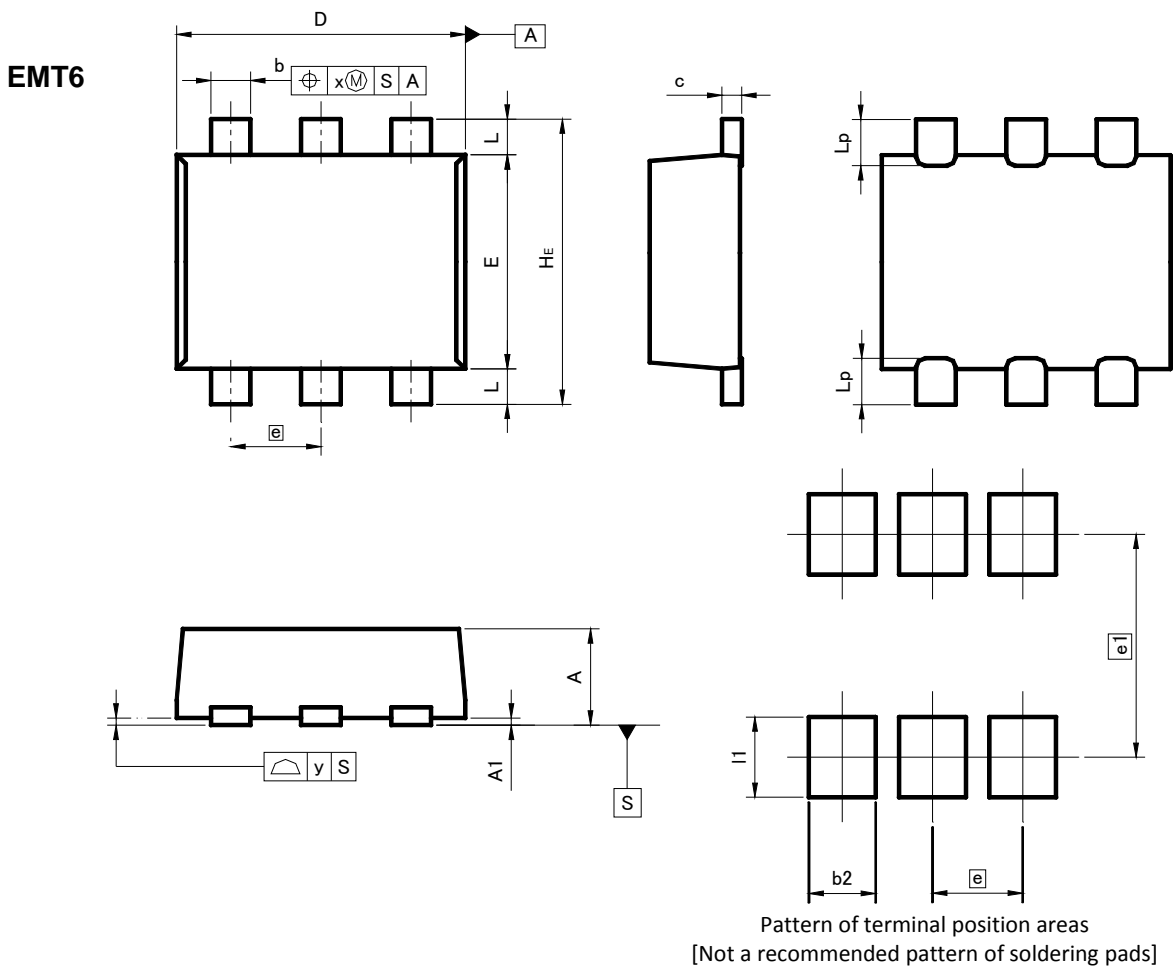


Fig.10 Output voltage vs. output current



●Dimensions (Unit : mm)



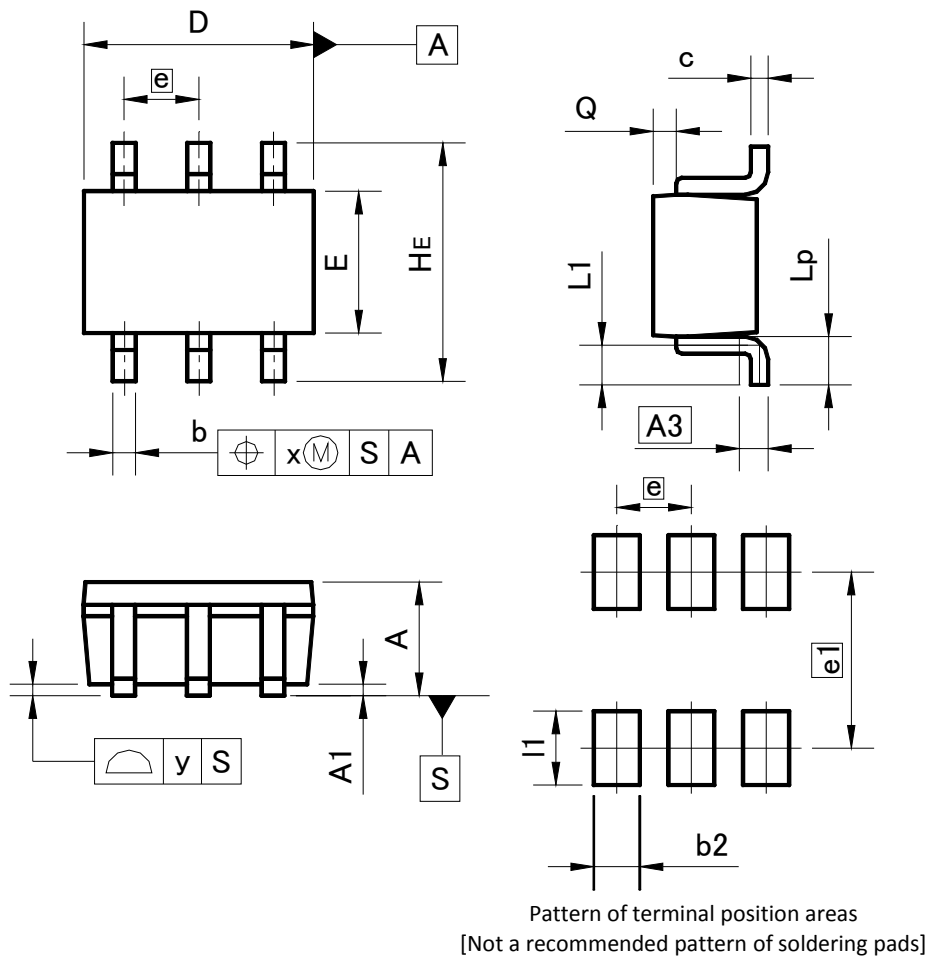
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	1.10	1.30	0.043	0.051
e	0.50		0.020	
HE	1.50	1.70	0.059	0.067
L	0.10	0.30	0.004	0.012
Lp	-	0.35	-	0.014
x	-	0.10	-	0.004
y	-	0.10	-	0.004

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]

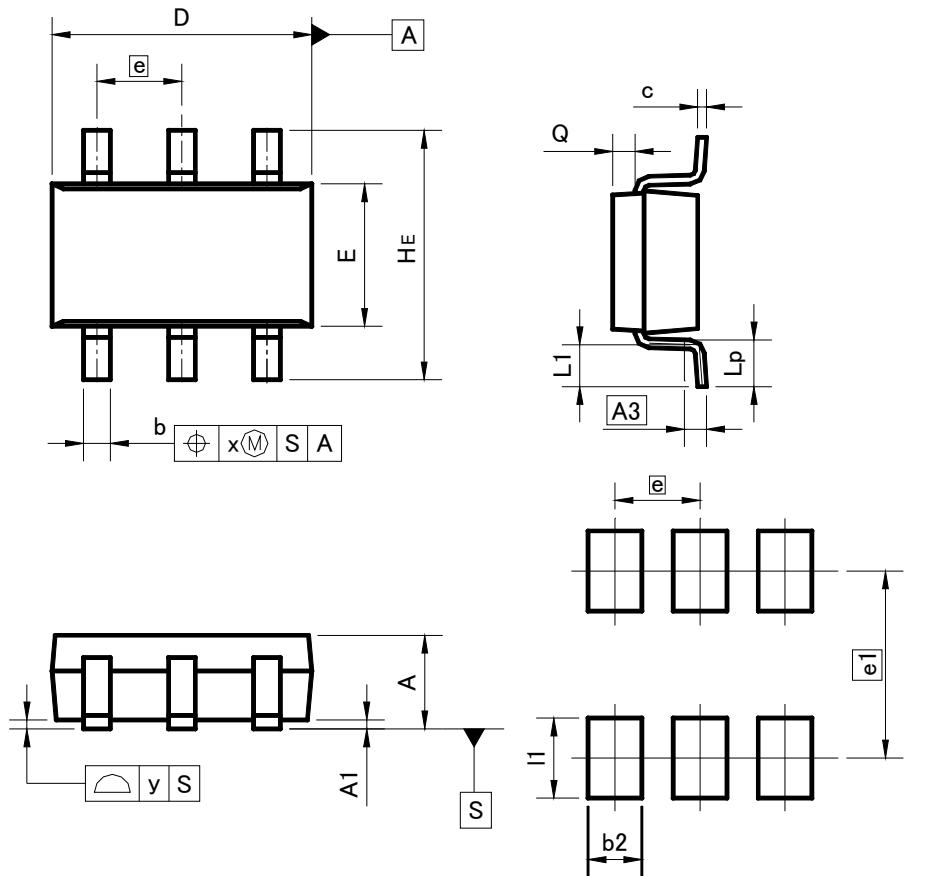
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.031	0.039
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.15	0.30	0.006	0.012
c	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.026	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.020
Lp	0.25	0.55	0.010	0.022
Q	0.10	0.30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



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

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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