

## BDW42\* - NPN, BDW46, BDW47\* - PNP

### Darlington Complementary Silicon Power Transistors

This series of plastic, medium-power silicon NPN and PNP Darlington transistors are designed for general purpose and low speed switching applications.

#### Features

- High DC Current Gain -  $h_{FE} = 2500$  (typ) @  $I_C = 5.0$  Adc.
- Collector Emitter Sustaining Voltage @ 30 mAdc:  
 $V_{CE(sus)} = 80$  Vdc (min) - BDW46  
100 Vdc (min.) - BDW42/BDW47
- Low Collector Emitter Saturation Voltage  
 $V_{CE(sat)} = 2.0$  Vdc (max) @  $I_C = 5.0$  Adc  
3.0 Vdc (max) @  $I_C = 10.0$  Adc
- Monolithic Construction with Built-In Base Emitter Shunt resistors
- TO-220AB Compact Package

#### MAXIMUM RATINGS

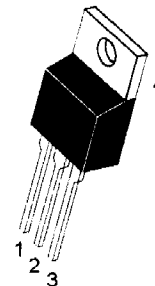
Rating	Symbol	Value	Unit
Collector-Emitter Voltage BDW46 BDW42, BDW47	$V_{CEO}$	80 100	Vdc
Collector-Base Voltage BDW46 BDW42, BDW47	$V_{CB}$	80 100	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0	Vdc
Collector Current	$I_C$	15	Adc
Base Current	$I_B$	0.5	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	85 0.68	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

#### THERMAL CHARACTERISTICS

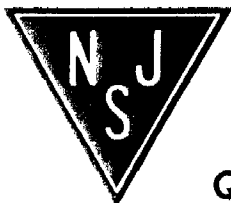
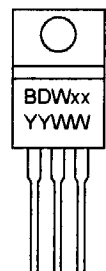
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.47	$^\circ\text{C/W}$

### 15 A DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS 80-100 V, 85 W



TO-220AB

#### MARKING DIAGRAM



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

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### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

Collector Emitter Sustaining Voltage (Note 1) ( $I_C = 30 \text{ mAdc}$ , $I_B = 0$ )	BDW46 BDW42/BDW47	$V_{CEO(sus)}$	80 100	- -	Vdc
Collector Cutoff Current ( $V_{CE} = 40 \text{ Vdc}$ , $I_B = 0$ ) ( $V_{CE} = 50 \text{ Vdc}$ , $I_B = 0$ )	BDW46 BDW42/BDW47	$I_{CEO}$	- -	2.0 2.0	mAdc
Collector Cutoff Current ( $V_{CB} = 80 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 100 \text{ Vdc}$ , $I_E = 0$ )	BDW46 BDW42/BDW47	$I_{CBO}$	- -	1.0 1.0	mAdc
Emitter Cutoff Current ( $V_{BE} = 5.0 \text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	-	2.0	mAdc

#### ON CHARACTERISTICS (Note 1)

DC Current Gain ( $I_C = 5.0 \text{ Adc}$ , $V_{CE} = 4.0 \text{ Vdc}$ ) ( $I_C = 10 \text{ Adc}$ , $V_{CE} = 4.0 \text{ Vdc}$ )	$h_{FE}$	1000 250	- -	
Collector-Emitter Saturation Voltage ( $I_C = 5.0 \text{ Adc}$ , $I_B = 10 \text{ mAdc}$ ) ( $I_C = 10 \text{ Adc}$ , $I_B = 50 \text{ mAdc}$ )	$V_{CE(sat)}$	- -	2.0 3.0	Vdc
Base-Emitter On Voltage ( $I_C = 10 \text{ Adc}$ , $V_{CE} = 4.0 \text{ Vdc}$ )	$V_{BE(on)}$	-	3.0	Vdc

#### SECOND BREAKDOWN (Note 2)

Second Breakdown Collector Current with Base Forward Biased BDW42	$I_{S/b}$	3.0	-	Adc
		$V_{CE} = 28.4 \text{ Vdc}$	-	
		$V_{CE} = 40 \text{ Vdc}$	-	
BDW46/BDW47		$V_{CE} = 22.5 \text{ Vdc}$	-	
		$V_{CE} = 36 \text{ Vdc}$	-	

#### DYNAMIC CHARACTERISTICS

Magnitude of common emitter small signal short circuit current transfer ratio ( $I_C = 3.0 \text{ Adc}$ , $V_{CE} = 3.0 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$ )	$f_T$	4.0	-	MHz
Output Capacitance ( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 0.1 \text{ MHz}$ )	$C_{ob}$	-	200 300	pF
		BDW42	-	
		BDW46/BDW47	-	
Small-Signal Current Gain ( $I_C = 3.0 \text{ Adc}$ , $V_{CE} = 3.0 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$ )	$h_{fe}$	300	-	

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle = 2.0%.
2. Pulse Test non repetitive: Pulse Width = 250 ms.