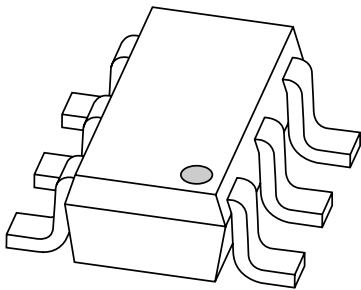


DATA SHEET



PBSS4140DPN

40 V low V_{CEsat} NPN/PNP
transistor

Product data sheet

2001 Dec 13

40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

FEATURES

- 600 mW total power dissipation
- Low collector-emitter saturation voltage
- High current capability
- Improved device reliability due to reduced heat generation
- Replaces two SOT23 packaged low V_{CEsat} transistors on same PCB area
- Reduces required PCB area
- Reduced pick and place costs.

APPLICATIONS

- General purpose switching and muting
- LCD backlighting
- Supply line switching circuits
- Battery driven equipment (mobile phones, video cameras and hand-held devices).

DESCRIPTION

NPN/PNP low V_{CEsat} transistor pair in an SC-74 (SOT457) plastic package.

MARKING

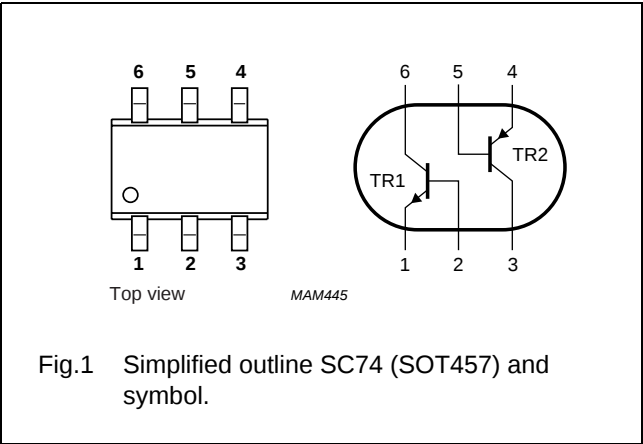
TYPE NUMBER	MARKING CODE
PBSS4140DPN	M2

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V_{CEO}	collector-emitter voltage	40	V
I_C	peak collector current	1	A
I_{CM}	peak collector current	2	A
TR1	NPN	–	–
TR2	PNP	–	–
R_{CEsat}	equivalent on-resistance	<500	m Ω

PINNING

PIN	DESCRIPTION	
1, 4	emitter	TR1; TR2
2, 5	base	TR1; TR2
6, 3	collector	TR1; TR2



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LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per transistor; for the PNP transistor with negative polarity					
V_{CBO}	collector-base voltage	open emitter	–	40	V
V_{CEO}	collector-emitter voltage	open base	–	40	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)		–	1	A
I_{CM}	peak collector current		–	2	A
I_{BM}	peak base current		–	1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	–	370	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C
Per device					
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	–	600	mW

Note

1. Device mounted on a printed-circuit board, single side copper, tinplated, mounting pad for collector 1 cm².

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; note 1	208	K/W

Note

1. Device mounted on a printed-circuit board, single side copper, tinplated, mounting pad for collector 1 cm².

40 V low V_{CEsat} NPN/PNP transistor

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CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

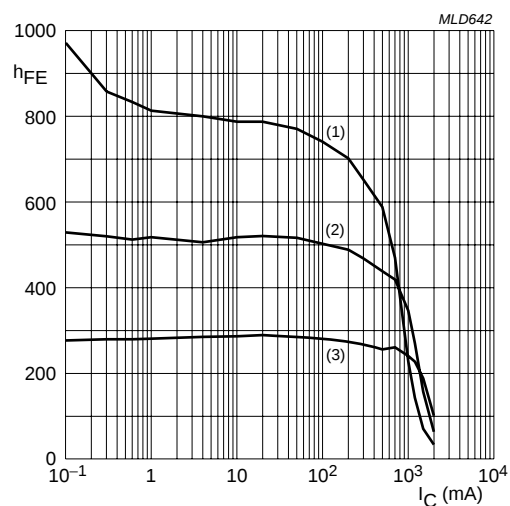
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor unless otherwise specified; for the PNP transistor with negative polarity						
I _{CBO}	collector-base cut-off current	V _{CB} = 40 V; I _E = 0	–	–	100	nA
		V _{CB} = 40 V; I _E = 0; T _j = 150 °C	–	–	50	μA
I _{CEO}	collector-emitter cut-off current	V _{CE} = 30 V; I _B = 0	–	–	100	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0	–	–	100	nA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 1 mA	300	–	–	
V _{CEsat}	collector-emitter saturation voltage	I _C = 100 mA; I _B = 1 mA	–	–	200	mV
		I _C = 500 mA; I _B = 50 mA	–	–	250	mV
		I _C = 1 A; I _B = 100 mA	–	–	500	mV
NPN transistor						
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 500 mA	300	–	900	
		V _{CE} = 5 V; I _C = 1 A	200	–	–	
V _{BEsat}	base-emitter saturation voltage	I _C = 1 A; I _B = 100 mA	–	–	1.2	V
V _{BEon}	base-emitter turn-on voltage	V _{CE} = 5 V; I _C = 1 A	–	–	1.1	V
R _{CEsat}	equivalent on-resistance	I _C = 500 mA; I _B = 50 mA; note 1	–	260	<500	mΩ
f _T	transition frequency	V _{CE} =10 V; I _C = 50 mA; f = 100 MHz	150	–	–	MHz
C _c	collector capacitance	V _{CB} = 10 V; I _E = I _e = 0; f = 1 MHz	–	–	10	pF
PNP transistor						
h _{FE}	DC current gain	V _{CE} = –5 V; I _C = –100 mA	300	–	800	
		V _{CE} = –5 V; I _C = –500 mA	250	–	–	
		V _{CE} = –5 V; I _C = –1 A	160	–	–	
V _{BEsat}	base-emitter saturation voltage	I _C = –1 A; I _B = –50 mA	–	–	–1.1	V
V _{BEon}	base-emitter turn-on voltage	V _{CE} = –5 V; I _C = –1 A	–	–	–1.0	V
R _{CEsat}	equivalent on-resistance	I _C = –500 mA; I _B –50 mA; note 1	–	300	<500	mΩ
f _T	transition frequency	V _{CE} = –10 V; I _C = –50 mA; f = 100 MHz	150	–	–	MHz
C _c	collector capacitance	V _{CB} = –10 V; I _E = I _e = 0; f =1 MHz	–	–	12	pF

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

40 V low V_{CEsat} NPN/PNP transistor

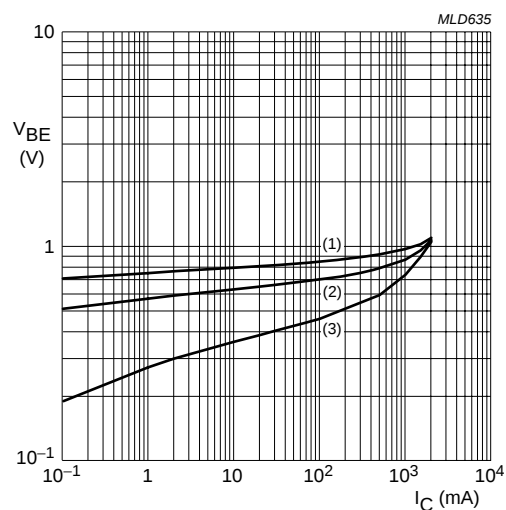
PBSS4140DPN



TR1 (NPN); $V_{CE} = 5$ V.

- (1) $T_{amb} = 150$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = -55$ °C.

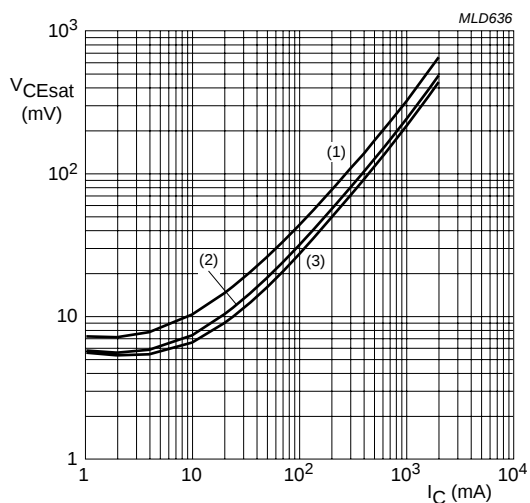
Fig.2 DC current gain as a function of collector current; typical values.



TR1 (NPN); $V_{CE} = 5$ V.

- (1) $T_{amb} = -55$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = 150$ °C.

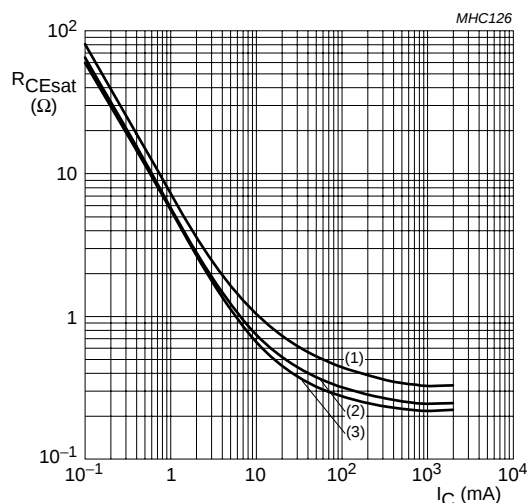
Fig.3 Base-emitter voltage as a function of collector current; typical values.



TR1 (NPN); $I_C/I_B = 10$.

- (1) $T_{amb} = 150$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = -55$ °C.

Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.



TR1 (NPN); $I_C/I_B = 10$.

- (1) $T_{amb} = 150$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = -55$ °C.

Fig.5 Equivalent on-resistance as a function of collector current; typical values.

40 V low V_{CEsat} NPN/PNP transistor

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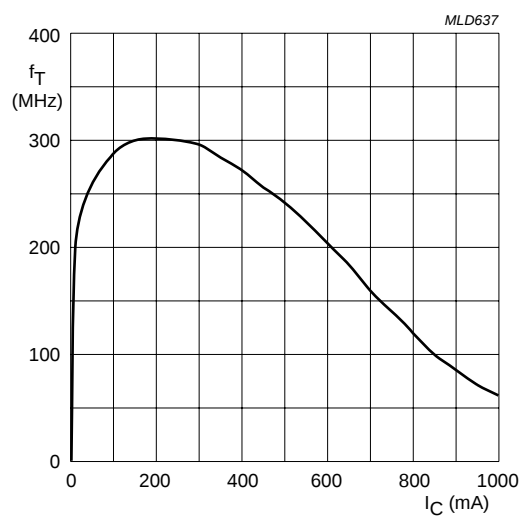
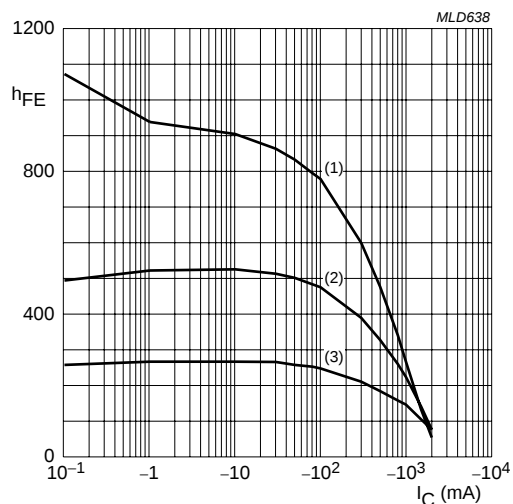
**TR1 (NPN);** $V_{CE} = 10$ V.

Fig.6 Transition frequency as a function of collector current; typical values.

40 V low V_{CEsat} NPN/PNP transistor

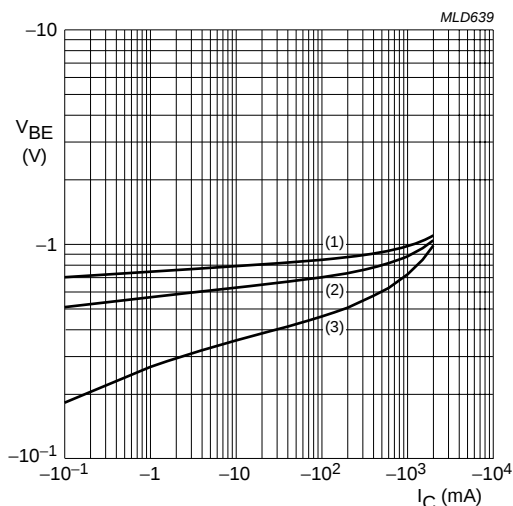
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TR2 (PNP); $V_{CE} = -5$ V.

- (1) $T_{amb} = 150$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = -55$ °C.

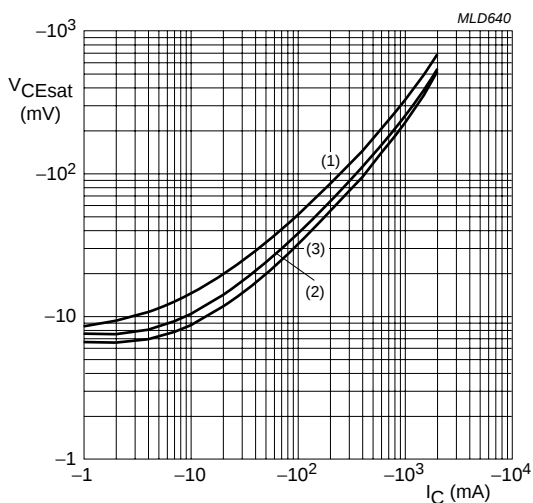
Fig.7 DC current gain as a function of collector current; typical values.



TR2 (PNP); $V_{CE} = -5$ V.

- (1) $T_{amb} = -55$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = 150$ °C.

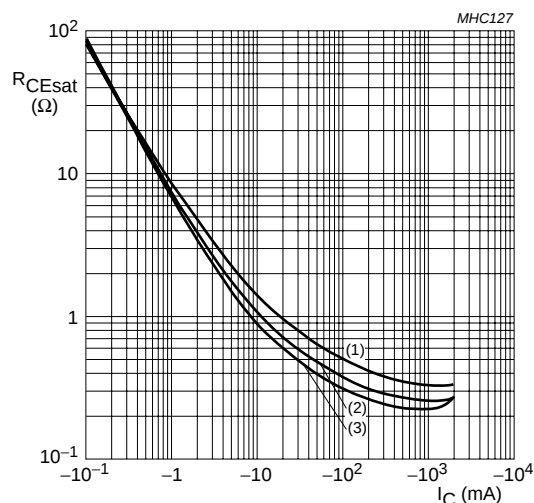
Fig.8 Base-emitter voltage as a function of collector current; typical values.



TR2 (PNP); $I_C/I_B = 10$.

- (1) $T_{amb} = 150$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = -55$ °C.

Fig.9 Collector-emitter saturation voltage as a function of collector current; typical values.



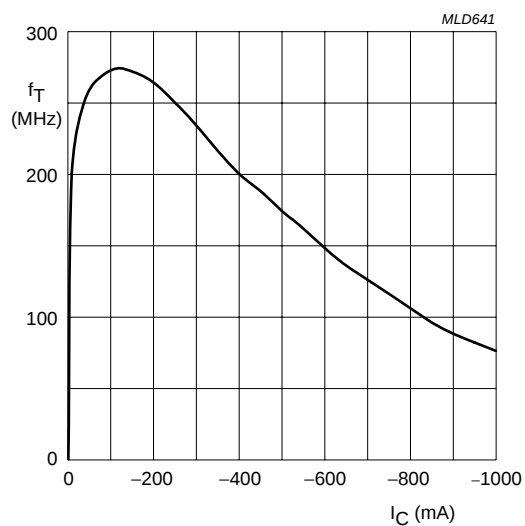
TR2 (PNP); $I_C/I_B = 10$.

- (1) $T_{amb} = 150$ °C.
- (2) $T_{amb} = 25$ °C.
- (3) $T_{amb} = -55$ °C.

Fig.10 Equivalent on-resistance as a function of collector current; typical values.

40 V low V_{CEsat} NPN/PNP transistor

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TR2 (PNP); $V_{CE} = -10$ V.

Fig.11 Transition frequency as a function of collector current; typical values.

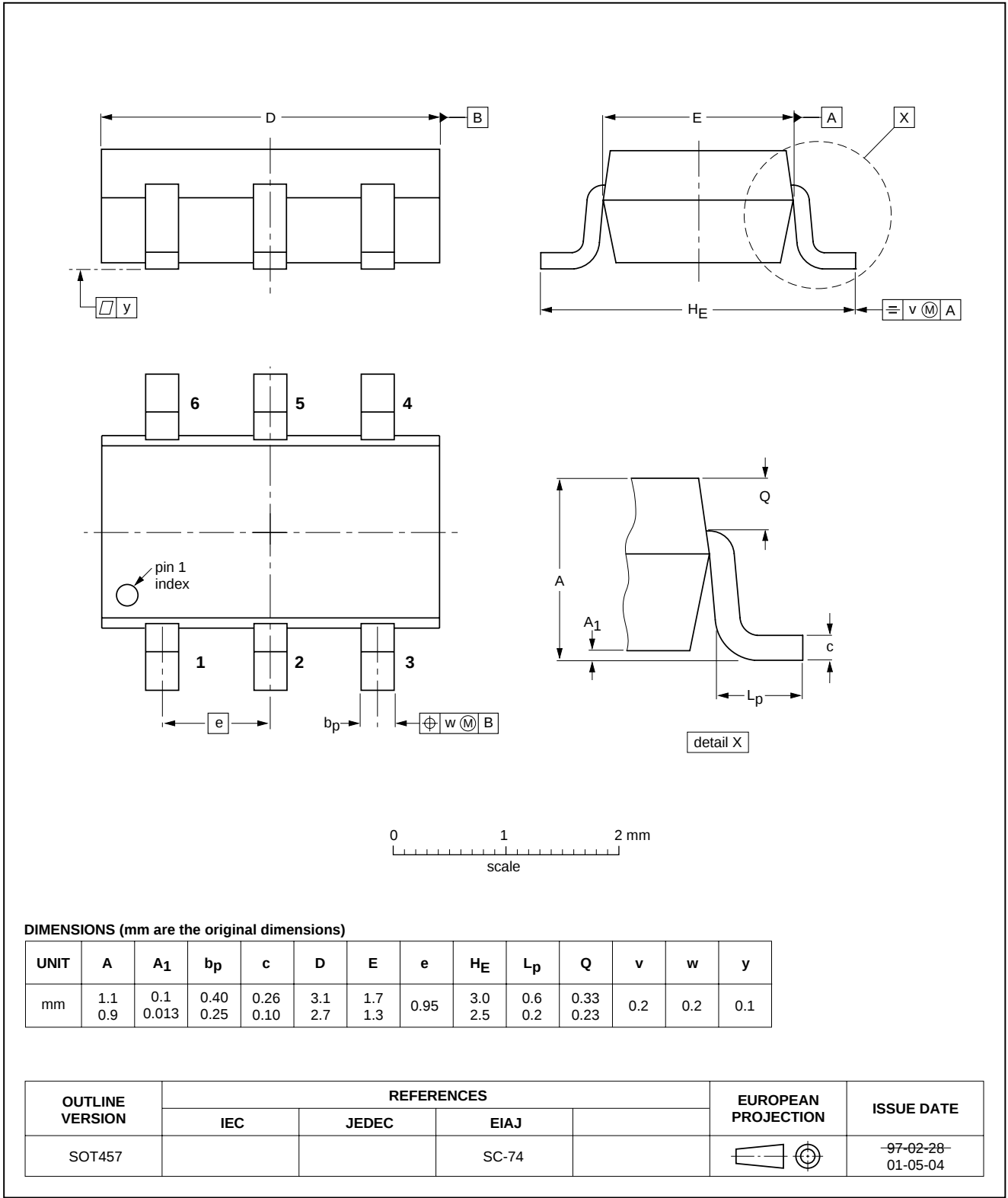
40 V low V_{CEsat} NPN/PNP transistor

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PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT457



40 V low V_{CEsat} NPN/PNP transistor

PBSS4140DPN

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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