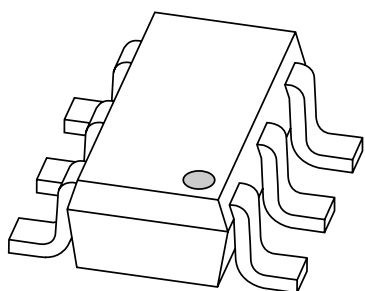


DATA SHEET



PBSS4240DPN 40 V low V_{CEsat} NPN/PNP transistor

Product specification

2003 Feb 20

40 V low V_{CEsat} NPN/PNP transistor

PBSS4240DPN

FEATURES

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High collector current gain h_{FE} at high I_C
- High efficiency leading to reduced heat generation
- Reduced printed-circuit board area requirements.

APPLICATIONS

- Power management:
 - Complementary MOSFET driver
 - Dual supply line switching.
- Peripheral driver:
 - Half and full bridge motor drivers
 - Multi-phase stepper motor driver.

DESCRIPTION

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

MARKING

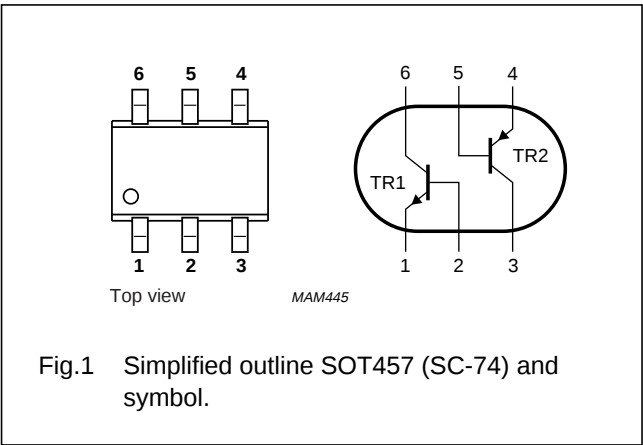
TYPE NUMBER	MARKING CODE
PBSS4240DPN	M3

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.		UNIT
		NPN	PNP	
V_{CEO}	emitter-collector voltage	40	−40	V
I_C	collector current (DC)	1.35	−1.1	A
I_{CRP}	repetitive peak collector current	2	−2	A
I_{CM}	peak collector current	3	−3	A
R_{CEsat}	equivalent on-resistance	200	260	mΩ

PINNING

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



40 V low V_{CEsat} NPN/PNP transistor

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per transistor unless otherwise specified; 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) NPN PNP		–		
			–	1.35	A
			–	–1.1	A
I_{CRP}	repetitive peak collector current	note 1	–	2	A
I_{CM}	peak collector current	single peak	–	3	A
I_B	base current (DC)		–	300	mA
I_{BM}	peak base current		–	1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 2	–	370	mW
		$T_{amb} \leq 25\text{ °C}$; note 3	–	310	mW
		$T_{amb} \leq 25\text{ °C}$; note 1	–	1.1	W
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 2	–	600	mW

Notes

1. Operated under pulsed conditions: duty cycle $\delta \leq 20\%$; pulse width $t_p \leq 10\text{ ms}$; mounting pad for collector standard footprint.
2. Device mounted on a printed-circuit board; single-sided copper; tinplated; mounting pad for collector 1 cm^2 .
3. Device mounted on a printed-circuit board; single-sided copper; tinplated; standard footprint.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
Per transistor				
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; note 1	340	K/W
		in free air; note 2	110	K/W

Notes

1. Device mounted on a printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm^2 .
2. Operated under pulsed conditions: pulse width $t_p \leq 10\text{ ms}$; duty cycle $\delta \leq 0.20$; mounting pad for collector standard footprint.

40 V low V_{CEsat} NPN/PNP transistor

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CHARACTERISTICS

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

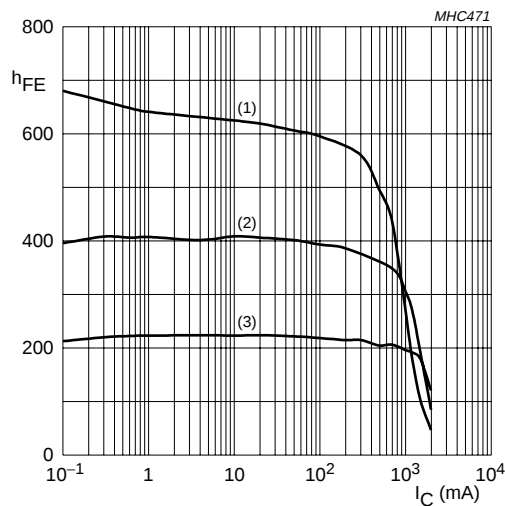
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transistor unless otherwise specified; for the PNP transistor with negative polarity						
I_{CBO}	collector-base cut-off current	$V_{CB} = 40\text{ V}; I_E = 0$	–	–	100	nA
		$V_{CB} = 40\text{ V}; I_E = 0; T_j = 150\text{ }^{\circ}\text{C}$	–	–	50	μA
I_{CEO}	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0$	–	–	100	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	–	–	100	nA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 1\text{ mA}$	300	–	–	
f_T	transition frequency	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V};$ $f = 100\text{ MHz}$	150	–	–	MHz
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0;$ $f = 1\text{ MHz}$	–	–	12	pF
TR1 (NPN)						
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 500\text{ mA}$	300	–	900	
		$V_{CE} = 5\text{ V}; I_C = 1\text{ A}$	200	–	–	
		$V_{CE} = 5\text{ V}; I_C = 2\text{ A}; \text{note 1}$	75	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 1\text{ mA}$	–	60	75	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	80	100	mV
		$I_C = 1\text{ A}; I_B = 100\text{ mA}$	–	150	200	mV
		$I_C = 2\text{ A}; I_B = 200\text{ mA}; \text{note 1}$	–	300	400	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	–	–	1.2	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = 5\text{ V}; I_C = 1\text{ A}$	–	–	1.1	V
R_{CEsat}	equivalent on-resistance	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	–	–	200	$\text{m}\Omega$
TR2 (PNP)						
h_{FE}	DC current gain	$V_{CE} = -5\text{ V}; I_C = -100\text{ mA}$	300	–	800	
		$V_{CE} = -5\text{ V}; I_C = -500\text{ mA}$	250	–	–	
		$V_{CE} = -5\text{ V}; I_C = -1\text{ A}$	160	–	–	
		$V_{CE} = -5\text{ V}; I_C = -2\text{ A}; \text{note 1}$	50	–	–	
V_{CEsat}	saturation voltage	$I_C = -100\text{ mA}; I_B = -1\text{ mA}$	–	-90	-120	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}$	–	-100	-145	mV
		$I_C = -1\text{ A}; I_B = -100\text{ mA}$	–	-180	-260	mV
		$I_C = -2\text{ A}; I_B = -200\text{ mA}; \text{note 1}$	–	-400	-530	mV
V_{BEsat}	saturation voltage	$I_C = -1\text{ A}; I_B = -50\text{ mA}$	–	–	-1.1	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = -5\text{ V}; I_C = -1\text{ A}$	–	–	-1	V
R_{CEsat}	equivalent on-resistance	$I_C = -1\text{ A}; I_B = -100\text{ mA}; \text{note 1}$	–	–	260	$\text{m}\Omega$

Note

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

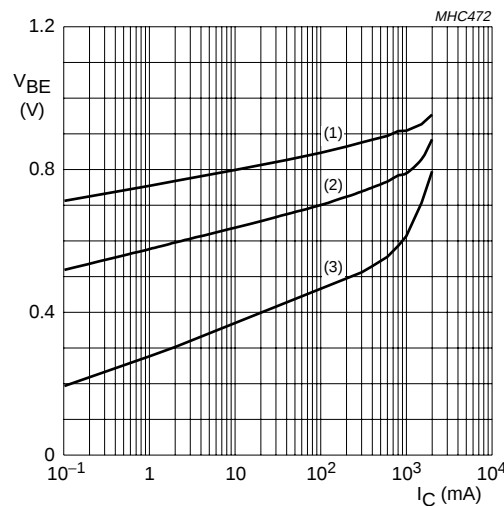
40 V low V_{CEsat} NPN/PNP transistor

PBSS4240DPN



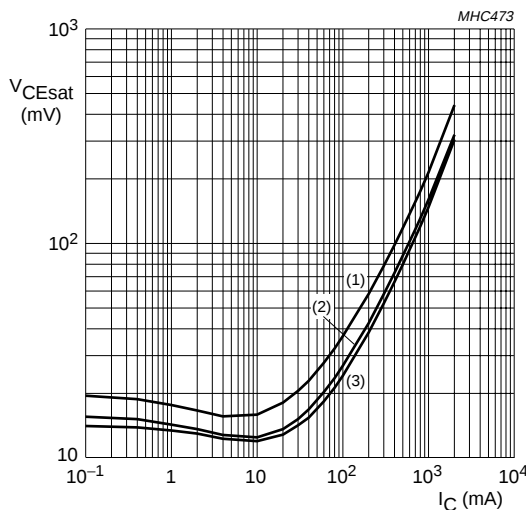
TR1 (NPN); $V_{CE} = 5\text{ V}$.
(1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.
(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
(3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

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



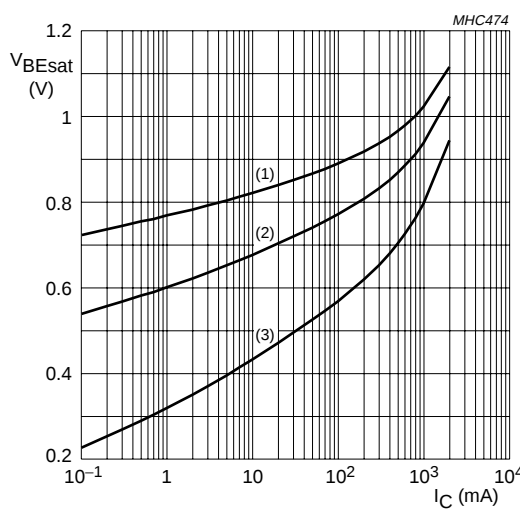
TR1 (NPN); $V_{CE} = 5\text{ V}$.
(1) $T_{amb} = -55\text{ }^{\circ}\text{C}$.
(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
(3) $T_{amb} = 150\text{ }^{\circ}\text{C}$.

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



TR1 (NPN); $I_C/I_B = 20$.
(1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.
(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
(3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

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

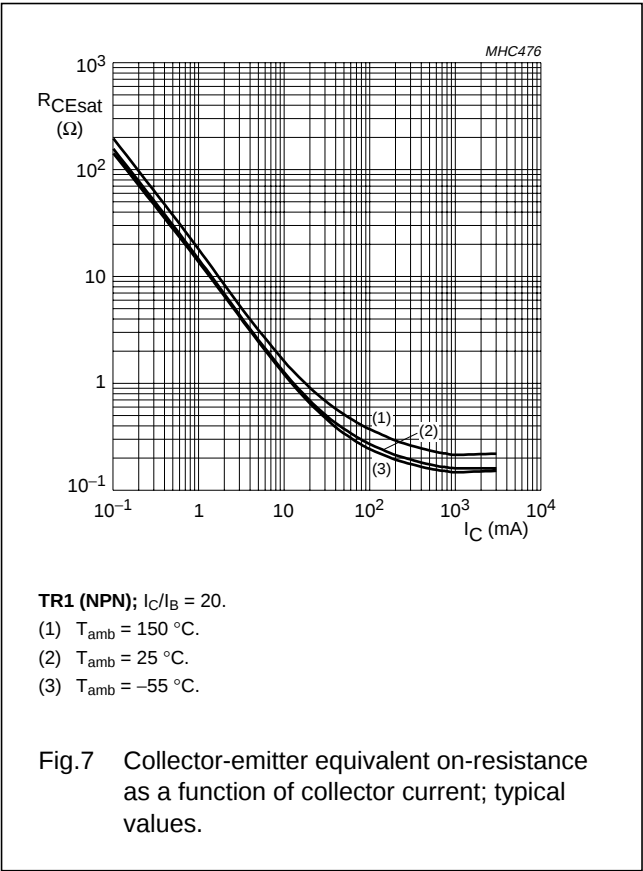
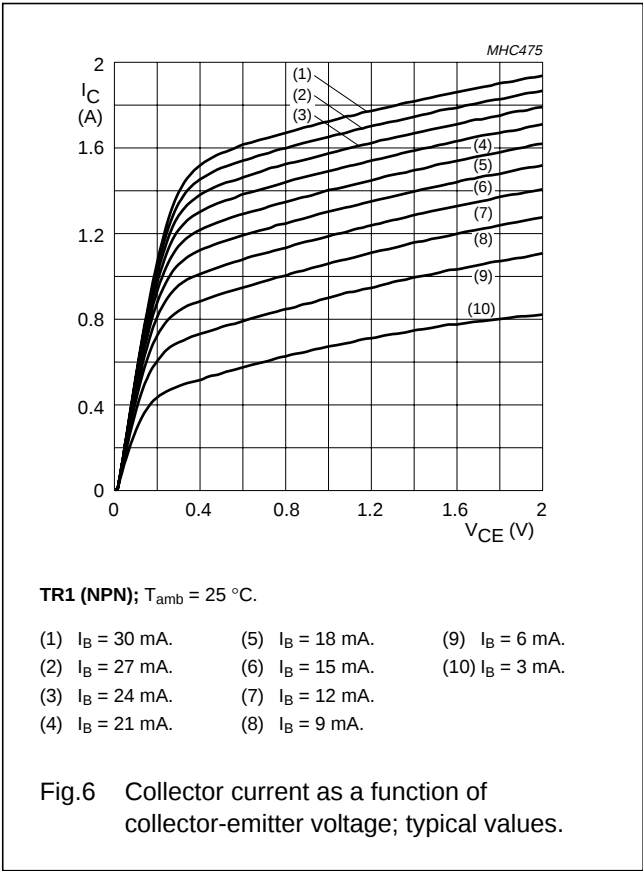


TR1 (NPN); $I_C/I_B = 20$.
(1) $T_{amb} = -55\text{ }^{\circ}\text{C}$.
(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.
(3) $T_{amb} = 150\text{ }^{\circ}\text{C}$.

Fig.5 Base-emitter saturation voltage as a function of collector current; typical values.

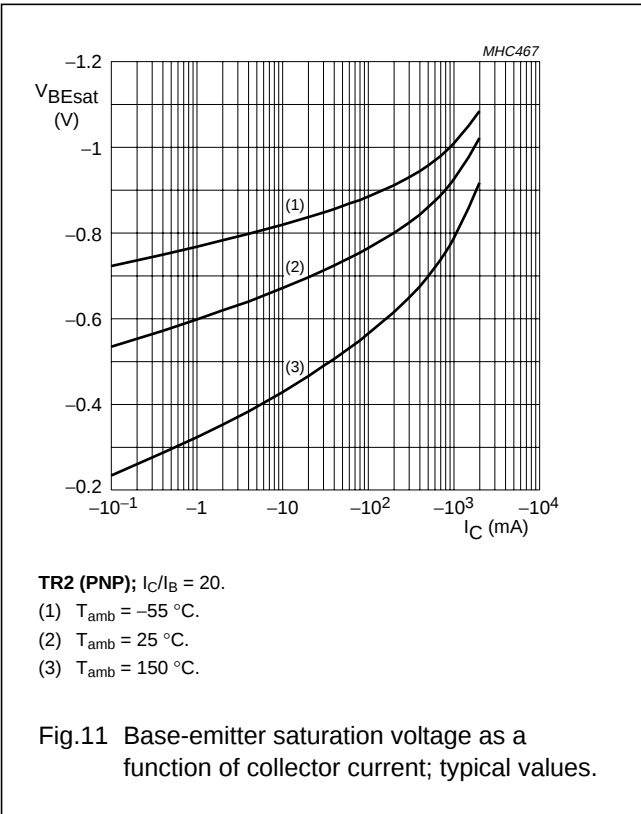
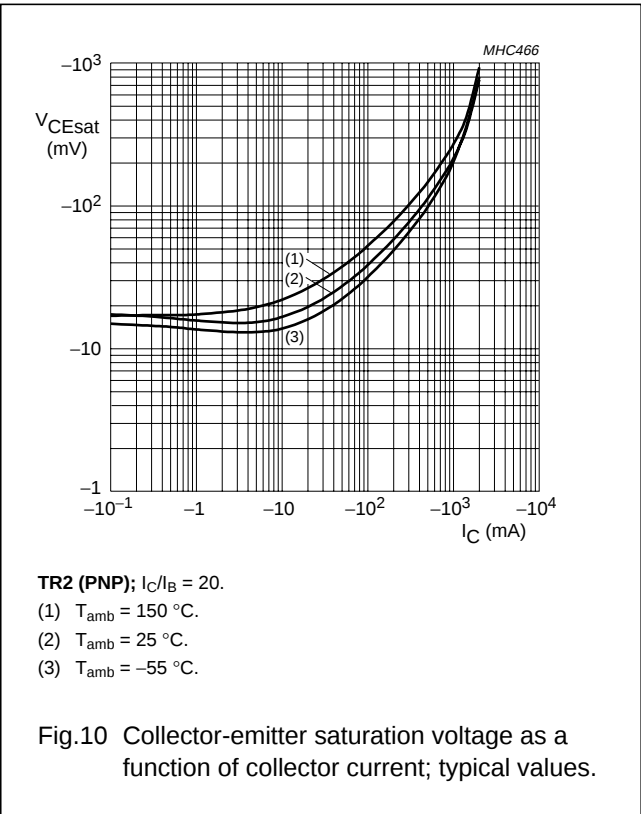
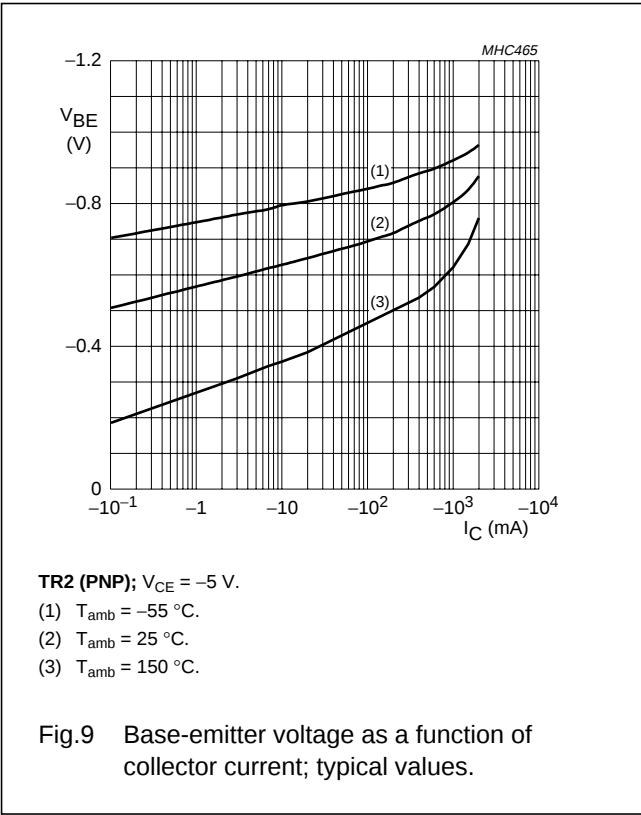
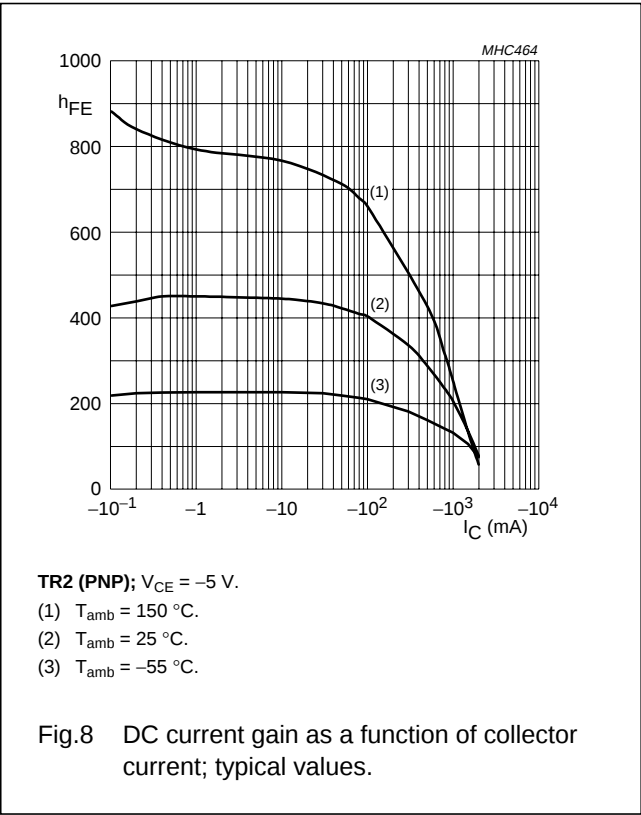
40 V low V_{CEsat} NPN/PNP transistor

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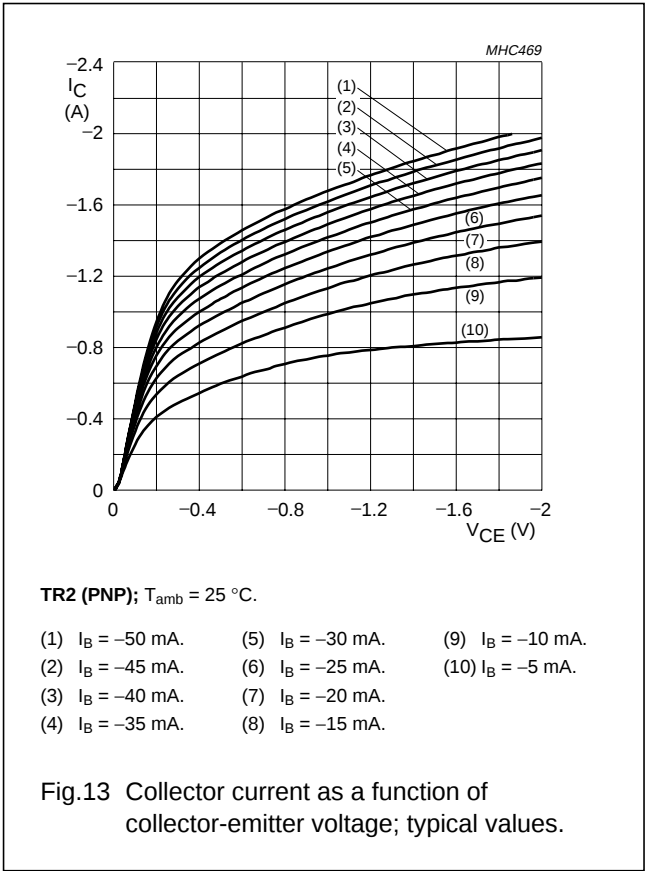
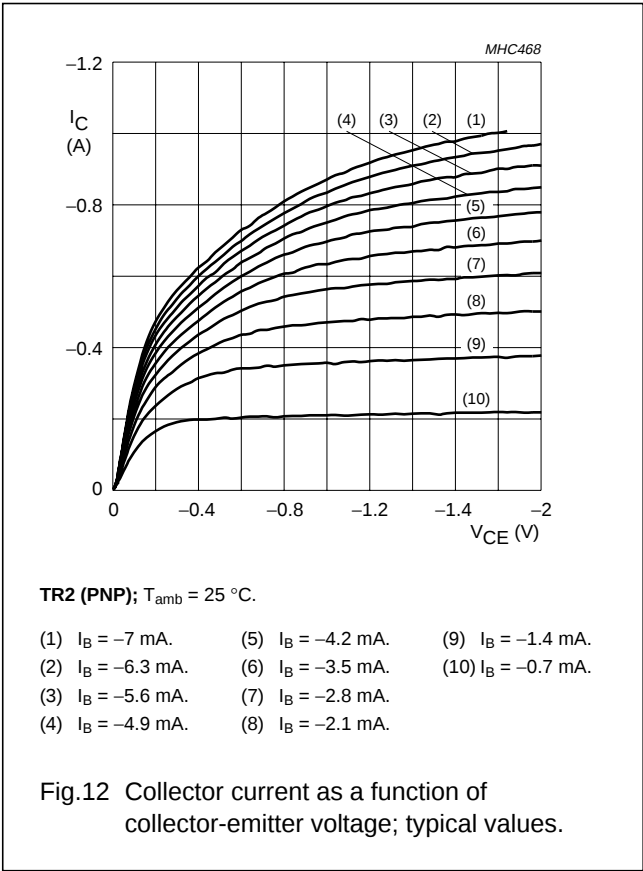
40 V low V_{CEsat} NPN/PNP transistor

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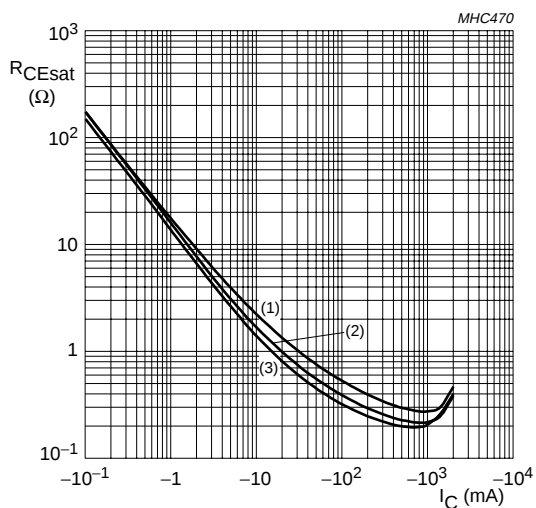
**TR2 (PNP);** $I_C/I_B = 20$.(1) $T_{amb} = 150\text{ }^{\circ}\text{C}$.(2) $T_{amb} = 25\text{ }^{\circ}\text{C}$.(3) $T_{amb} = -55\text{ }^{\circ}\text{C}$.

Fig.14 Collector-emitter equivalent on-resistance as a function of collector current; typical values.

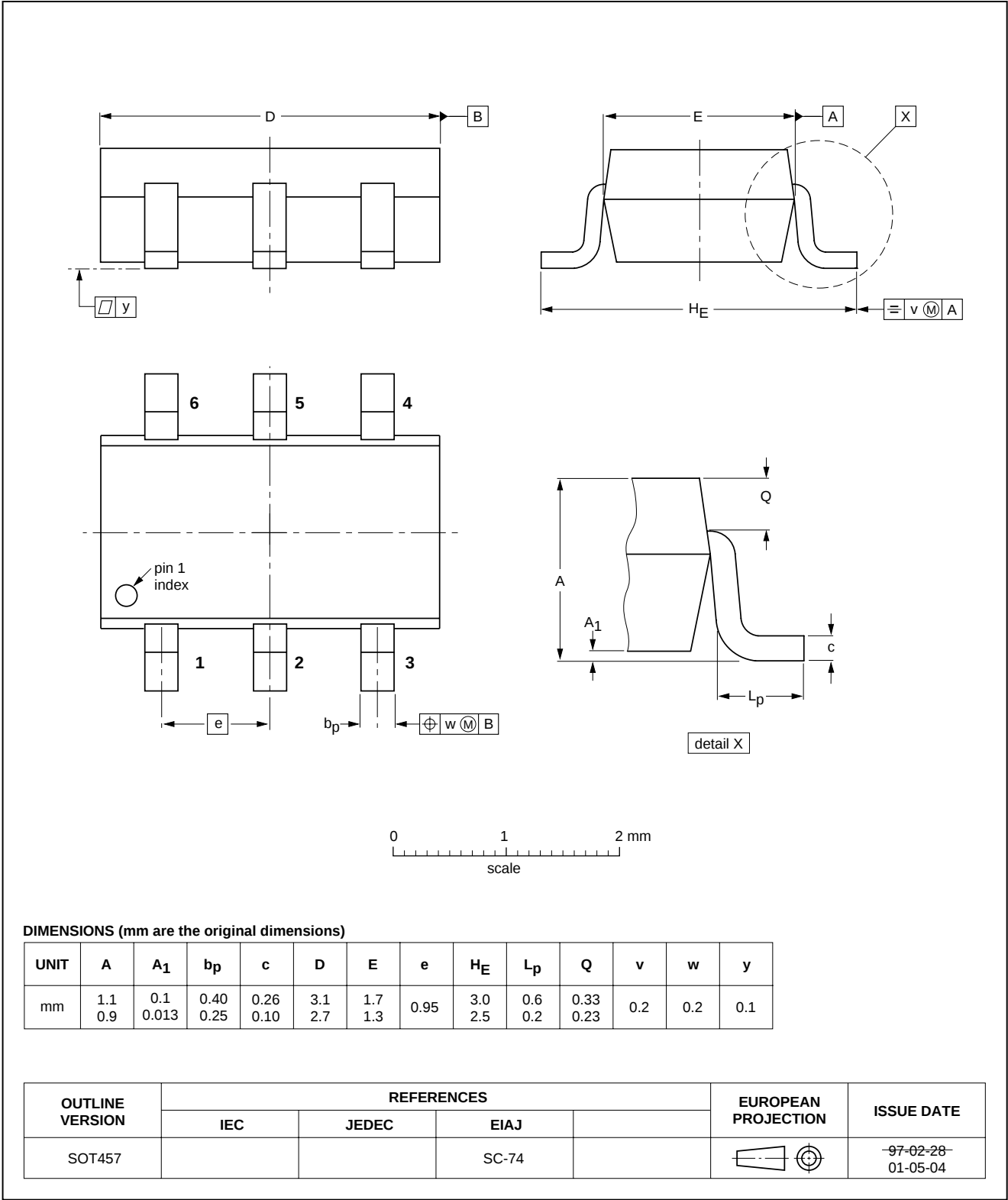
40 V low V_{CEsat} NPN/PNP transistor

PBSS4240DPN

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT457



40 V low V_{CEsat} NPN/PNP transistor

PBSS4240DPN

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
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