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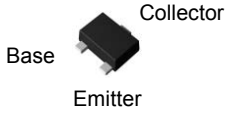
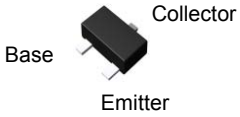
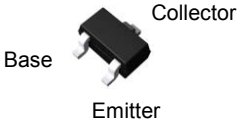
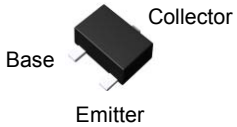
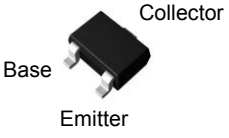
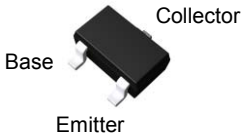
DTC143T series

NPN 100mA 50V Digital Transistors (Bias Resistor Built-in Transistors) Datasheet

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

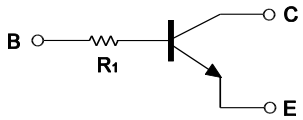
●Outline

VMT3  DTC143TM (SC-105AA)	EMT3F  DTC143TEB (SC-89)
EMT3  DTC143TE SOT-416 (SC-75A)	UMT3F  DTC143TUB (SC-85)
UMT3  DTC143TUA SOT-323 (SC-70)	SMT3  DTC143TKA SOT-346 (SC-59)

●Features

1) Built-In Biasing Resistors
2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent 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) Complementary PNP Types :DTA143T series
6) Complex transistors :EMH3 /UMH3N /IMH3A /EMG3 /UMG3N /FMG3A（PNP type）
7) Lead Free/RoHS Compliant.

●Inner circuit



●Application

Switching circuit, Inverter circuit, Interface circuit, Driver circuit

●Packaging specifications

Part No.	Package	Package size (mm)	Taping code	Reel size (mm)	Tape width (mm)	Basic ordering unit (pcs)	Marking
DTC143TM	VMT3	1212	T2L	180	8	8,000	03
DTC143TEB	EMT3F	1616	TL	180	8	3,000	03
DTC143TE	EMT3	1616	TL	180	8	3,000	03
DTC143TUB	UMT3F	2021	TL	180	8	3,000	03
DTC143TUA	UMT3	2021	T106	180	8	3,000	03
DTC143TKA	SMT3	2928	T146	180	8	3,000	03

●Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Values	Unit
Collector-base voltage		V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage		V_{EBO}	5	V
Collector current		I_C	100	mA
Collector Power dissipation	DTC143TM DTC143TEB DTC143TE	P_C *2	150	mW
	DTC143TUB DTC143TUA DTC143TKA		200	mW
Junction temperature		T_j	150	°C
Range of storage temperature		T_{stg}	−55 to +150	°C

●Electrical characteristics(Ta = 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	BV_{CBO}	I_C= 50μA	50	-	-	V
Collector-emitter breakdown voltage	BV_{CEO}	I_C= 1mA	50	-	-	V
Emitter-base breakdown voltage	BV_{EBO}	I_E= 50μA	5	-	-	V
Collector cut-off current	I_{CBO}	V_{CB} = 50V	-	-	0.5	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 4V	-	-	0.5	μA
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C / I_B= 5mA / 0.25mA	-	-	0.15	V
DC current gain	h_{FE}	V_{CE}= 5V , I_C= 1mA ,	100	250	600	-
Input resistance	R_1	-	3.5	4.7	5.9	kΩ
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

●**Electrical characteristic curves**(Ta = 25°C)

Fig.1 Grounded emitter propagation characteristics

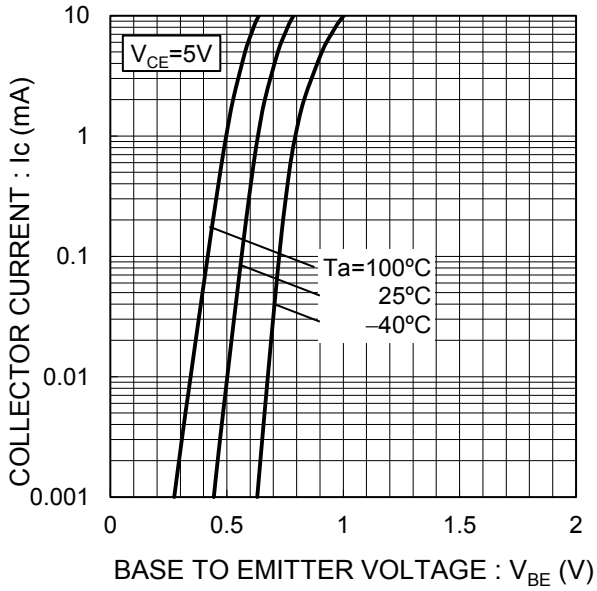


Fig.2 Grounded emitter output characteristics

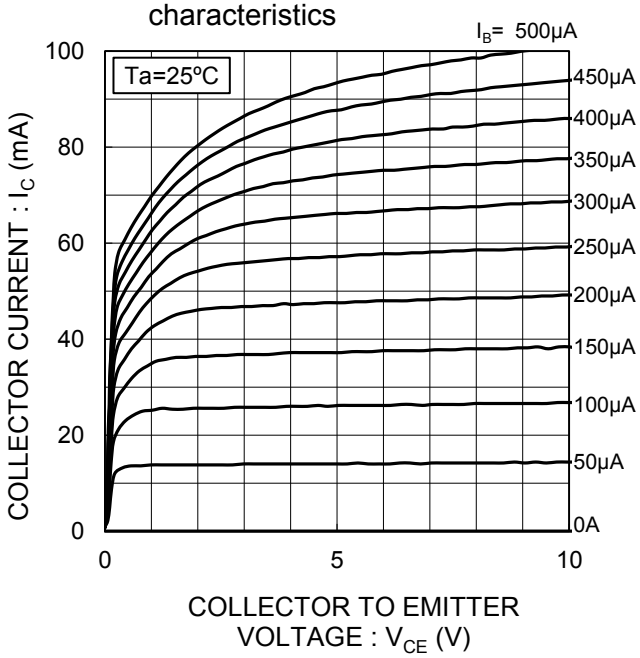


Fig.3 DC Current gain vs. Collector Current

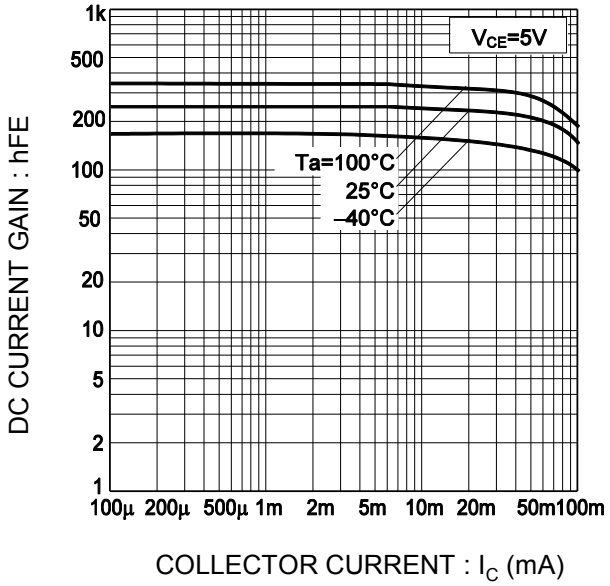
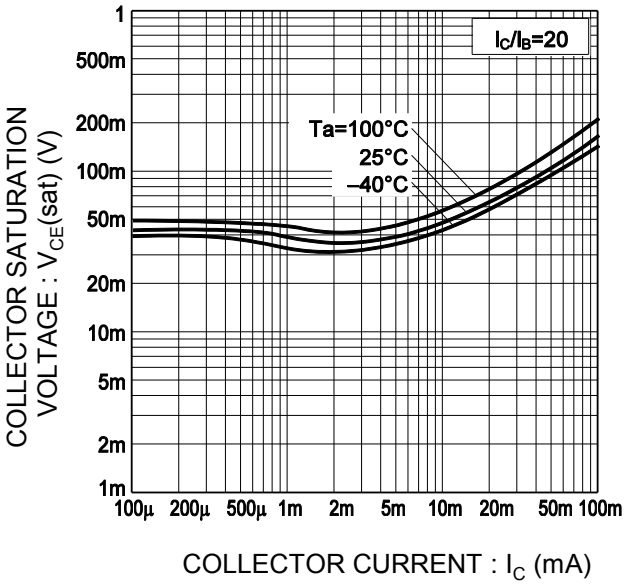
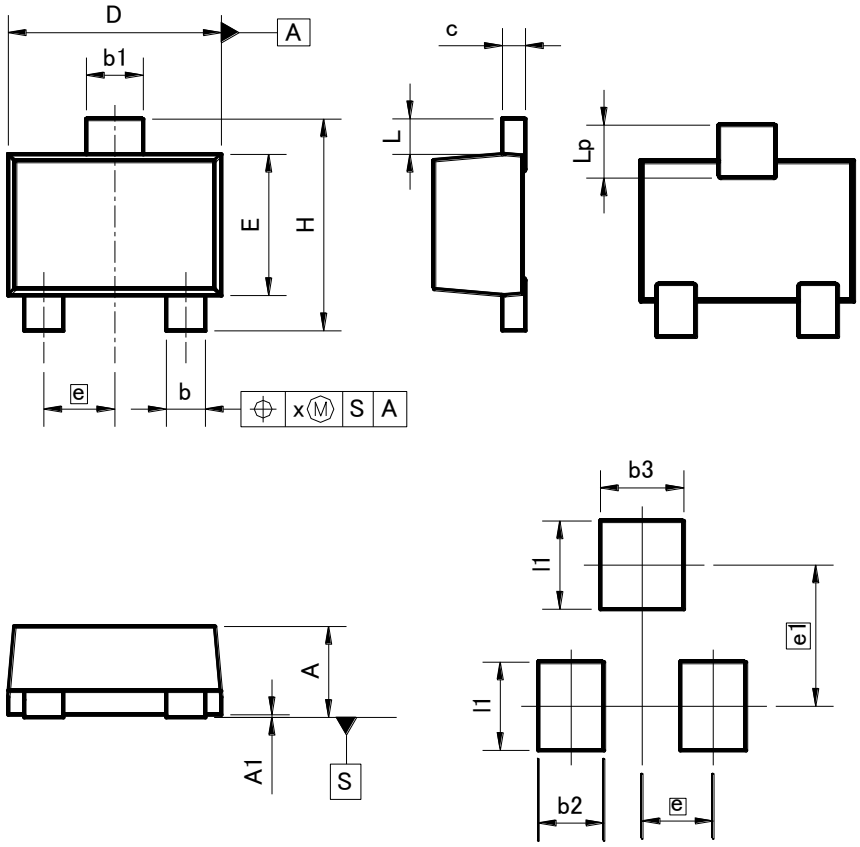


Fig.4 Collector-emitter saturation voltage vs. Collector Current



●**Dimensions** (Unit : mm)

VMT3



Patterm of terminal position areas

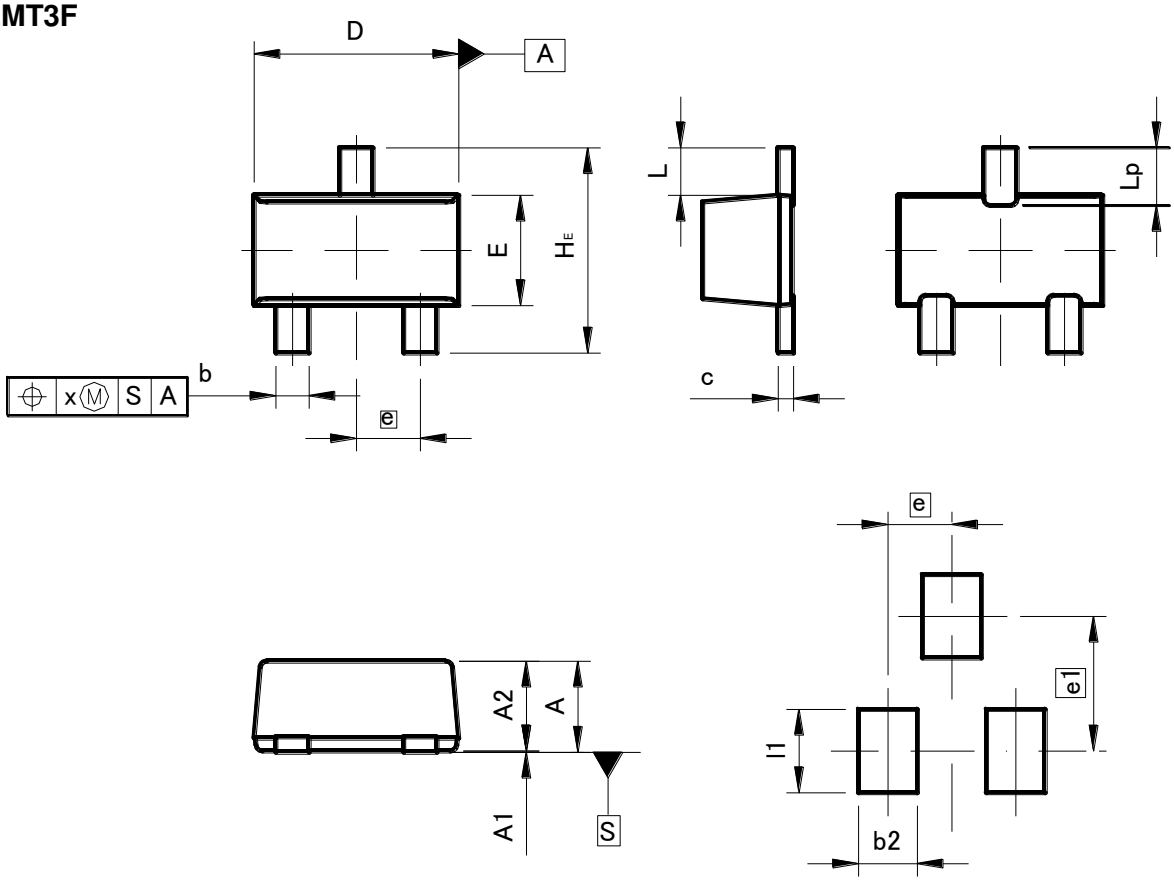
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.45	0.55	0.018	0.022
A1	0.00	0.10	0	0.004
b	0.17	0.27	0.007	0.011
b1	0.27	0.37	0.011	0.015
c	0.08	0.18	0.003	0.007
D	1.10	1.30	0.043	0.051
E	0.70	0.90	0.028	0.035
e	0.40		0.02	
HE	1.10	1.30	0.043	0.051
L	0.10	0.30	0.004	–
Lp	0.20	0.40	0.008	–
x	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
e1	0.80		0.03	
b2	–	0.37	–	0.015
b3	–	0.47	–	0.019
l1	–	0.50	–	0.02

Dimension in mm/inches

●**Dimensions** (Unit : mm)

EMT3F



Patterm of terminal position areas

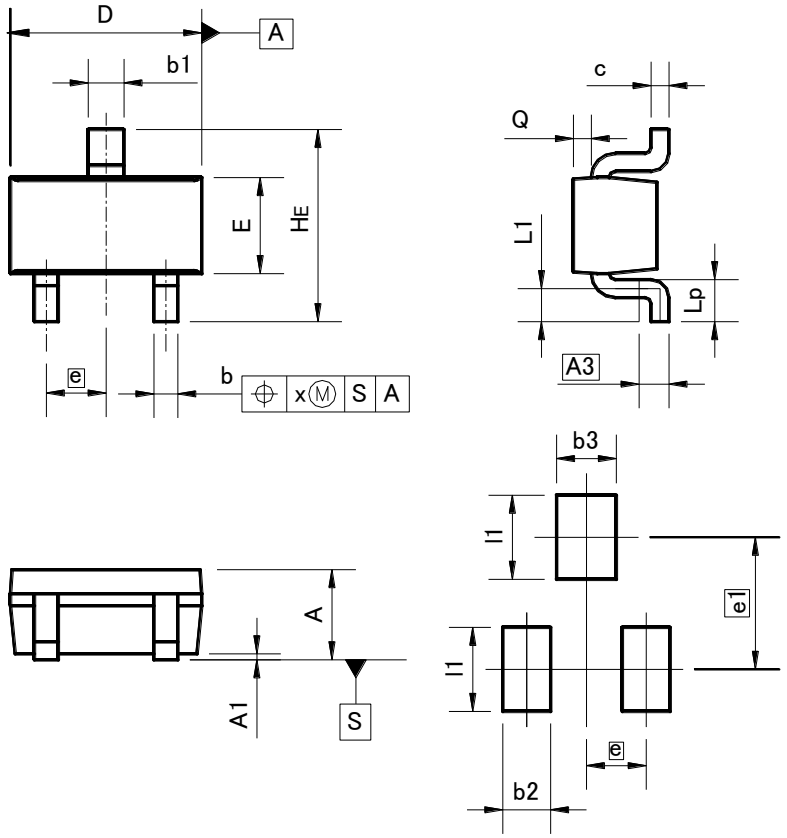
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.65	0.85		
A1	0.00	0.10	0	0.004
A2	0.60	0.80	0.024	0.031
b	0.21	0.36	0.008	0.014
c	0.08	0.18	0.003	0.007
D	1.50	1.70	0.059	0.067
E	0.76	0.96	0.03	0.038
e	0.50		0.02	
HE	1.50	1.70	0.059	0.067
L	0.37		0.015	
Lp	0.35	0.55	0.014	0.022
x	−	0.10	−	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
e1	−	1.05	−	0.041
b2	−	0.46	−	0.018
l1	−	0.65	−	0.026

Dimension in mm/inches

●**Dimensions** (Unit : mm)

EMT3



Patterm of terminal position areas

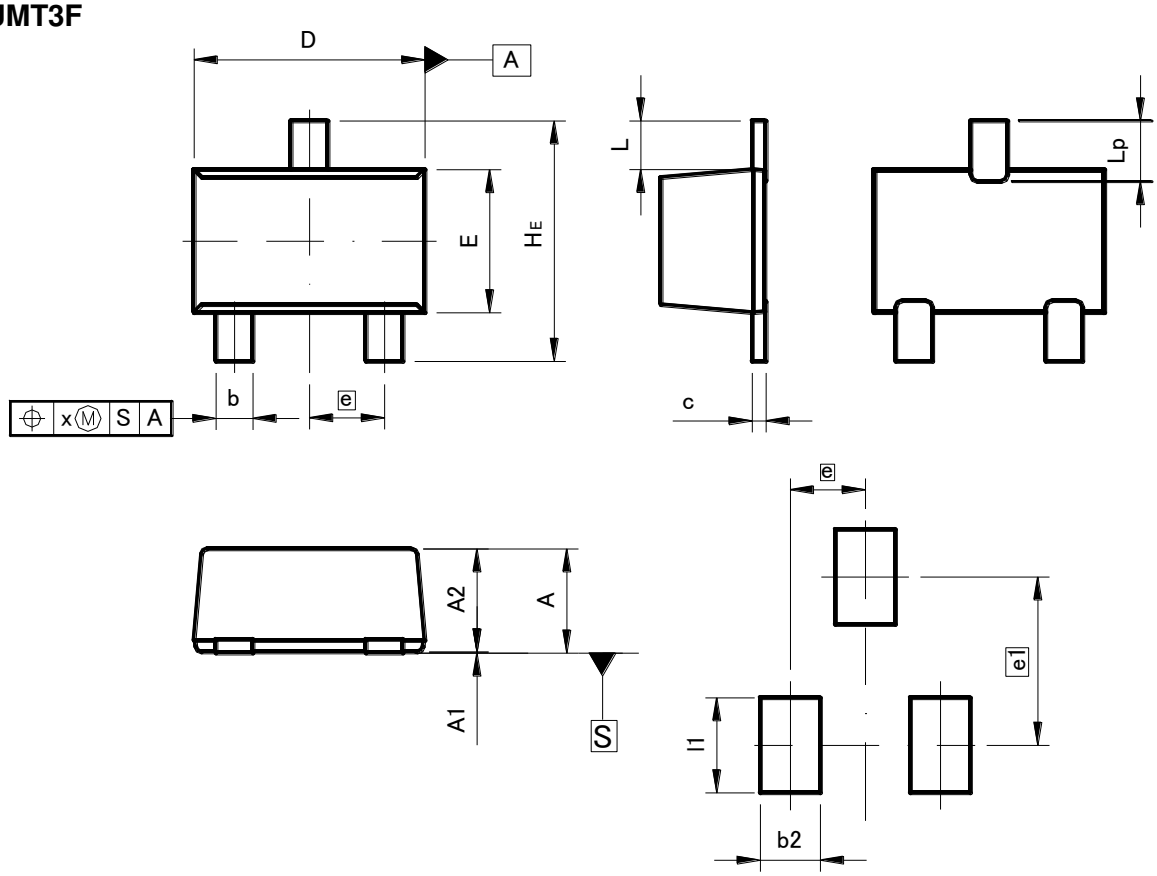
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.60	0.80	0.024	0.031
A1	0.00	0.10	0	0.004
A3	0.25		0.01	
b	0.15	0.30	0.006	0.012
b1	0.25	0.40	0.01	0.016
c	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
e	0.50		0.02	
HE	1.40	1.80	0.055	0.071
L1	0.10	–	0.004	–
Lp	0.15	–	0.006	–
Q	0.05	0.25	0.002	0.01
x	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
e1	1.10		0.04	
b2	–	0.40	–	0.016
b3	–	0.50	–	0.02
l1	–	0.70	–	0.028

Dimension in mm/inches

●**Dimensions** (Unit : mm)

UMT3F



Patterm of terminal position areas

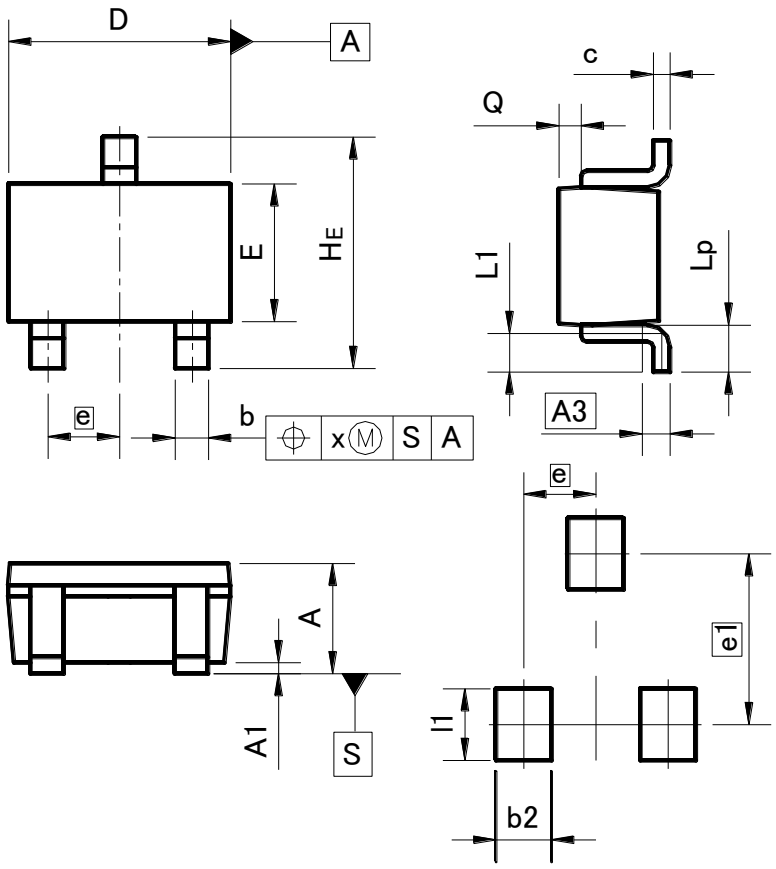
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.85	1.05	0.033	0.041
A1	0.00	0.10	0	0.004
A2	0.80	1.00	0.031	0.039
b	0.27	0.42	0.011	0.017
c	0.08	0.18	0.003	0.007
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.03	
HE	2.00	2.20	0.079	0.087
L	0.425		0.02	
Lp	0.43	0.63	0.017	0.025
x	−	0.10	−	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
e1	1.47		0.058	
b2	−	0.52	−	0.02
l1	−	0.83	−	0.033

Dimension in mm/inches

●**Dimensions** (Unit : mm)

UMT3



Patterm of terminal position areas

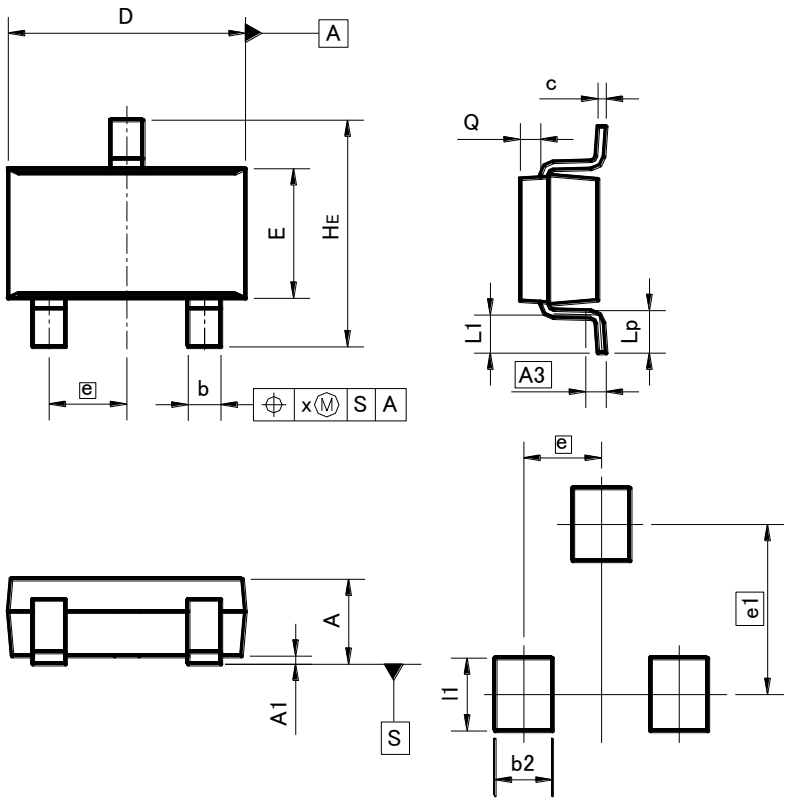
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.031	0.039
A1	0.00	0.10	0	0.004
A3	0.25		0.01	
b	0.15	0.30	0.006	0.012
c	0.10	0.20	0.004	0.008
D	1.90	2.10	0.075	0.083
E	1.15	1.35	0.045	0.053
e	0.65		0.03	
HE	2.00	2.20	0.079	0.087
L1	0.20	0.50	0.008	0.02
Lp	0.25	0.55	0.01	0.022
Q	0.10	0.30	0.004	0.012
x	−	0.10	−	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
e1	1.55		0.06	
b2	−	0.50	−	0.02
l1	−	0.65	−	0.026

Dimension in mm/inches

●**Dimensions** (Unit : mm)

SMT3



Patterm of terminal position areas

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.30	–	0.051
A1	0.00	0.10	0	0.004
A3	0.25		0.01	
b	0.35	0.50	0.014	0.02
c	0.09	0.25	0.004	0.01
D	2.80	3.00	0.11	0.118
E	1.50	1.80	0.059	0.071
e	0.95		0.04	
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	–	0.10	–	0.004
y	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
e1	2.10		0.08	
b2		0.60	–	0.024
l1	–	0.90	–	0.035

Dimension in mm/inches

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