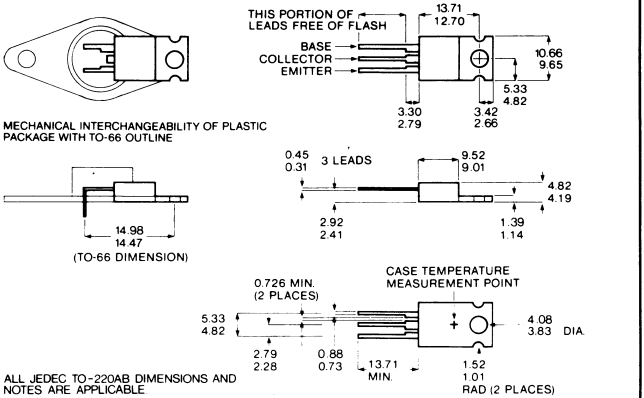
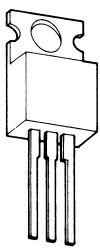
- High SOA Capability, 40 V and 1 A
- 40 W at 25 °C Case Temperature
- 4 A Rated Collector Current
- Min h_{FE} of 750 @ 1.5 A/3 V
- 25 mJ Reverse Energy Rating

mechanical data

THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB



ALL DIMENSIONS ARE IN MILLIMETRES



absolute maximum ratings at 25 °C case temperature (unless otherwise noted)

	NPN BDW53 PNP BDW54	BDW53A BDW54A	BDW53B BDW54B	BDW53C BDW54C	BDW53D BDW54D
Collector-Base Voltage	45 V	60 V	80 V	100 V	120 V
Collector-Emitter Voltage (See Note 1)	45 V	60 V	80 V	100 V	120 V
Emitter-Base Voltage	5 V				
Continuous Collector Current	4 A				
Continuous Base Current	50 mA				
Continuous Device Dissipation at 25 °C Case Temperature (See Note 2)	40 W				
Continuous Device Dissipation at 25 °C Free Air Temperature (See Note 3)	2 W				
Unclamped Inductive Load Energy (See Note 4)	25 mJ				
Operating Ambient Temperature Range	−65 °C to 150 °C				
Operating Collector Junction Temperature Range	−65 °C to 150 °C				
Storage Temperature Range	−65 °C to 150 °C				

NOTES: 1. These values apply when the base-emitter diode is open circuited
2. Derate linearly to 150 °C Case Temperature at the rate of 0.32 W/°C
3. Derate linearly to 150 °C Free-Air Temperature at the rate of 16 mW/°C
4. This rating is based on the capability of the transistor to operate safely in a circuit of: L = 20 mH, R_{BB2} = 100 Ω, V_{BB2} = 0 V, R_S = 0.1 Ω, V_{CC} = 20 V, Energy ≈ $I_C^2 \cdot L/2$.

electrical characteristics at 25 °C case temperature

PARAMETER		TEST CONDITIONS		BDW53 BDW54		BDW53A BDW54A		BDW53B BDW54B		BDW53C BDW54C		BDW53D BDW54D		UNITS
				Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 30 mA, (See Note 5)	I_B = 0	45		60		80		100		120		V
I_{CEO}	Collector Cutoff Current	V_{CE} = 30 V,	I_B = 0		500		500							μA
		V_{CE} = 40 V,	I_B = 0						500					
		V_{CE} = 50 V,	I_B = 0								500			
		V_{CE} = 60 V,	I_B = 0										500	
I_{CBO}	Collector Cutoff Current	V_{CB} = 45 V,	I_E = 0		200									μA
		V_{CB} = 60 V,	I_E = 0				200							
		V_{CB} = 80 V,	I_E = 0						200					
		V_{CB} = 100 V,	I_E = 0								200			
		V_{CB} = 120 V,	I_E = 0										200	
I_{CBO}	T_C = 150 °C	45/60/80/100/120 V			5		5		5		5		5	mA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5 V,	I_C = 0		2		2		2		2		2	mA
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 3 V,	I_C = 1.5 A	750	20000	750	20000	750	20000	750	20000	750	20000	
		V_{CE} = 3 V, (See Notes 5 & 6)	I_C = 4 A	100		100		100		100		100		
$V_{BE(ON)}$	Base-Emitter Voltage	V_{CE} = 3 V, (See Notes 5 & 6)	I_C = 1.5 A		2.5		2.5		2.5		2.5		2.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 1.5 A,	I_B = 30 mA		2.5		2.5		2.5		2.5		2.5	V
		I_C = 4 A, (See Notes 5 & 6)	I_B = 40 mA		4		4		4		4		4	V
V_{FR}	Forward Voltage of Reverse Diode	$-I_C$ = 4A			3.5		3.5		3.5		3.5		3.5	V

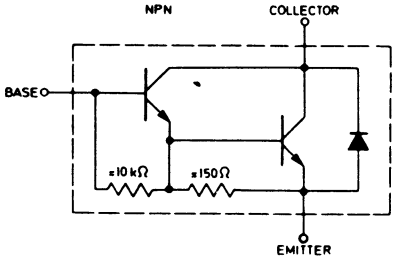
thermal characteristics

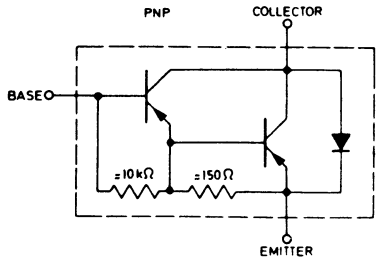
	PARAMETER	Max	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance (See Note 7)	3.125	°C/W
$R_{\theta JA}$	Junction-to-Free-Air Thermal Resistance	62.0	°C/W

switching characteristics at 25 °C case temperature

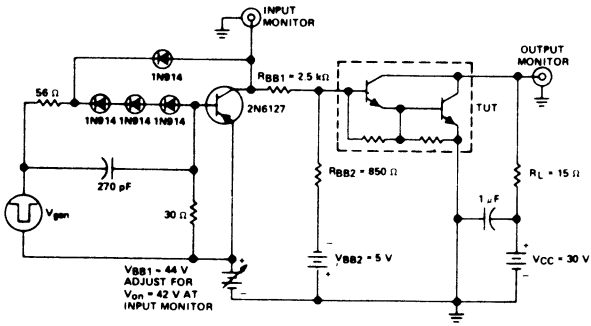
	PARAMETER	TEST CONDITIONS	Typ	UNIT
t_{ON}	Turn-On Time	I_C = 2 A, $I_{B(1)}$ = 8 mA, $I_{B(2)}$ = −8)	1.0	μs
t_{OFF}	Turn-Off Time	$V_{BE(off)}$ = −5 V, R_L = 15 Ω	4.5	μs

NOTES: 5. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ⩽2%
6. These parameters are measured with voltage-sensing contacts separate from the current carrying contacts and located within 3 mm from the device body
7. A 40 W Power Pulse is applied (50 ms with I_C = 2 A, V_{CE} = 20 V). After 30 μs stabilization time ΔV_{BE} is measured ⩽450 mV. (Base test current = 3 mA).

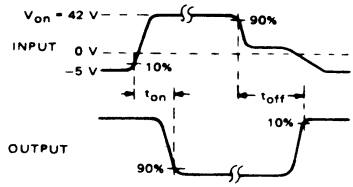




PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT

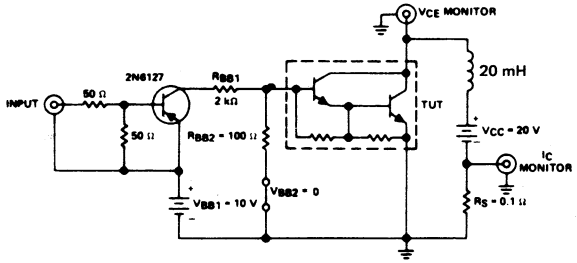


VOLTAGE WAVEFORMS

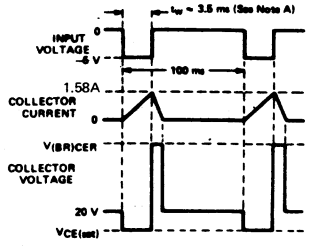
NOTES: A. V_{gen} is a −30-V pulse (from 0 V) into a 50-Ω termination.
B. The V_{gen} waveform is supplied by a generator with the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, $Z_{out} = 50\ \Omega$, $t_w = 20\ \mu s$, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15$ ns, $R_{in} \geq 10\ M\Omega$, $C_{in} \leq 11.5$ pF.
D. Resistors must be noninductive types.
E. The d-c power supplies may require additional bypassing in order to minimize ringing.

FIGURE 1

INDUCTIVE LOAD SWITCHING



TEST CIRCUIT



VOLTAGE AND CURRENT WAVEFORMS

NOTE A: Input pulse width is increased until I_{CM} = 1.58A

FIGURE 2

TYPICAL CHARACTERISTICS

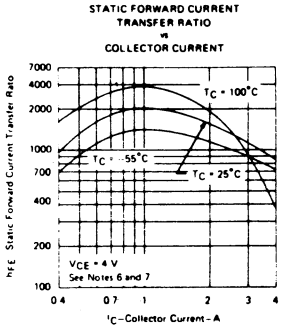


FIGURE 3

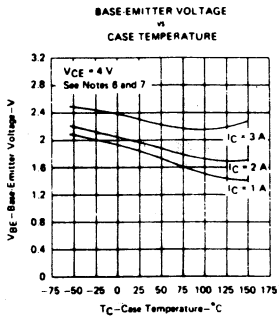


FIGURE 4

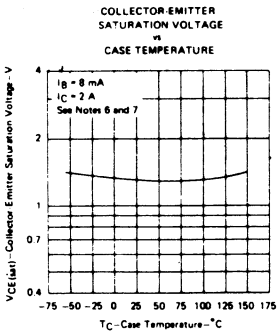


FIGURE 5

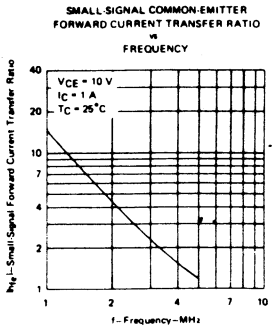


FIGURE 6

MAXIMUM SAFE OPERATING AREAS

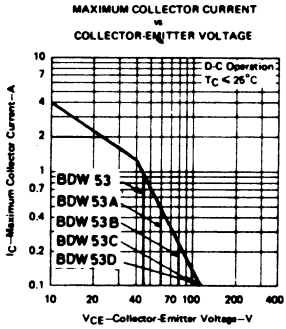


FIGURE 7

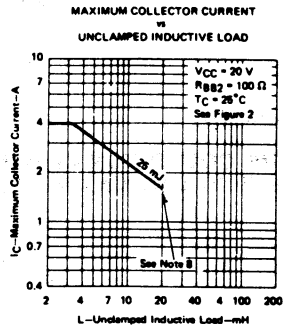


FIGURE 8

NOTE 8: Above this point the safe operating area has not been defined.

THERMAL INFORMATION

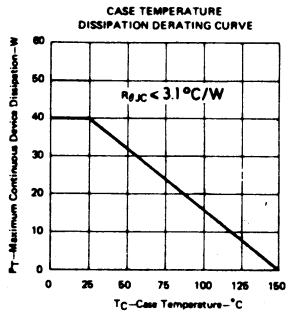


FIGURE 9

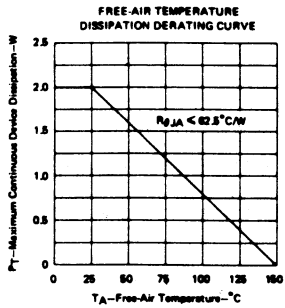


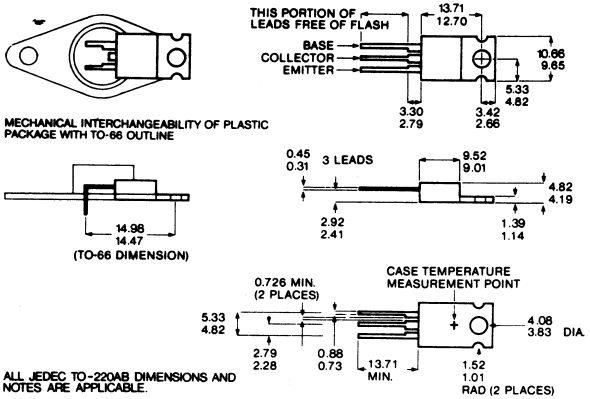
FIGURE 10

NPN SILICON POWER DARLINGTON BDW63 SERIES
PNP SILICON POWER DARLINGTON BDW64 SERIES

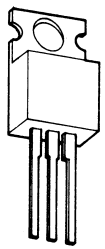
- High SOA Capability, 20 V and 3 A
- 60 W at 25 °C Case Temperature
- 6 A Rated Collector Current
- Min h_{FE} of 750 @ 2 A/3 V
- 50 mJ Reverse Energy Rating

mechanical data

THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB



ALL DIMENSIONS ARE IN MILLIMETRES



absolute maximum ratings at 25 °C case temperature (unless otherwise noted)

	NPN BDW63 PNP BDW64	BDW63A BDW64A	BDW63B BDW64B	BDW63C BDW64C	BDW63D BDW64D
Collector-Base Voltage	45 V	60 V	80 V	100 V	120 V
Collector-Emitter Voltage (See Note 1)	45 V	60 V	80 V	100 V	120 V
Emitter-Base Voltage	5 V				
Continuous Collector Current	6 A				
Continuous Base Current	100 mA				
Continuous Device Dissipation at 25 °C Case Temperature (See Note 2)	60 W				
Continuous Device Dissipation at 25 °C Free-Air Temperature (See Note 3)	2 W				
Unclamped Inductive Load Energy (See Note 4)	50 mJ				
Operating Ambient Temperature Range	−65 °C to 150 °C				
Operating Collector Junction Temperature Range	−65 °C to 150 °C				
Storage Temperature Range	−65 °C to 150 °C				

NOTES: 1. These values apply when the base-emitter diode is open-circuited
2. Derate linearly to 150 °C Case Temperature at the rate of 0.48 W/°C
3. Derate linearly to 150 °C Free-Air Temperature at the rate of 16 mW/°C
4. This rating is based on the capability of the transistor to operate safely in a circuit of: L = 20 mH, R_{BB} = 100 Ω, V_{BB2} = 0 V, R_S = 0.1 Ω, Energy ≈ $I_C^2 . L/2$.

electrical characteristics at 25 °C case temperature

PARAMETER		TEST CONDITIONS		BDW63 BDW64		BDW63A BDW64A		BDW63B BDW64B		BDW63C BDW64C		BDW63D BDW64D		UNITS
				Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (See Note 5)	I_C = 30 mA,	I_B = 0	45		60		80		100		120		V
I_{CEO}	Collector Cutoff Current	V_{CE} = 30 V,	I_B = 0		500		500							μA
		V_{CE} = 40 V,	I_B = 0						500					
		V_{CE} = 50 V,	I_B = 0								500			
		V_{CE} = 60 V,	I_B = 0										500	
I_{CBO}	Collector Cutoff Current	V_{CB} = 45 V,	I_E = 0		200									μA
		V_{CB} = 60 V,	I_E = 0				200							
		V_{CB} = 80 V,	I_E = 0						200					
		V_{CB} = 100 V,	I_E = 0								200			
		V_{CB} = 120 V,	I_E = 0										200	
I_{CBO}	T_C = 150 °C	45/60/80/100/120 V			5		5		5		5		5	mA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5 V,	I_C = 0		2		2		2		2		2	mA
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 3 V,	I_C = 2 A	750	20000	750	20000	750	20000	750	20000	750	20000	
		V_{CE} = 3 V,	I_C = 6 A	100		100		100		100		100		
		(See Notes 5 & 6)												
$V_{BE(ON)}$	Base Emitter Voltage	V_{CE} = 3 V,	I_C = 2 A		2.5		2.5		2.5		2.5		2.5	V
		(See Notes 5 & 6)												
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	I_C = 2 A,	I_B = 12 mA		2.5		2.5		2.5		2.5		2.5	V
		I_C = 6 A,	I_B = 60 mA		4		4		4		4		4	
		(See Notes 5 & 6)												
V_{FR}	Forward Voltage of Reverse Diode	$-I_C$ = 6A			3.5		3.5		3.5		3.5		3.5	V

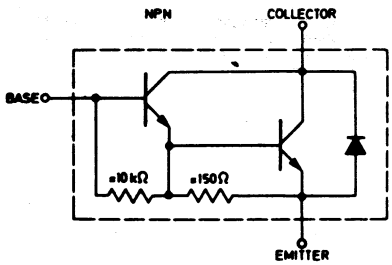
thermal characteristics

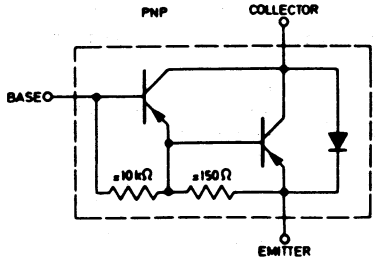
	PARAMETER	Max	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance (See Note 7)	2.08	°C/W
$R_{\theta JA}$	Junction-to-Free-Air Thermal Resistance	62.0	°C/W

switching characteristics at 25 °C case temperature

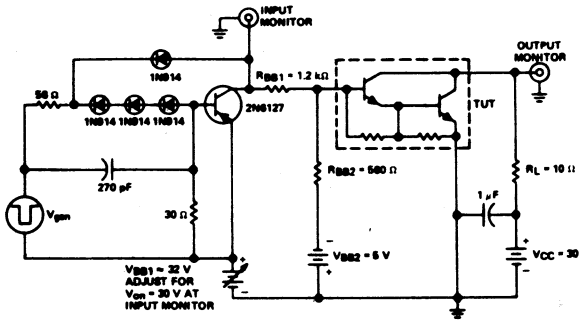
	PARAMETER	TEST CONDITIONS	Typ	UNIT
t_{ON}	Turn-On Time	I_C = 3 A, $I_{B(1)}$ = 12 mA, $I_{B(2)}$ = −12 mA	1.0	μs
t_{OFF}	Turn-Off Time	$V_{BE(off)}$ = −4.5 V, R_L = 10 Ω	5	μs

NOTES: 5. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ⩽2%
6. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 3 mm from the device body
7. A 40 Watt Power Pulse is applied (50 ms with I_C = 2 A, V_{CE} = 20 V).
After 30 μs stabilization time ΔV_{BE} is measured ⩽300 mV (Base test current = 3 mA)

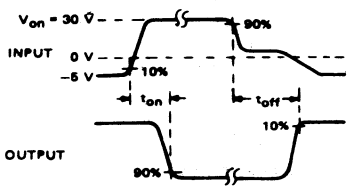




PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT

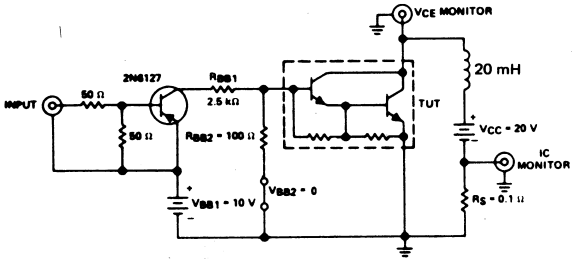


VOLTAGE WAVEFORMS

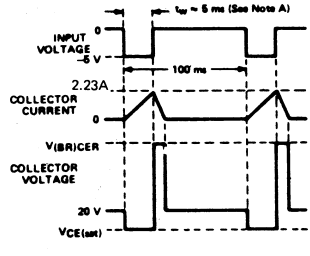
NOTES: A. V_{gen} is a −30-V pulse (from 0 V) into a 50-Ω termination.
B. The V_{gen} waveform is supplied by a generator with the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, $Z_{out} = 50\ \Omega$, $t_w = 20\ \mu s$, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15$ ns, $R_{in} \geq 10\ M\Omega$, $C_{in} \leq 11.5$ pF.
D. Resistors must be noninductive types.
E. The d-c power supplies may require additional bypassing in order to minimize ringing.

FIGURE 1

INDUCTIVE LOAD SWITCHING



TEST CIRCUIT



VOLTAGE AND CURRENT WAVEFORMS

NOTE A: Input pulse width is increased until I_{CM} = 2.23A

FIGURE 2

TYPICAL CHARACTERISTICS

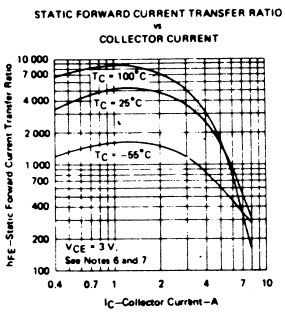


FIGURE 3

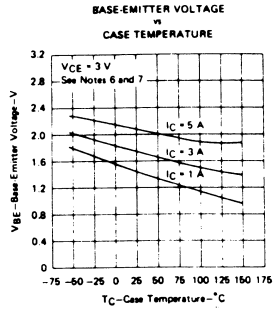


FIGURE 4

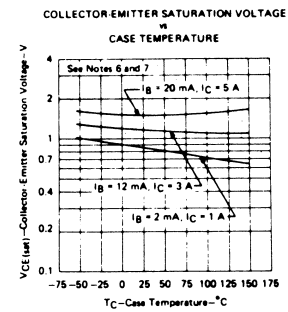


FIGURE 5

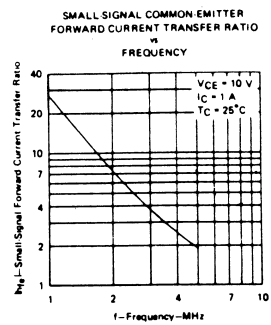


FIGURE 6

NOTES: 6. These parameters must be measured using pulse techniques. t_w = 300 µs, duty cycle ≤ 2%.

7. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 0.125 inch from the device body.

MAXIMUM SAFE OPERATING AREAS

MAXIMUM COLLECTOR CURRENT
vs
COLLECTOR-EMITTER VOLTAGE

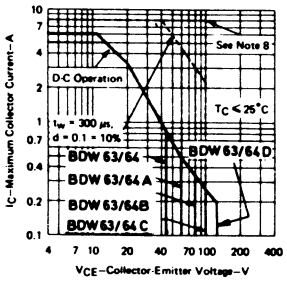


FIGURE 7

MAXIMUM COLLECTOR CURRENT
vs
UNCLAMPED INDUCTIVE LOAD

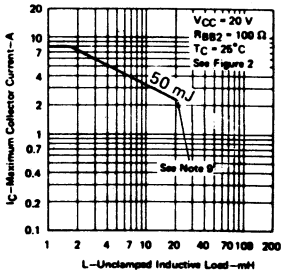


FIGURE 8

NOTES: 8. This combination of maximum voltage and current may be achieved only when switching from saturation to cutoff with a clamped inductive load.
9. Above this point the safe operating area has not been defined.

THERMAL INFORMATION

CASE TEMPERATURE
DISSIPATION DERATING CURVE

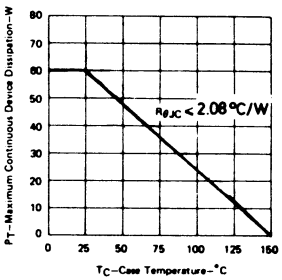


FIGURE 9

FREE-AIR TEMPERATURE
DISSIPATION DERATING CURVE

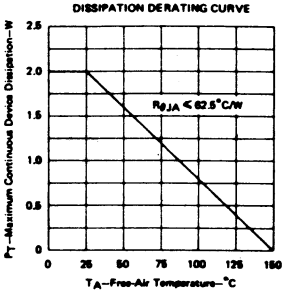


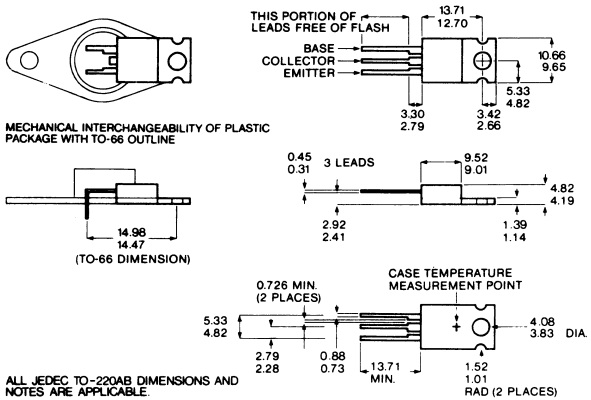
FIGURE 10

NPN SILICON POWER DARLINGTON BDW73 SERIES
PNP SILICON POWER DARLINGTON BDW74 SERIES

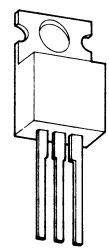
- High SOA Capability, 20 V and 4 A
- 80 W at 25 °C Case Temperature
- 8 A Rated Collector Current
- Min h_{FE} of 750 @ 3 A/3 V
- 75 mJ Reverse Energy Rating

mechanical data

THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB



ALL DIMENSIONS ARE IN MILLIMETRES



absolute maximum ratings at 25 °C case temperature (unless otherwise noted)

NPN / PNP	BDW73 / BDW74	BDW73A / BDW74A	BDW73B / BDW74B	BDW73C / BDW74C	BDW73D / BDW74D
Collector-Base Voltage	45 V	60 V	80 V	100 V	120 V
Collector-Emitter Voltage (See Note 1)	45 V	60 V	80 V	100 V	120 V
Emitter-Base Voltage	5 V				
Continuous Collector Current	8 A				
Continuous Base Current	300 mA				
Continuous Device Dissipation at 25 °C Case Temperature (See Note 2)	80 W				
Continuous Device Dissipation at 25 °C Free-Air Temperature (See Note 3)	2 W				
Unclamped Inductive Load Energy (See Note 4)	75 mJ				
Operating Ambient Temperature Range	−65 °C to 150 °C				
Operating Collector Junction Temperature Range	−65 °C to 150 °C				
Storage Temperature Range	−65 °C to 150 °C				

NOTES: 1. These values apply when the base-emitter diode is open circuited
2. Derate linearly to 150 °C Case Temperature at the rate of 0.64 W/°C
3. Derate linearly to 150 °C Free-Air Temperature at the rate of 16 mW/°C
4. This rating is based on the capability of the transistor to operate safely in a circuit of: L = **20 mH**, R_{BB} = 100 Ω, V_{BB2} = 0 V, R_S = 0.1 Ω, V_{CC} = 20 V, Energy ≈ $I_C^2.L/2$.

electrical characteristics at 25 °C case temperature

PARAMETER		TEST CONDITIONS		BDW73 BDW74		BDW73A BDW74A		BDW73B BDW74B		BDW73C BDW74C		BDW73D BDW74D		UNITS
				Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 30 mA, (See Note 5)	I_B = 0	45		60		80		100		120		V
I_{CEO}	Collector Cutoff Current	V_{CE} = 30 V,	I_B = 0		500		500							μA
		V_{CE} = 40 V,	I_B = 0						500					
		V_{CE} = 50 V,	I_B = 0								500			
		V_{CE} = 60 V,	I_B = 0										500	
I_{CBO}	Collector Cutoff Current	V_{CB} = 45 V,	I_E = 0		200									μA
		V_{CB} = 60 V,	I_E = 0				200							
		V_{CB} = 80 V,	I_E = 0						200					
		V_{CB} = 100 V,	I_E = 0								200			
		V_{CB} = 120 V,	I_E = 0										200	
I_{CBO}	T_C = 150 °C	45/60/80/100/120 V			5		5		5		5		5	mA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5 V,	I_C = 0		2		2		2		2		2	mA
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 3 V,	I_C = 3 A	750	20000	750	20000	750	20000	750	20000	750	20000	
		V_{CE} = 3 V, (See Notes 5 & 6)	I_C = 8 A	100		100		100		100		100		
$V_{BE(ON)}$	Base Emitter Voltage	V_{CE} = 3 V, (See Notes 5 & 6)	I_C = 3 A		2.5		2.5		2.5		2.5		2.5	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	I_C = 3 A,	I_B = 12 mA		2.5		2.5		2.5		2.5		2.5	V
		I_C = 8 A, (See Notes 5 & 6)	I_B = 80 mA		4		4		4		4		4	
V_{FR}	Forward Voltage of Reverse Diode	$-I_C$ = 8 A			3.5		3.5		3.5		3.5		3.5	V

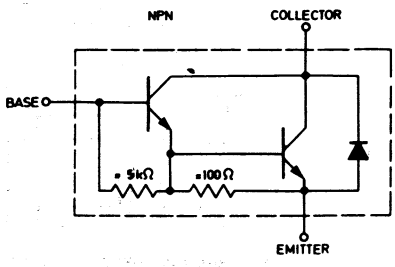
thermal characteristics

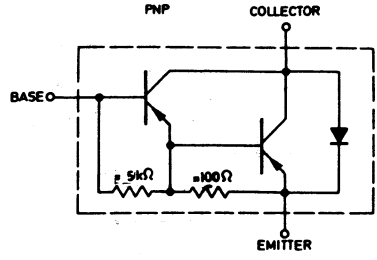
	PARAMETER	Max	UNITS
$R_{\theta JC}$	Junction -to-Case Thermal Resistance (See Note 7)	1.56	°C/W
$R_{\theta JA}$	Junction-to-Free-Air Thermal Resistance	62.0	°C/W

switching characteristics at 25 °C case temperature

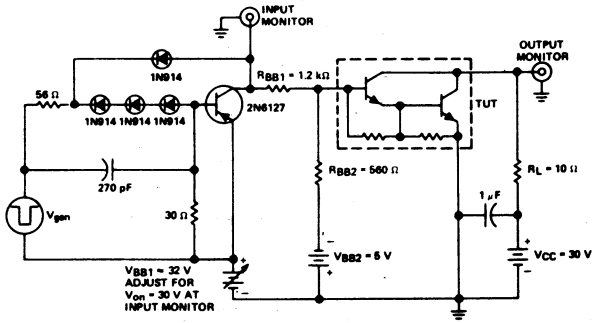
	PARAMETER	TEST CONDITIONS	Typ	UNIT
t_{ON}	Turn-On Time	I_C = 3 A, $I_{B(1)}$ = 12 mA, $I_{B(2)}$ = −12 mA	1.0	μs
t_{OFF}	Turn-Off Time	$V_{BE(off)}$ = −3.5 V, R_L = 10 Ω	5.0	μs

NOTES: 5. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ≤ 2%
6. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 3 mm from the device body
7. A 40 Watt Power Pulse is applied (50 ms with I_C = 2 A, V_{CE} = 20 V). After 30 μs stabilization time ΔV_{BE} is measured ≤ 225 mV. (Base test current = 3 mA).

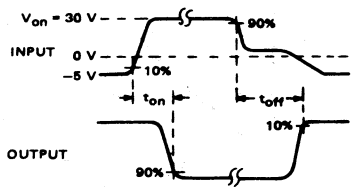




PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT

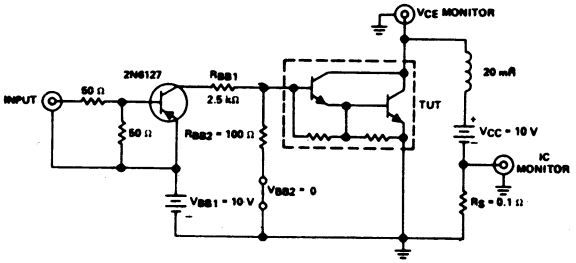


VOLTAGE WAVEFORMS

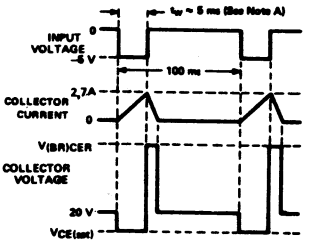
NOTES: A. V_{gen} is a −30-V pulse (from 0 V) into a 50-Ω termination.
B. The V_{gen} waveform is supplied by a generator with the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, $Z_{out} = 50\ \Omega$, $t_w = 20\ \mu s$, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15$ ns, $R_{in} \geq 10\ M\Omega$, $C_{in} \leq 11.5$ pF.
D. Resistors must be noninductive types.
E. The d-c power supplies may require additional bypassing in order to minimize ringing.

FIGURE 1

INDUCTIVE LOAD SWITCHING



TEST CIRCUIT



VOLTAGE AND CURRENT WAVEFORMS

NOTE A: Input pulse width is increased until I_{CM} = 2.74 A

FIGURE 2

TYPICAL CHARACTERISTICS

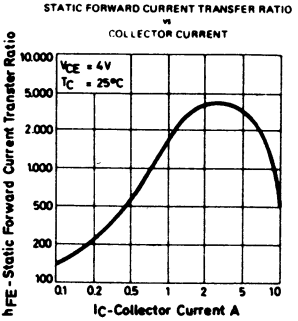


FIGURE 3

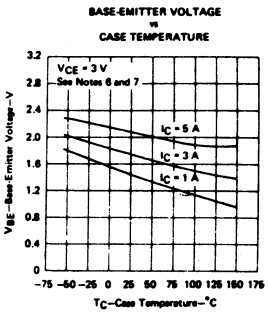


FIGURE 4

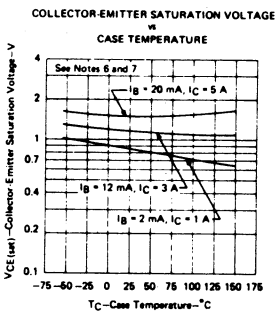


FIGURE 5

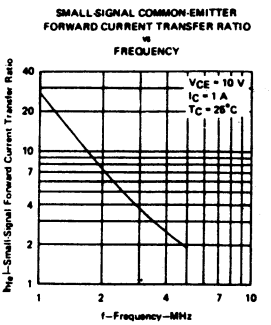


FIGURE 6

NOTES: 6. These parameters must be measured using pulse techniques. t_w = 300 μs, duty cycle ≤ 2%.

7. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 0.125 inch from the device body.

MAXIMUM SAFE OPERATING AREAS

MAXIMUM COLLECTOR CURRENT
vs
COLLECTOR-EMITTER VOLTAGE

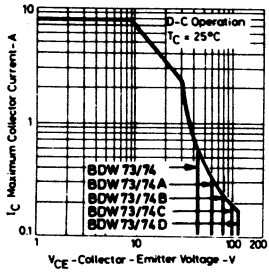


FIGURE 7

MAXIMUM COLLECTOR CURRENT
vs
UNCLAMPED INDUCTIVE LOAD

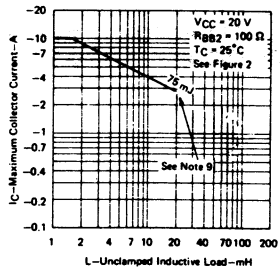


FIGURE 8

NOTES: 8. This combination of maximum voltage and current may be achieved only when switching from saturation to cutoff with a clamped inductive load.
9. Above this point the safe operating area has not been defined.

THERMAL INFORMATION

CASE TEMPERATURE
DISSIPATION DERATING CURVE

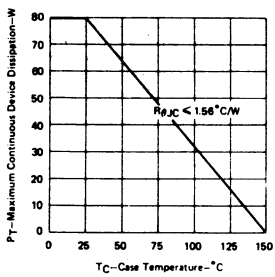


FIGURE 9

FREE-AIR TEMPERATURE
DISSIPATION DERATING CURVE

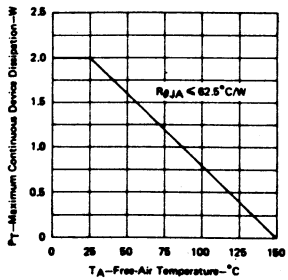


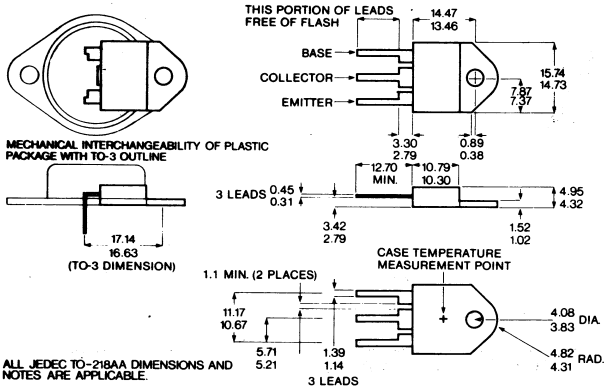
FIGURE 10

NPN SILICON POWER DARLINGTON BDW83 SERIES
PNP SILICON POWER DARLINGTON BDW84 SERIES

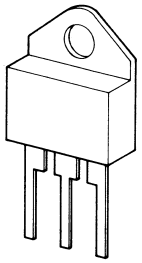
- High SOA Capability, 30 V and 5 A
- 150 W at 25 °C Case Temperature
- 15 A Rated Collector Current
- Min h_{FE} of 750 @ 6 A/3 V
- 100 mJ Reverse Energy Rating

mechanical data

THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB



ALL DIMENSIONS ARE IN MILLIMETRES



absolute maximum ratings at 25 °C case temperature (unless otherwise noted)

	NPN / PNP	BDW83 / BDW84	BDW83A / BDW84A	BDW83B / BDW84B	BDW83C / BDW84C	BDW83D / BDW84D
Collector-Base Voltage		45 V	60 V	80 V	100 V	120 V
Collector-Emitter Voltage (See Note 1)		45 V	60 V	80 V	100 V	120 V
Emitter-Base Voltage				5 V		
Continuous Collector Current				15 A		
Continuous Base Current				500 mA		
Continuous Device Dissipation at 25 °C Case Temperature (See Note 2)				150 W		
Continuous Device Dissipation at 25 °C Free-Air Temperature (See Note 3)				3.5 W		
Unclamped Inductive Load Energy (See Note 4)				100 mJ		
Operating Ambient Temperature Range				−65 °C to 150 °C		
Operating Collector Junction Temperature Range				−65 °C to 150 °C		
Storage Temperature Range				−65 °C to 150 °C		

NOTES: 1. These values apply when the base-emitter diode is open-circuited.
2. Derate linearly to 150 °C Case Temperature at the rate of 1.2 W/°C.
3. Derate linearly to 150 °C Free-Air Temperature at the rate of 28 mW/°C.
4. This rating is based on the capability of the transistor to operate safely in a circuit of: L = 20 mH, R_{BB} = 100 Ω, V_{BB2} = 0 V, R_S = 0.1 Ω, V_{CC} = 20 V, Energy ≈ $I_C^2 \cdot L/2$.

electrical characteristics at 25 °C case temperature

PARAMETER		TEST CONDITIONS		BDW83 BDW84		BDW83A BDW84A		BDW83B BDW84B		BDW83C BDW84C		BDW83D BDW84D		UNITS
				Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 30 mA, (See Note 5)	I_B = 0	45		60		80		100		120		V
I_{CEO}	Collector Cutoff Current	V_{CE} = 30 V,	I_B = 0		1		1							mA
		V_{CE} = 40 V,	I_B = 0						1					
		V_{CE} = 50 V,	I_B = 0								1			
		V_{CE} = 60 V,	I_B = 0										1	
I_{CBO}	Collector Cutoff Current	V_{CB} = 45 V,	I_E = 0		500									μA
		V_{CB} = 60 V,	I_E = 0				500							
		V_{CB} = 80 V,	I_E = 0						500					
		V_{CB} = 100 V,	I_E = 0								500			
		V_{CB} = 120 V,	I_E = 0										500	
I_{CBO}	T_C = 150 °C	45/60/80/100/120 V			5		5		5		5		5	mA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 5 V,	I_C = 0		2		2		2		2		2	mA
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 3 V,	I_C = 6 A	750	20000	750	20000	750	20000	750	20000	750	20000	
		V_{CE} = 3 V,	I_C = 15 A	100		100		100		100		100		
		(See Notes 5 & 6)												
$V_{BE(ON)}$	Base Emitter Voltage	V_{CE} = 3 V, (See Notes 5 & 6)	I_C = 6 A		2.5		2.5		2.5		2.5		2.5	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	I_C = 6 A,	I_B = 12 mA		2.5		2.5		2.5		2.5		2.5	V
		I_C = 15 A, (See Notes 5 & 6)	I_B = 150 mA		4		4		4		4		4	
V_{FR}	Forward Voltage of Reverse Diode	$-I_C$ = 15 A			3.5		3.5		3.5		3.5		3.5	V

thermal characteristics

	PARAMETER	Max	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance (See Note 7)	0.83	°C/W
$R_{\theta JA}$	Junction-to-Free-Air Thermal Resistance	35.7	°C/W

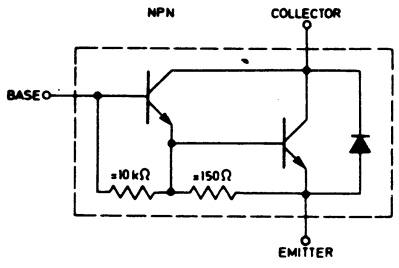
switching characteristics at 25 °C case temperature

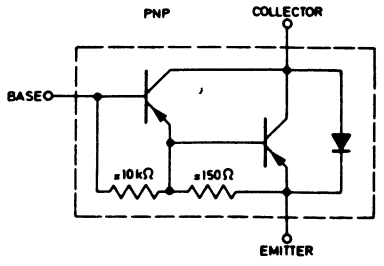
	PARAMETER	TEST CONDITIONS	Typ	UNIT
t_{ON}	Turn-On Time	I_C = 10 A, $I_{B(1)}$ = 40 mA, $I_{B(2)}$ = −40 mA	0.9	μs
t_{OFF}	Turn-Off Time	$V_{BE(off)}$ = −4.2 V, R_L = 3 Ω	7	μs

NOTES 5. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ≤ 2%

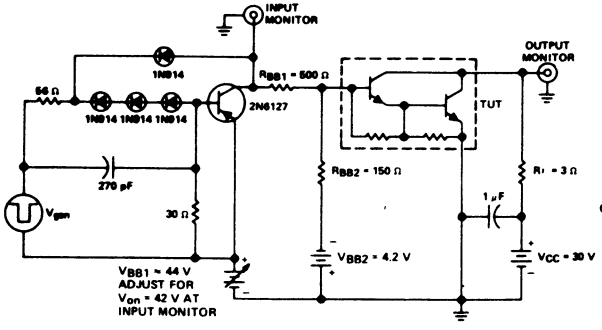
6. These parameters are measured with voltage sensing contacts separate from the current contacts and located within 3 mm from the device body.

7. A 62 Watt Power Pulse is applied (50 ms with I_C = 2.5 A, V_{CE} = 25 V)
After 30 μs stabilization time ΔV_{BE} is measured ≤ 187 mV (Base test current = 3 mA)

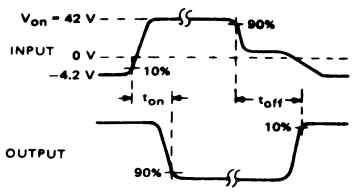




PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT

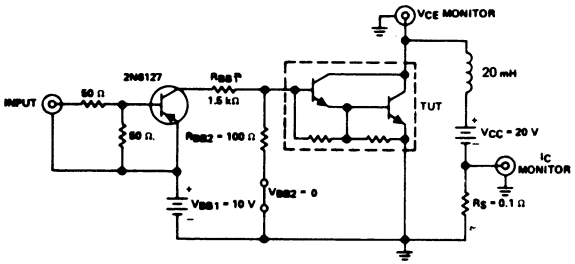


VOLTAGE WAVEFORMS

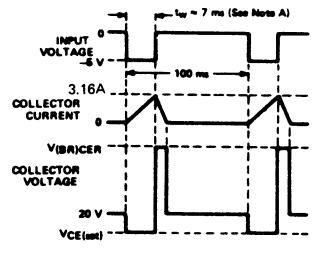
NOTES: A. V_{gen} is a −30-V pulse (from 0 V) into a 50-Ω termination.
B. The V_{gen} waveform is supplied by a generator with the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, $Z_{out} = 50\ \Omega$, $t_w = 20\ \mu s$, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15$ ns, $R_{in} \geq 10\ M\Omega$, $C_{in} \leq 11.5$ pF.
D. Resistors must be noninductive types.
E. The d-c power supplies may require additional bypassing in order to minimize ringing.

FIGURE 1

INDUCTIVE LOAD SWITCHING



TEST CIRCUIT



VOLTAGE AND CURRENT WAVEFORMS

NOTE A: Input pulse width is increased until I_{CM} = 3.16 A

FIGURE 2

TYPICAL CHARACTERISTICS

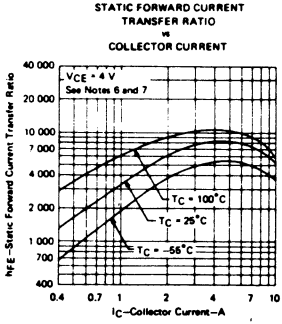


FIGURE 3

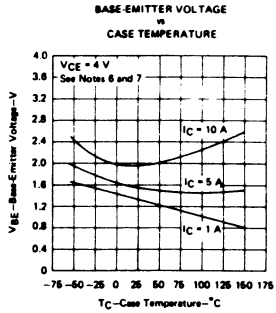


FIGURE 4

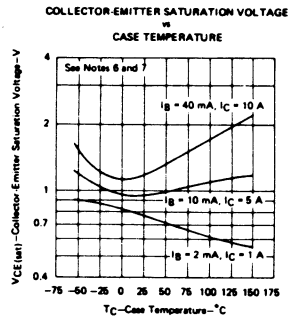


FIGURE 5

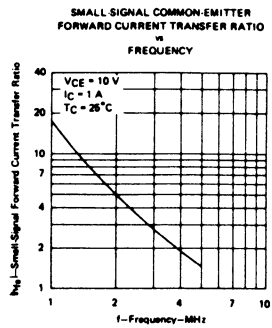


FIGURE 6

NOTES: 6. These parameters must be measured using pulse techniques, t_w = 300 µs, duty cycle < 2%.

7. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 0.125 inch from the device body.

MAXIMUM SAFE OPERATING AREAS

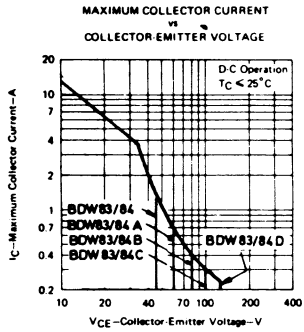


FIGURE 7

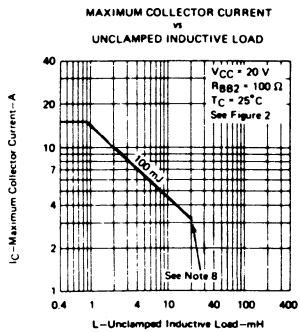


FIGURE 8

NOTE 8: Above this point the safe operating area has not been defined.

THERMAL INFORMATION

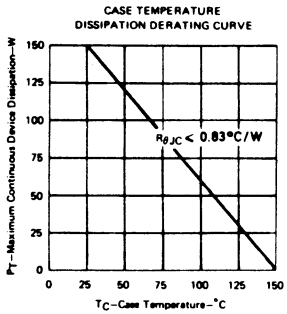


FIGURE 9

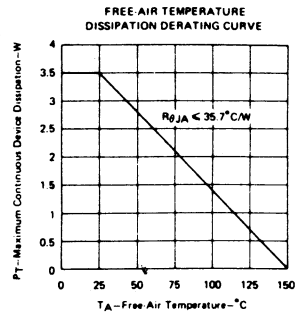


FIGURE 10