

**NPN resistor-equipped transistors;  
R1 = 47 kΩ, R2 = 22 kΩ**
**PDTC144W series**
**FEATURES**

- Built-in bias resistors
- Simplified circuit design
- Reduction of component count
- Reduced pick and place costs.

**APPLICATIONS**

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

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V <sub>CEO</sub>	collector-emitter voltage	-	50	V
I <sub>O</sub>	output current (DC)	-	100	mA
R <sub>1</sub>	bias resistor	47	-	kΩ
R <sub>2</sub>	bias resistor	22	-	kΩ

**DESCRIPTION**

NPN resistor-equipped transistor (see "Simplified outline, symbol and pinning" for package details).

**PRODUCT OVERVIEW**

TYPE NUMBER	PACKAGE		MARKING CODE	PNP COMPLEMENT
	PHILIPS	EIAJ		
PDTC144WE	SOT416	SC-75	42	PDTA144WE
PDTC144WEF	SOT490	SC-89	34	PDTA144WEF
PDTC144WK	SOT346	SC-59	41	PDTA144WK
PDTC144WM	SOT883	SC-101	DD	PDTA144WM
PDTC144WS	SOT54 (TO-92)	SC-43	TC144W	PDTA144WS
PDTC144WT	SOT23	-	*20 <sup>(1)</sup>	PDTA144WT
PDTC144WU	SOT323	SC-70	*20 <sup>(1)</sup>	PDTA144WU

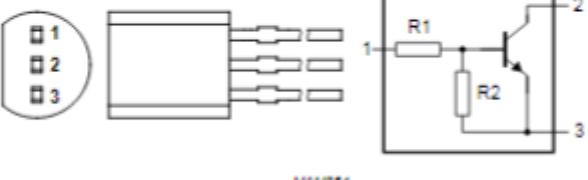
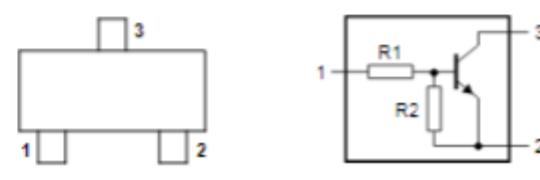
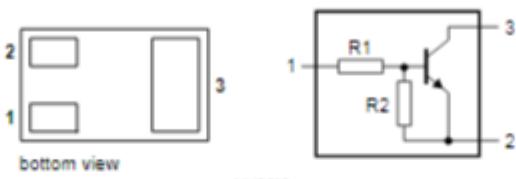
**Note**

1. \* = p: Made in Hong Kong.
- \* = t: Made in Malaysia.
- \* = W: Made in China.

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#### SIMPLIFIED OUTLINE, SYMBOL AND PINNING

TYPE NUMBER	SIMPLIFIED OUTLINE AND SYMBOL	PINNING	
		PIN	DESCRIPTION
PDTC144WS	 M41/254	1 2 3	base collector emitter
PDTC144WE PDTC144WEF PDTC144WK PDTC144WT PDTC144WU	 Top view M42/259	1 2 3	base emitter collector
PDTC144WM	 bottom view MHC605	1 2 3	base emitter collector

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## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PDTC144WE	-	plastic surface mounted package; 3 leads	SOT416
PDTC144WEF	-	plastic surface mounted package; 3 leads	SOT490
PDTC144WK	-	plastic surface mounted package; 3 leads	SOT346
PDTC144WM	-	leadless ultra small plastic package; 3 solder lands; body 1.0 × 0.6 × 0.5 mm	SOT883
PDTC144WS	-	plastic single-ended leaded (through hole) package; 3 leads	SOT54
PDTC144WT	-	plastic surface mounted package; 3 leads	SOT23
PDTC144WU	-	plastic surface mounted package; 3 leads	SOT323

## LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter	-	50	V
V <sub>CEO</sub>	collector-emitter voltage	open base	-	50	V
V <sub>EBO</sub>	emitter-base voltage	open collector	-	10	V
V <sub>i</sub>	input voltage positive negative		-	+40	V
I <sub>o</sub>	output current (DC)		-	100	mA
I <sub>CM</sub>	peak collector current		-	100	mA
P <sub>tot</sub>	total power dissipation SOT54 SOT23 SOT346 SOT323 SOT490 SOT883 SOT416	T <sub>amb</sub> ≤ 25 °C note 1 note 1 note 1 notes 1 and 2 notes 2 and 3 note 1	-	500 250 250 200 250 250 150	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C
T <sub>j</sub>	junction temperature		-	150	°C
T <sub>amb</sub>	operating ambient temperature		-65	+150	°C

## Notes

1. Refer to standard mounting conditions.
2. Reflow soldering is the only recommended soldering method.
3. Refer to SOT883 standard mounting conditions; FR4 with 60 µm copper strip line.

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 $R_1 = 47 \text{ k}\Omega$ ,  $R_2 = 22 \text{ k}\Omega$

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		
		note 1	250	K/W
		note 1	500	K/W
		note 1	500	K/W
		note 1	625	K/W
		notes 1 and 2	500	K/W
		notes 2 and 3	500	K/W
	SOT416	note 1	833	K/W

## Notes

- Refer to standard mounting conditions.
- Reflow soldering is the only recommended soldering method.
- Refer to SOT883 standard mounting conditions; FR4 with 60  $\mu\text{m}$  copper strip line.

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 50 \text{ V}; I_E = 0 \text{ A}$	-	-	100	nA
$I_{CEO}$	collector-emitter cut-off current	$V_{CE} = 30 \text{ V}; I_B = 0 \text{ A}$	-	-	1	$\mu\text{A}$
		$V_{CE} = 30 \text{ V}; I_B = 0 \text{ A}; T_j = 150^\circ\text{C}$	-	-	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5 \text{ V}; I_C = 0 \text{ A}$	-	-	110	$\mu\text{A}$
$h_{FE}$	DC current gain	$V_{CE} = 5 \text{ V}; I_C = 5 \text{ mA}$	60	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10 \text{ mA}; I_B = 0.5 \text{ mA}$	-	-	150	mV
$V_{i(off)}$	input-off voltage	$I_C = 100 \mu\text{A}; V_{CE} = 5 \text{ V}$	-	1.7	1.2	V
$V_{i(on)}$	input-on voltage	$I_C = 2 \text{ mA}; V_{CE} = 0.3 \text{ V}$	4	2.7	-	V
$R_1$	input resistor		33	47	61	k $\Omega$
$\frac{R_2}{R_1}$	resistor ratio		0.37	0.47	0.57	
$C_c$	collector capacitance	$I_E = i_e = 0 \text{ A}; V_{CB} = 10 \text{ V}; f = 1 \text{ MHz}$	-	-	2.5	pF