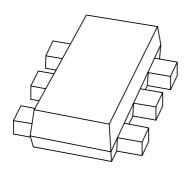
DISCRETE SEMICONDUCTORS

DATA SHEET



PEMD12 NPN/PNP resistor-equipped transistors

Product specification Supersedes data of 2001 Aug 30

2001 Nov 07





NPN/PNP resistor-equipped transistors

PEMD12

FEATURES

- 300 mW total power dissipation
- Very small 1.6 mm x 1.2 mm ultra thin package
- Excellent coplanarity due to straight leads
- Replaces two SC-75/SC-89 packaged transistors on same PCB area
- Reduces required PCB area
- Reduced pick and place costs.

APPLICATIONS

- · General purpose switching and amplification
- · Inverter and interface circuits
- · Circuit driver.

DESCRIPTION

NPN/PNP resistor-equipped transistor in a SOT666 plastic package.

MARKING

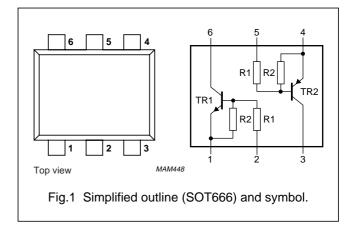
TYPE NUMBER	MARKING CODE
PEMD12	D2

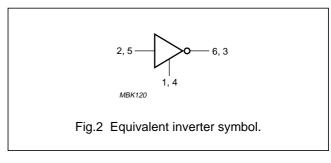
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
V _{CEO}	collector-emitter voltage	50	٧
I _{CM}	peak collector current	100	mA
R1	bias resistor	47	kΩ
R2	bias resistor	47	kΩ

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	_	50	V
V _{CEO}	collector-emitter voltage	open base	_	50	V
V _{EBO}	emitter-base voltage	open collector	_	10	V
VI	input voltage TR1				
	positive		_	+40	V
	negative		_	-10	V
	input voltage TR2				
	positive		_	+10	V
	negative		_	-40	V
Io	output current (DC)		_	100	mA
I _{CM}	peak collector current		_	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C; notes 1 and 2	_	200	mW
T _{stg}	storage temperature		-65	+150	°C
Tj	junction temperature		_	150	°C
T _{amb}	operating ambient temperature		-65	+150	°C
Per device					
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C; note 1	_	300	mW

Notes

- 1. Transistor mounted on an FR4 printed-circuit board.
- 2. The only recommended soldering is reflow soldering.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-a}	thermal resistance from junction to ambient	notes 1 and 2	416	K/W

Notes

- 1. Transistor mounted on an FR4 printed-circuit board.
- 2. The only recommended soldering is reflow soldering.

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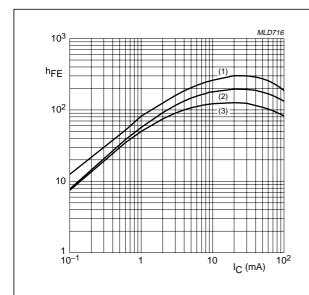
CHARACTERISTICS

 T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per transist	or for the PNP transistor with nega	tive polarity				
I _{CBO}	collector-base cut-off current	V _{CB} = 50 V; I _E = 0	_	_	100	nA
I _{CEO}	collector-emitter cut-off current	V _{CE} = 50 V; I _B = 0	_	_	1	μΑ
		$V_{CE} = 30 \text{ V}; I_{B} = 0; T_{j} = 150 ^{\circ}\text{C}$	_	_	50	μΑ
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0	_	_	90	μΑ
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 5 mA	80	_	_	
V _{CEsat}	saturation voltage	I _C = 10 mA; I _B = 0.5 mA	_	_	150	mV
V _{i(off)}	input off voltage	$V_{CE} = 5 \text{ V}; I_{C} = 100 \mu\text{A}$	_	1.2	0.8	V
V _{i(on)}	input on voltage	$V_{CE} = 0.3 \text{ V}; I_{C} = 2 \text{ mA}$	3	1.6	_	V
R ₁	input resistor		33	47	61	kΩ
R2	resistor ratio		0.8	1	1.2	
R1						
C _c	collector capacitance	$I_E = i_e = 0; V_{CB} = 10 V;$				
	TR1 (NPN)	f = 1 MHz	_	_	2.5	pF
	TR2 (PNP)		_	_	3	pF

NPN/PNP resistor-equipped transistors

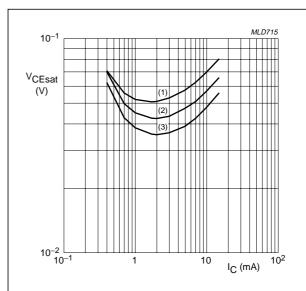
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TR1 (NPN); $V_{CE} = 5 \text{ V}.$

- (1) $T_{amb} = 150 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = -40 \, ^{\circ}C$.

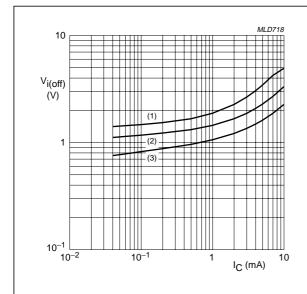
Fig.3 DC current gain as a function of collector current; typical values.



TR1 (NPN); $I_C/I_B = 20$.

- (1) $T_{amb} = 100 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = -40 \, ^{\circ}C$.

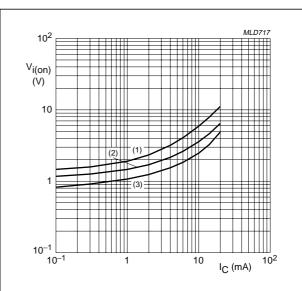
Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.



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

- (1) $T_{amb} = -40 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = 100 \, ^{\circ}C$.

Fig.5 Input-off voltage as a function of collector current; typical values.



TR1 (NPN); $V_{CE} = 0.3 \text{ V}.$

- (1) $T_{amb} = -40 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = 100 \, ^{\circ}C$.

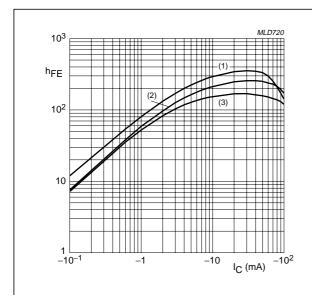
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Fig.6 Input-on voltage as a function of collector current; typical values.

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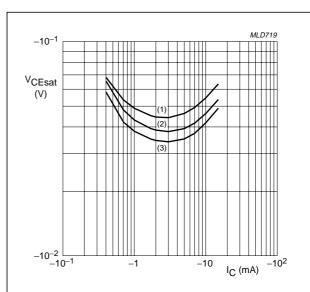
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TR2 (PNP); $V_{CE} = -5 \text{ V}.$

- (1) $T_{amb} = 150 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = -40 \, ^{\circ}C$.

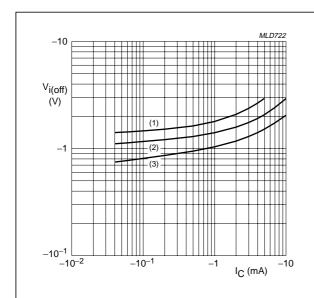
Fig.7 DC current gain as a function of collector current; typical values.



TR2 (PNP); $I_C/I_B = 20$.

- (1) $T_{amb} = 100 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = -40 \, ^{\circ}C$.

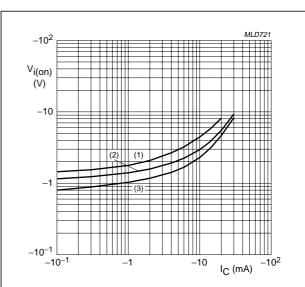
Fig.8 Collector-emitter saturation voltage as a function of collector current; typical values.



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

- (1) $T_{amb} = -40 \, ^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = 100 \, ^{\circ}C$.

Fig.9 Input-off voltage as a function of collector current; typical values.



TR2 (PNP); $V_{CE} = -0.3 \text{ V}.$

- (1) $T_{amb} = -40 \,^{\circ}C$.
- (2) $T_{amb} = 25 \, ^{\circ}C$.
- (3) $T_{amb} = 100 \, ^{\circ}C$.

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Fig.10 Input-on voltage as a function of collector current; typical values.

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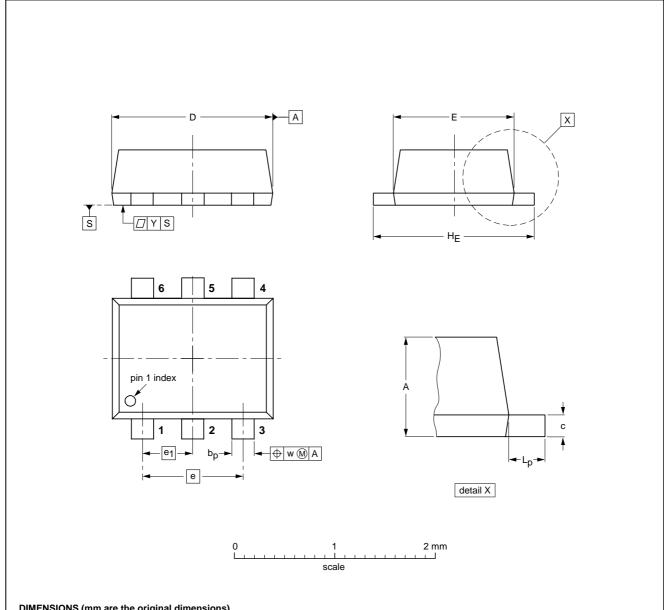
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PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT666



UNIT	A	bp	С	D	E	е	e ₁	HE	L _p	w	у
mm	0.6 0.5	0.27 0.17	0.18 0.08	1.7 1.5	1.3 1.1	1.0	0.5	1.7 1.5	0.3 0.1	0.1	0.1

OUTLINE	REFERENCES				EUROPEAN	ISSUE DATE	
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT666						-01-01-04 01-08-27	

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NOTES

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