

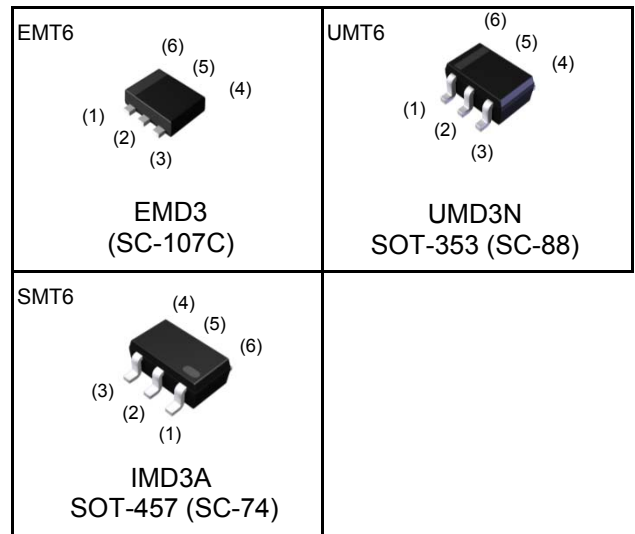
<For DTr1(NPN)>

Parameter	Value
$V_{CC}$	50V
$I_{C(MAX.)}$	100mA
$R_1$	10k $\Omega$
$R_2$	10k $\Omega$

<For DTr2(PNP)>

Parameter	Value
$V_{CC}$	-50V
$I_{C(MAX.)}$	-100mA
$R_1$	10k $\Omega$
$R_2$	10k $\Omega$

### ●Outline



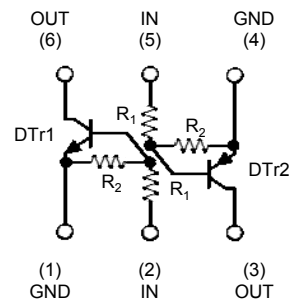
### ●Features

- 1) Both the DTC114E chip and DTA114E 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.

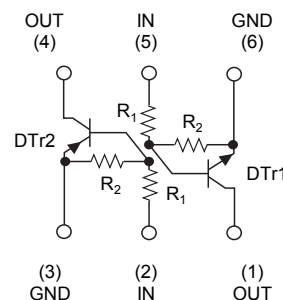
### ●Application

Inverter circuit, Interface circuit, Driver circuit

### ●Inner circuit



EMD3 / UMD3N



IMD3A

### ●Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
EMD3	EMT6	1616	T2R	180	8	8,000	D3
UMD3N	UMT6	2021	TN	180	8	3,000	D3
IMD3A	SMT6	2928	T110	180	8	3,000	D3

**●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		$I_O$	50	-50	mA
Collector current		$I_{C(MAX.)}^{*1}$	100	-100	mA
Power dissipation	EMD3 / UMD3N	$P_D^{*2}$	150 (Total) <sup>*3</sup>		mW
	IMD3A		300 (Total) <sup>*4</sup>		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	$V_{I(off)}$	$V_{CC} = 5V, I_O = 100\mu A$	-	-	0.5	V
	$V_{I(on)}$	$V_O = 0.3V, I_O = 10mA$	3.0	-	-	
Output voltage	$V_{O(on)}$	$I_O / I_I = 10mA / 0.5mA$	-	0.1	0.3	V
Input current	$I_I$	$V_I = 5V$	-	-	0.88	mA
Output current	$I_{O(off)}$	$V_{CC} = 50V, V_I = 0V$	-	-	0.5	$\mu A$
DC current gain	$G_I$	$V_O = 5V, I_O = 5mA$	30	-	-	-
Input resistance	$R_1$	-	7	10	13	k $\Omega$
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	$V_{I(off)}$	$V_{CC} = -5V, I_O = -100\mu A$	-	-	-0.5	V
	$V_{I(on)}$	$V_O = -0.3V, I_O = -10mA$	-3.0	-	-	
Output voltage	$V_{O(on)}$	$I_O / I_I = -10mA / -0.5mA$	-	-0.1	-0.3	V
Input current	$I_I$	$V_I = -5V$	-	-	-0.88	mA
Output current	$I_{O(off)}$	$V_{CC} = -50V, V_I = 0V$	-	-	-0.5	$\mu A$
DC current gain	$G_I$	$V_O = -5V, I_O = -5mA$	30	-	-	-
Input resistance	$R_1$	-	7	10	13	k $\Omega$
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)

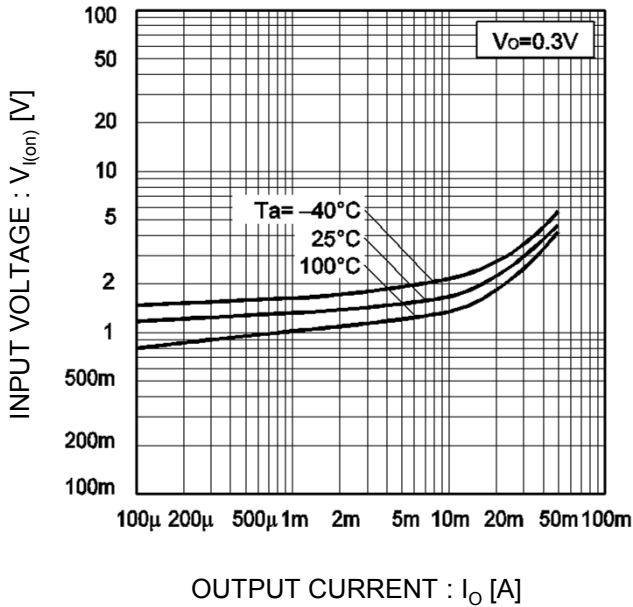


Fig.2 Output current vs. input voltage (OFF characteristics)

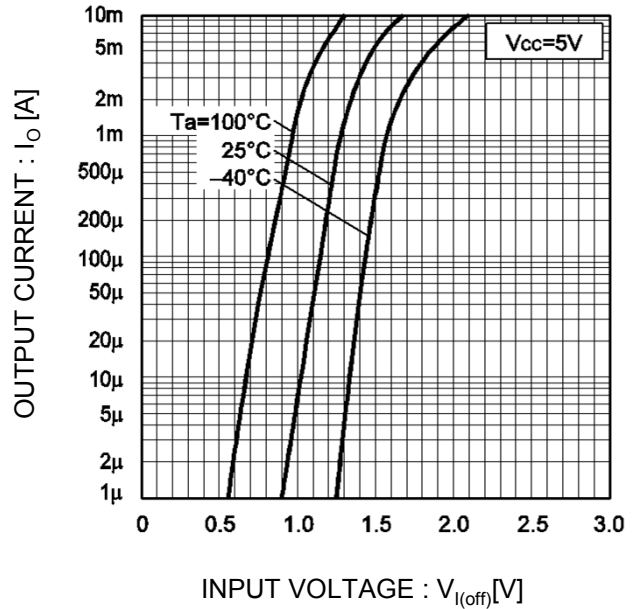


Fig.3 Output current vs. output voltage

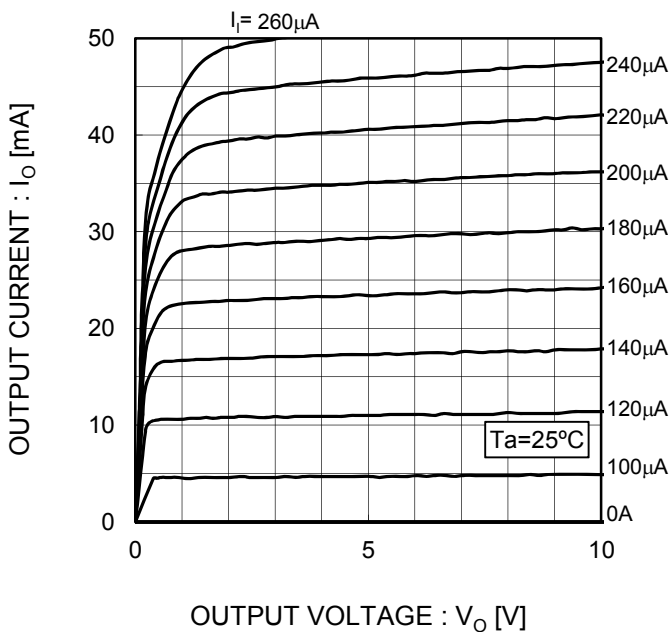
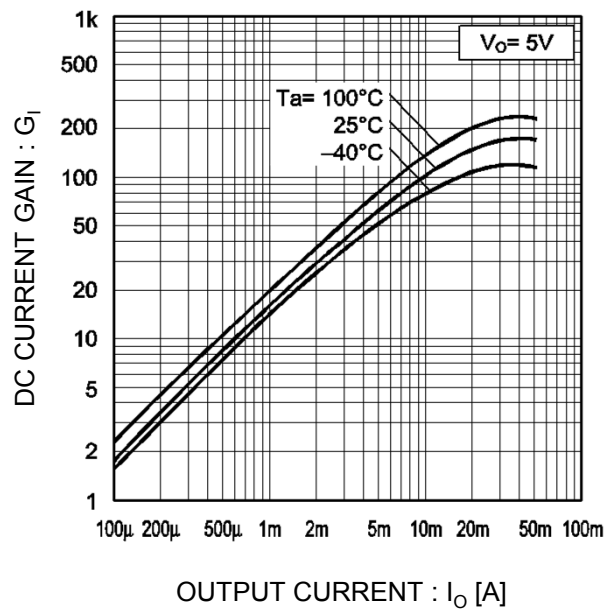
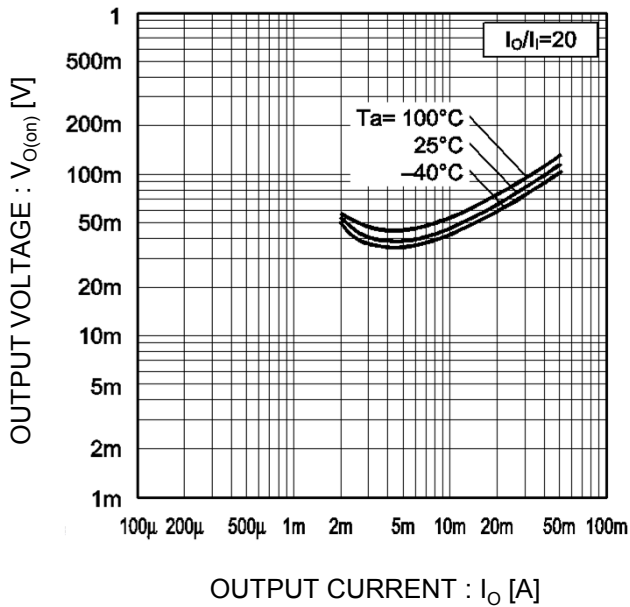


Fig.4 DC current gain vs. output current



●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)

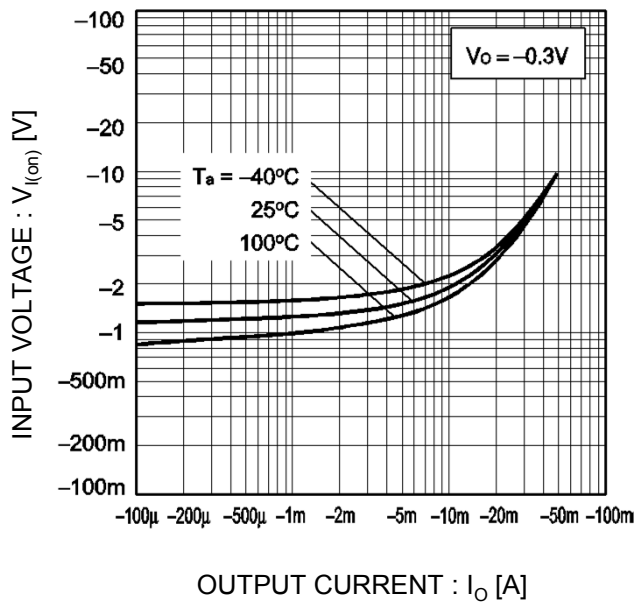
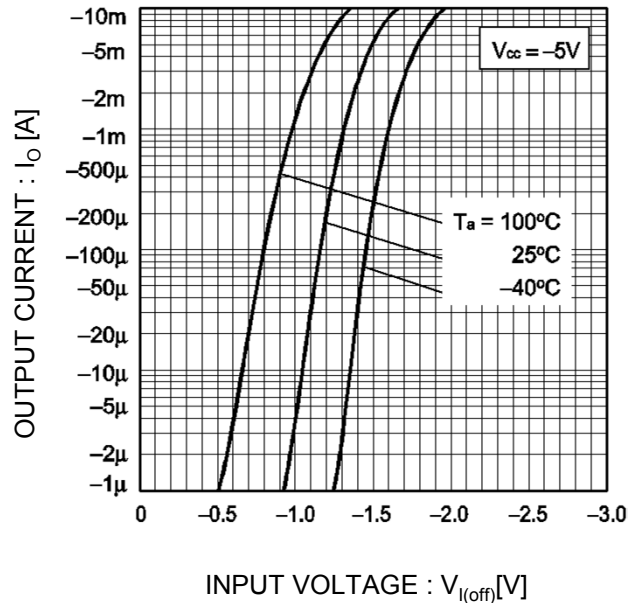


Fig.7 Output current vs. input voltage (OFF characteristics)



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

Fig.8 Output current vs. output voltage

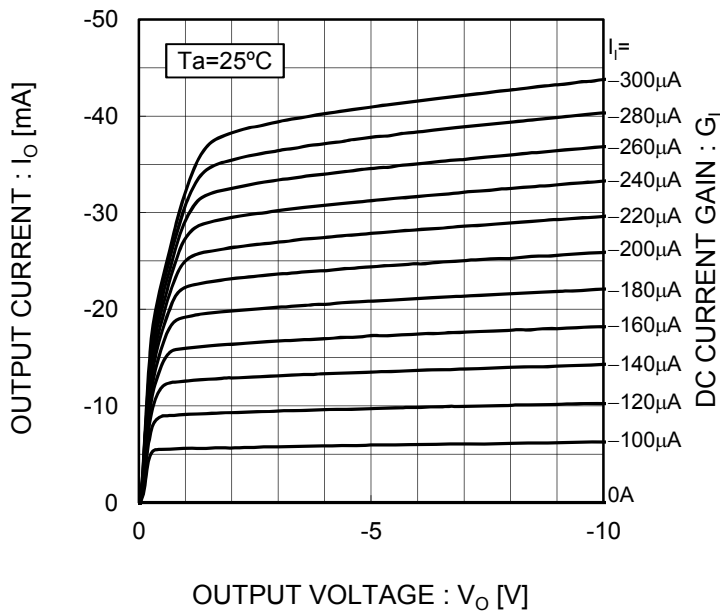


Fig.9 DC current gain vs. output current

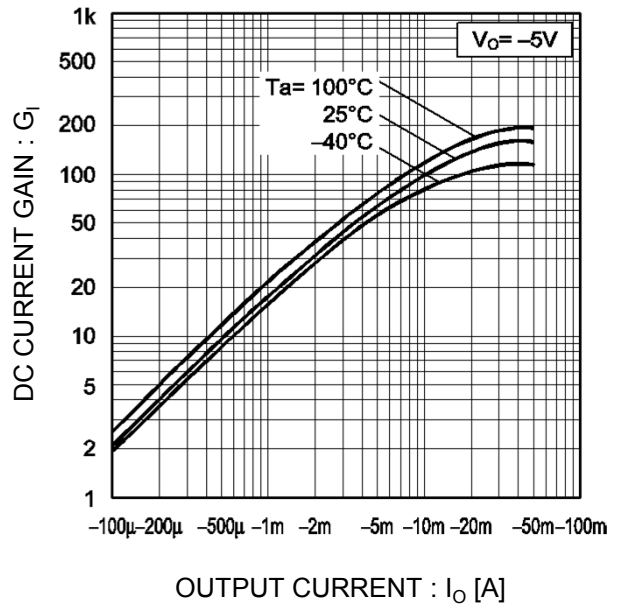
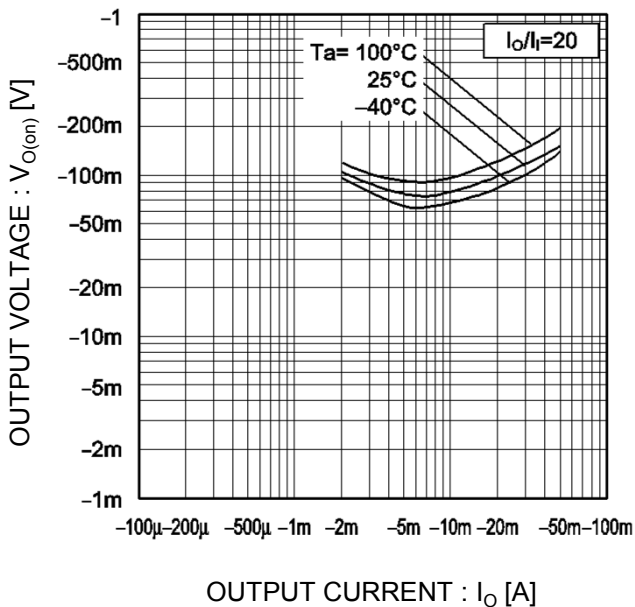
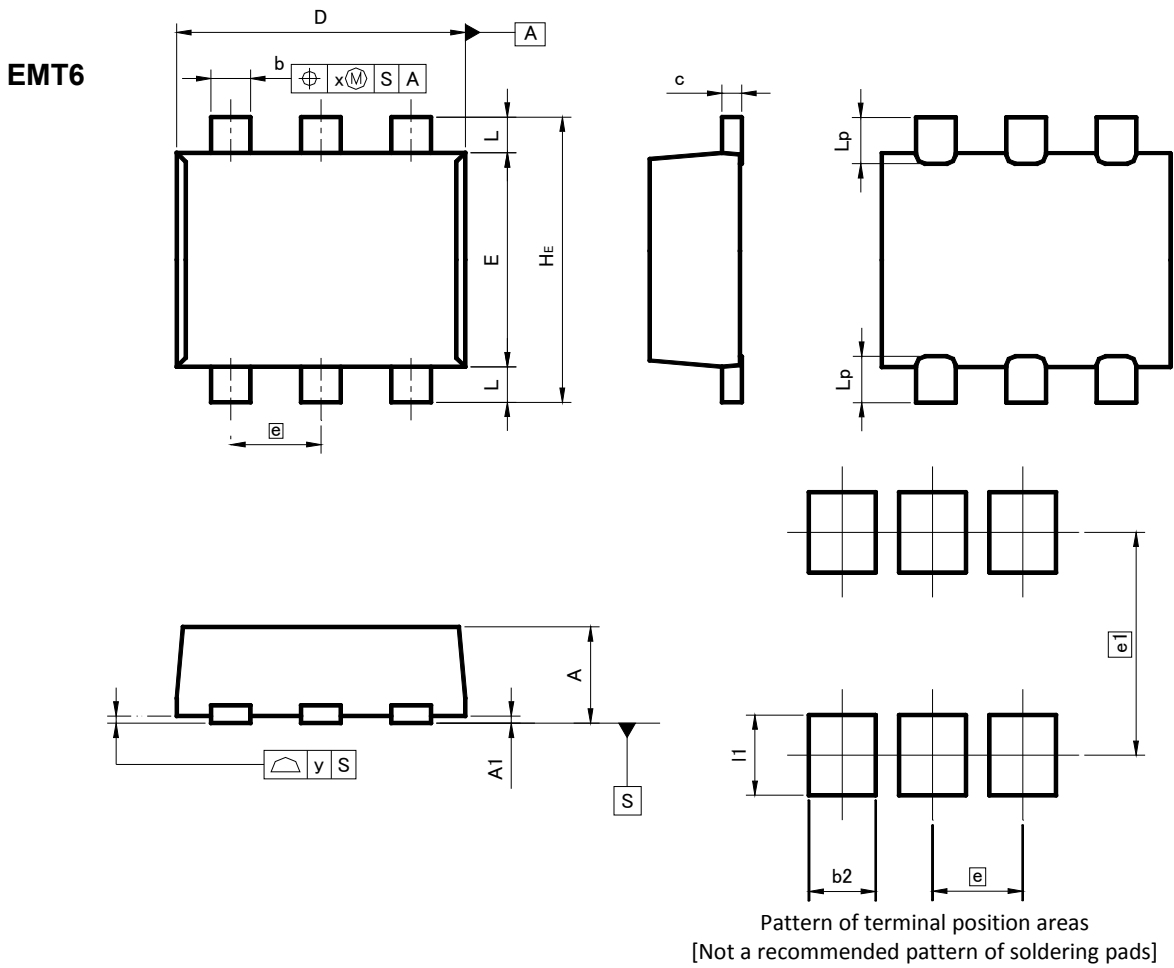


Fig.10 Output voltage vs. output current



●Dimensions (Unit : mm)



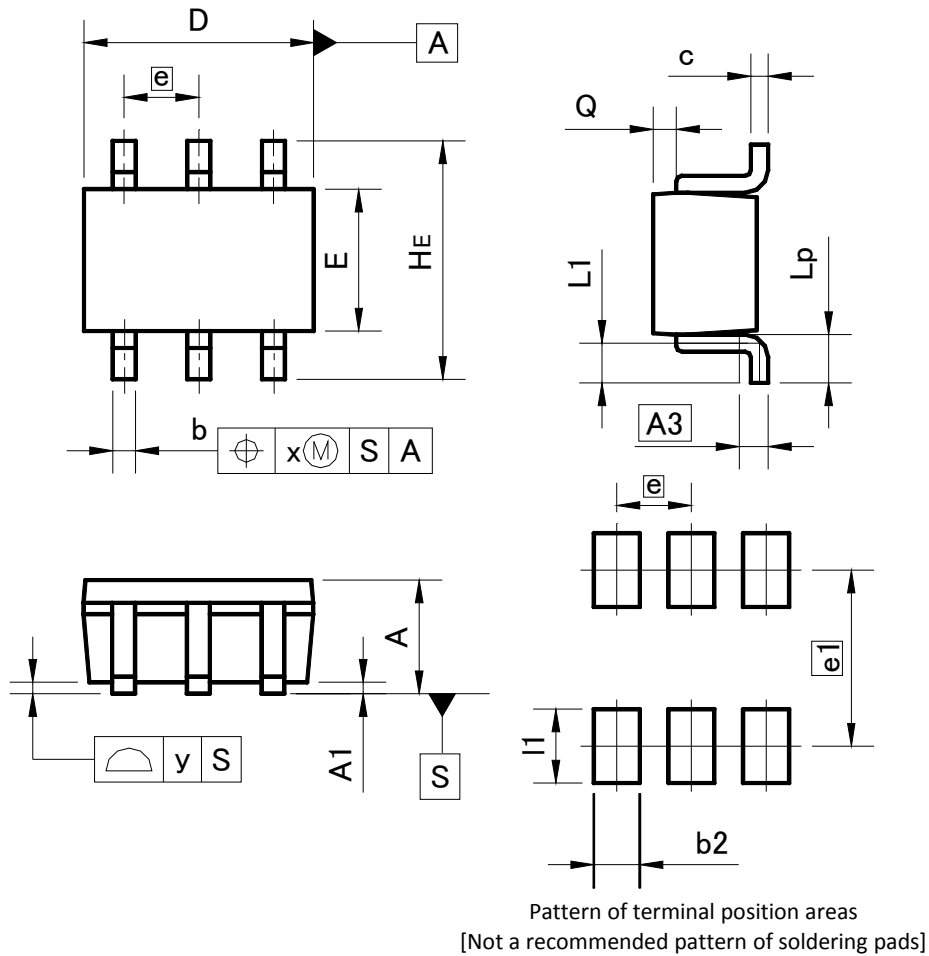
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0.000	0.004
b	0.17	0.27	0.007	0.011
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	1.10	1.30	0.043	0.051
e	0.50		0.020	
HE	1.50	1.70	0.059	0.067
L	0.10	0.30	0.004	0.012
Lp	-	0.35	-	0.014
x	-	0.10	-	0.004
y	-	0.10	-	0.004

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



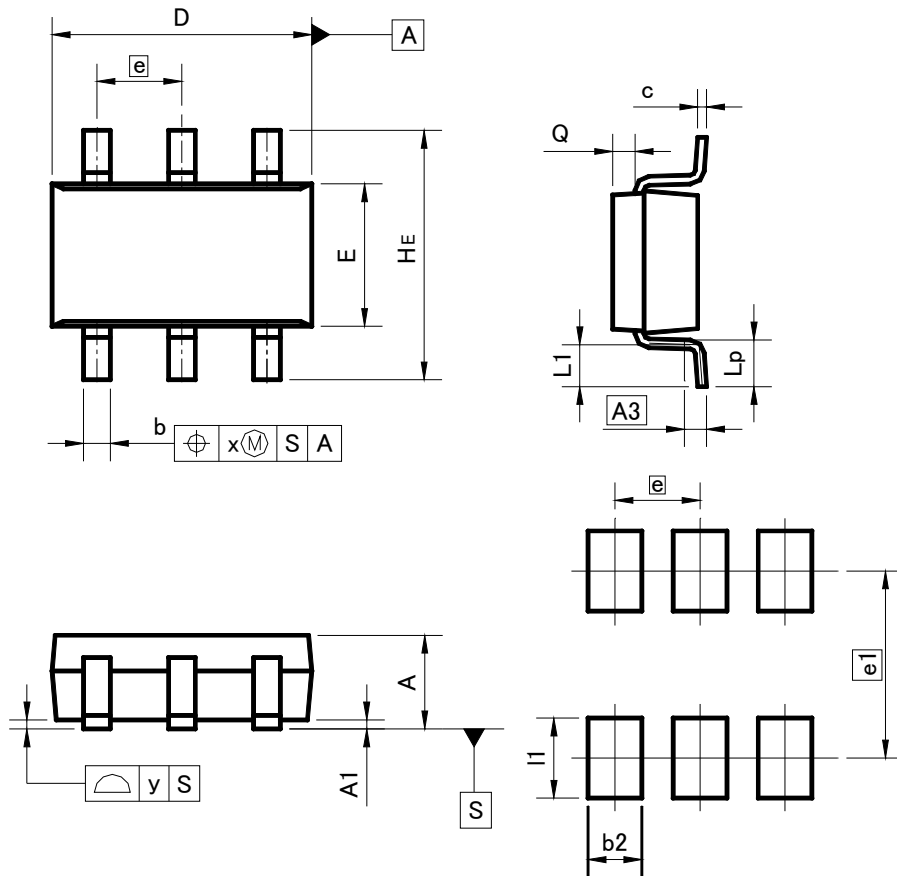
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.031	0.039
A1	0.00	0.10	0.000	0.004
A3	0.25		0.010	
b	0.15	0.30	0.006	0.012
c	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.026	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.020
Lp	0.25	0.55	0.010	0.022
Q	0.10	0.30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