

EPITAXIAL-BASE NPN

BDW 93
BDW 93A
BDW 93B
BDW 93C

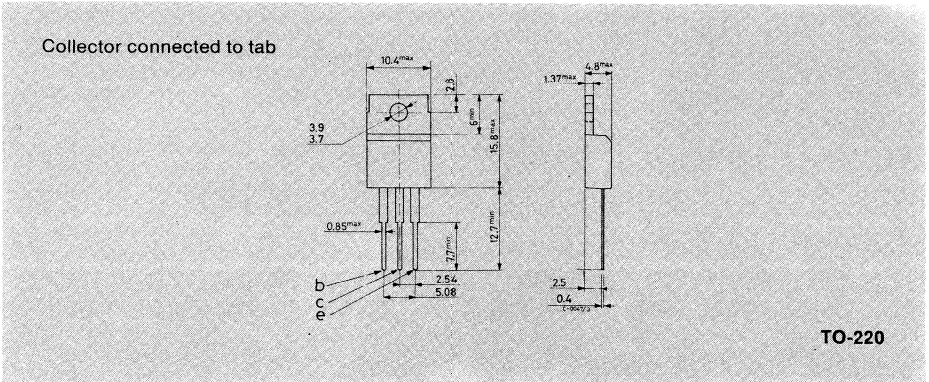
POWER DARLINGTONS

The BDW 93, BDW 93A, BDW 93B and BDW 93C are silicon epitaxial-base NPN transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications. The complementary PNP types are the BDW 94, BDW 94A, BDW 94B and BDW 94C respectively.

ABSOLUTE MAXIMUM RATINGS		BDW93	BDW93A	BDW93B	BDW93C
V_{CBO}	Collector-base voltage ($I_E = 0$)	45V	60V	80V	100V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	45V	60V	80V	100V
I_C	Collector current			12A	
I_{CM}	Collector peak current			15A	
I_B	Base current			0.2A	
P_{tot}	Total power dissipation at $T_{case} \leq 25^{\circ}C$			80W	
T_{stg}	Storage temperature			-65 to 150°C	
T_J	Junction temperature			150°C	

MECHANICAL DATA

Dimensions in mm



BDW 93
BDW 93A
BDW 93B
BDW 93C

THERMAL DATA

$R_{th\ j-case}$	Thermal resistance junction-case	max	1.56	$^{\circ}C/W$
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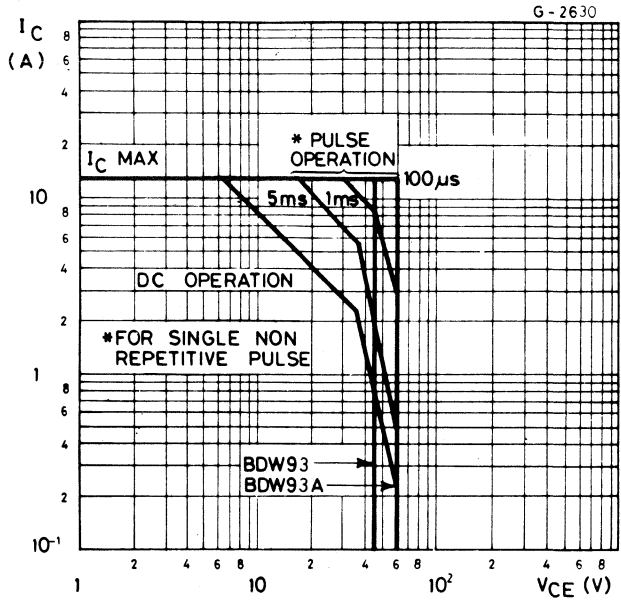
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Parameter		Test conditions		Min. Typ. Max.		Unit.
I_{CBO}	Collector cutoff current ($I_E = 0$)	for BDW93	$V_{CB} = 45V$		100	μA
		for BDW93A	$V_{CB} = 60V$		100	μA
		for BDW93B	$V_{CB} = 80V$		100	μA
		for BDW93C	$V_{CB} = 100V$		100	μA
		$T_{case} = 150^{\circ}C$				
		for BDW93	$V_{CB} = 45V$		5	mA
		for BDW93A	$V_{CB} = 60V$		5	mA
		for BDW93B	$V_{CB} = 80V$		5	mA
for BDW93C	$V_{CB} = 100V$		5	mA		
I_{CEO}	Collector cutoff current ($I_B = 0$)	for BDW93	$V_{CE} = 40V$		1	mA
		for BDW93A	$V_{CE} = 60V$		1	mA
		for BDW93B	$V_{CE} = 80V$		1	mA
		for BDW93C	$V_{CE} = 80V$		1	mA
I_{EBO}	Emitter cutoff current ($I_C = 0$)	$V_{EB} = 5V$			2	mA
$V_{CEO(sus)}^*$	Collector-emitter sustaining voltage ($I_B = 0$)	$I_C = 100mA$ for BDW93 for BDW93A for BDW93B for BDW93C		45 60 80 100		V V V V
$V_{CE(sat)}^*$	Collector-emitter saturation voltage	$I_C = 5A$	$I_B = 20mA$		2	V
		$I_C = 10A$	$I_B = 100mA$		3	V
$V_{BE(sat)}^*$	Base-emitter saturation voltage	$I_C = 5A$	$I_B = 20mA$		2.5	V
		$I_C = 10A$	$I_B = 100mA$		4	V
h_{FE}^*	DC current gain	$I_C = 3A$	$V_{CE} = 3V$	1000		—
		$I_C = 5A$	$V_{CE} = 3V$	750	20000	—
		$I_C = 10A$	$V_{CE} = 3V$	100		—
V_F^*	Parallel-diode forward voltage	$I_F = 5A$		1.3	2	V
		$I_F = 10A$		1.8	4	V
h_{fe}	Small signal current gain	$I_C = 1A$	$V_{CE} = 10V$			—
		$f = 1\text{ MHz}$		20		—

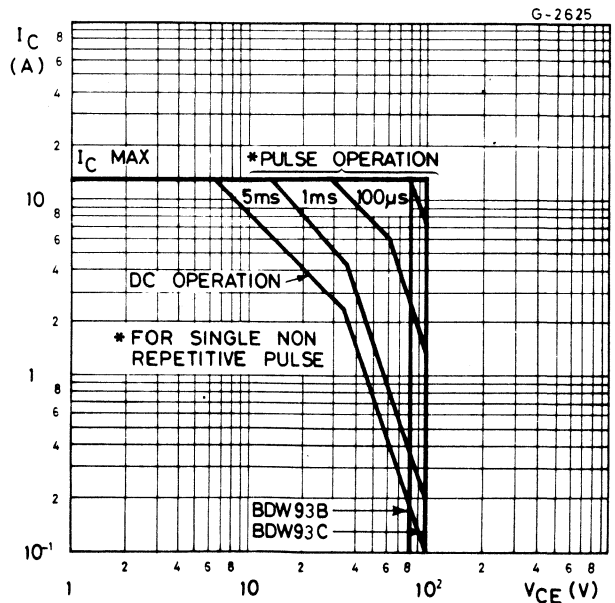
* Pulsed: pulse duration = 300 μs , duty cycle = 1.5%

BDW 93
BDW 93A
BDW 93B
BDW 93C

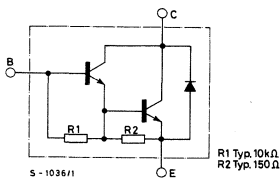
Safe operating areas
 (for **BDW93** and **BDW93A**)



Safe operating areas
 (for **BDW93B** and **BDW93C**)

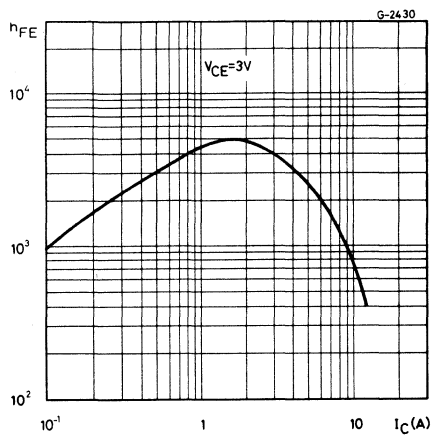


Internal circuit diagram

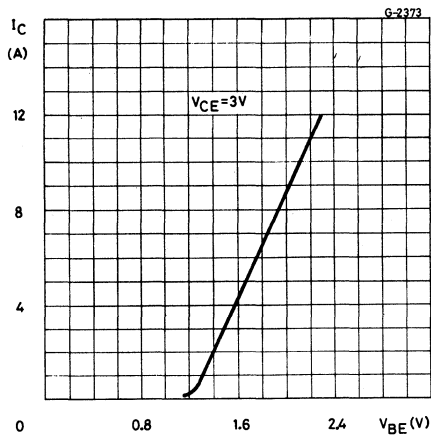


BDW 93
BDW 93A
BDW 93B
BDW 93C

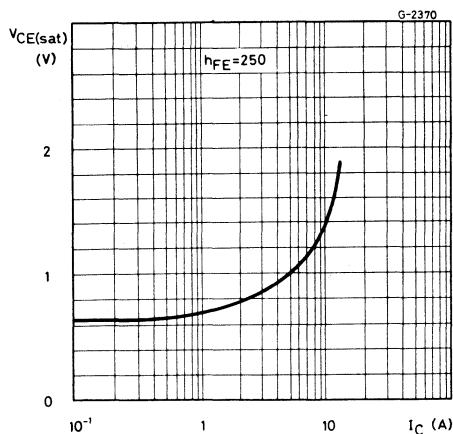
DC current gain



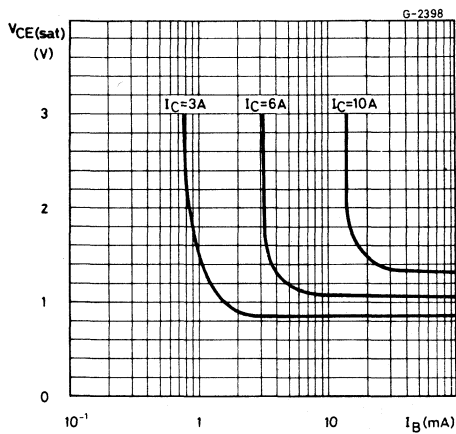
DC transconductance



Collector-emitter saturation voltage

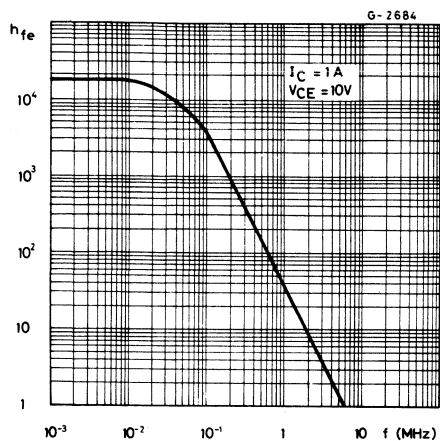


Collector-emitter saturation voltage

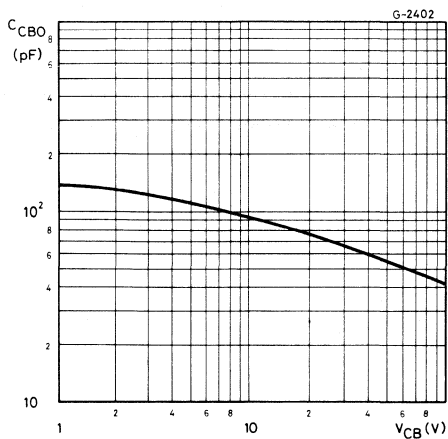


BDW 93
BDW 93A
BDW 93B
BDW 93C

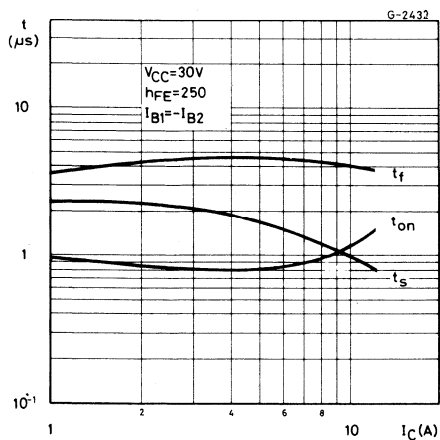
Small signal current gain



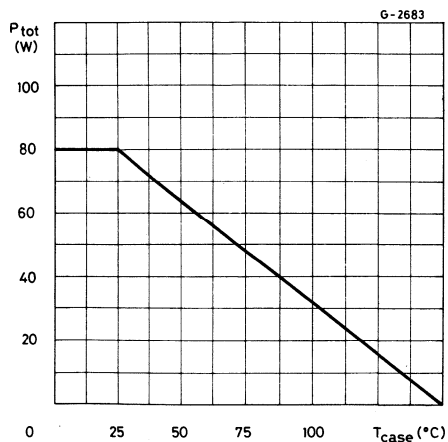
Collector-base capacitance



Saturated switching characteristics



Power rating chart



BDW 94
BDW 94A
BDW 94B
BDW 94C

EPITAXIAL-BASE PNP

POWER DARLINGTONS

The BDW 94, BDW 94A, BDW 94B and BDW 94C are silicon epitaxial-base PNP transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications. The complementary NPN types are the BDW 93, BDW 93A, BDW 93B and BDW 93C respectively.

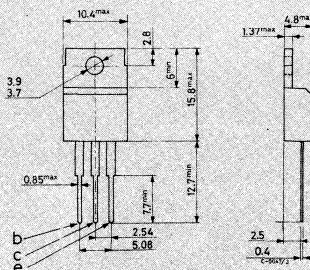
ABSOLUTE MAXIMUM RATINGS

		BDW94	BDW94A	BDW94B	BDW94C
V_{CBO}	Collector-base voltage ($I_E = 0$)	-45V	-60V	-80V	-100V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	-45V	-60V	-80V	-100V
I_C	Collector current			-12A	
I_{CM}	Collector peak current			-15A	
I_B	Base current			-0.2A	
P_{tot}	Total power dissipation at $T_{case} \leq 25^\circ C$			80W	
T_{stg}	Storage temperature			-65 to $150^\circ C$	
T_j	Junction temperature			$150^\circ C$	

MECHANICAL DATA

Dimensions in mm

Collector connected to tab



TO-220

THERMAL DATA

$R_{th\ j-case}$	Thermal resistance junction-case	max	1.56	°C/W
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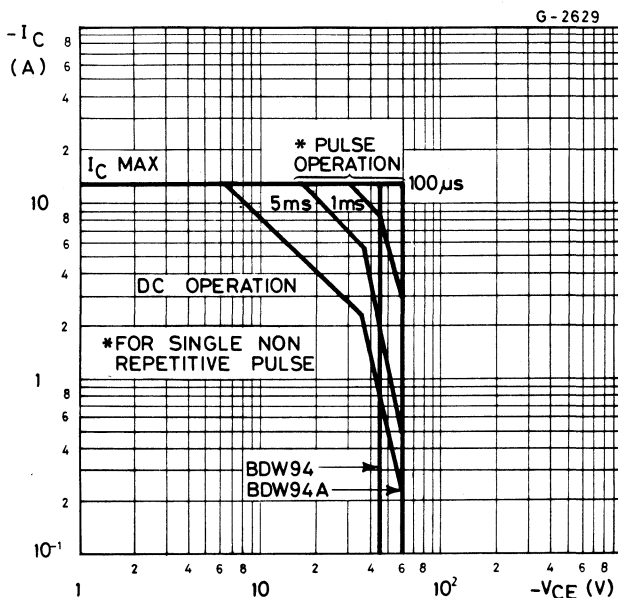
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
I_{CBO}	Collector cutoff current ($I_E = 0$)	for BDW94 for BDW94A for BDW94B for BDW94C $T_{case} = 150^{\circ}C$ for BDW94 for BDW94A for BDW94B for BDW94C	$V_{CB} = -45V$ $V_{CB} = -60V$ $V_{CB} = -80V$ $V_{CB} = -100V$ $V_{CB} = -45V$ $V_{CB} = -60V$ $V_{CB} = -80V$ $V_{CB} = -100V$			-100 -100 -100 -100 -5 -5 -5 -5	μA μA μA μA mA mA mA mA
I_{CEO}	Collector cutoff current ($I_B = 0$)	for BDW94 for BDW94A for BDW94B for BDW94C	$V_{CE} = -40V$ $V_{CE} = -60V$ $V_{CE} = -80V$ $V_{CE} = -80V$			-1 -1 -1 -1	mA mA mA mA
I_{EBO}	Emitter cutoff current ($I_C = 0$)	$V_{EB} = -5V$				-2	mA
$V_{CEO(sus)}^*$	Collector-emitter sustaining voltage ($I_B = 0$)	$I_C = -100mA$ for BDW94 for BDW94A for BDW94B for BDW94C				-45 -60 -80 -100	V V V V
$V_{CE(sat)}^*$	Collector-emitter saturation voltage	$I_C = -5A$ $I_C = -10A$	$I_B = -20mA$ $I_B = -100mA$			-2 -3	V V
$V_{BE(sat)}^*$	Base-emitter saturation voltage	$I_C = -5A$ $I_C = -10A$	$I_B = -20mA$ $I_B = -100mA$			-2.5 -4	V V
h_{FE}^*	DC current gain	$I_C = -3A$ $I_C = -5A$ $I_C = -10A$	$V_{CE} = -3V$ $V_{CE} = -3V$ $V_{CE} = -3V$	1000 750 100		20000	— — —
V_F^*	Parallel-diode forward voltage	$I_F = 5A$ $I_F = 10A$				1.3 1.8	2 4 V V
h_{ie}	Small signal current gain	$I_C = -1A$ $f = 1\text{ MHz}$				20	—

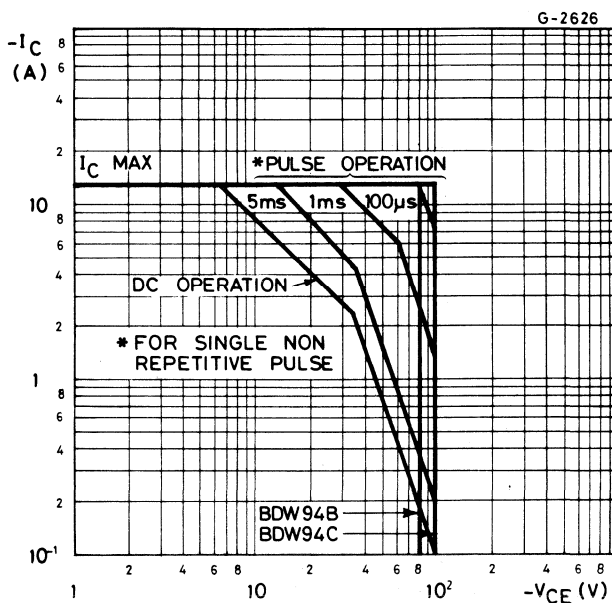
* Pulsed: pulse duration = 300 μs , duty cycle = 1.5%

BDW 94
BDW 94A
BDW 94B
BDW 94C

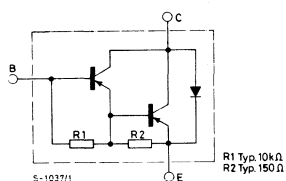
Safe operating areas
(for **BDW94** and **BDW94A**)



Safe operating areas
(for **BDW94B** and **BDW94C**)

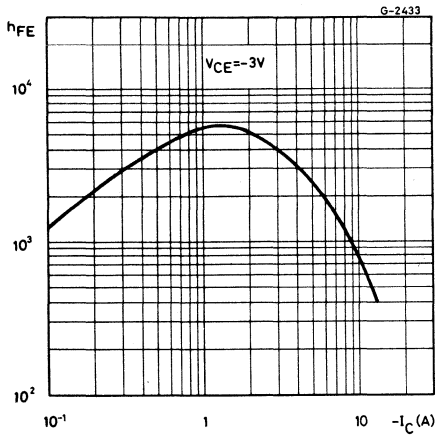


Internal circuit diagram

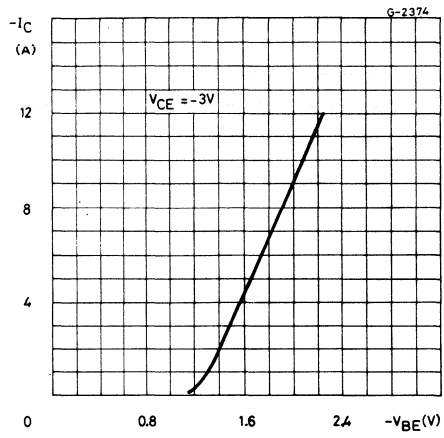


BDW 94
BDW 94A
BDW 94B
BDW 94C

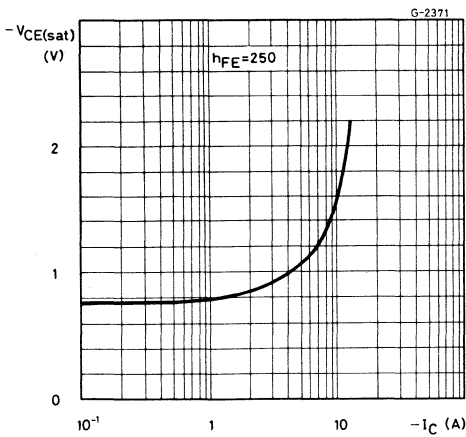
DC current gain



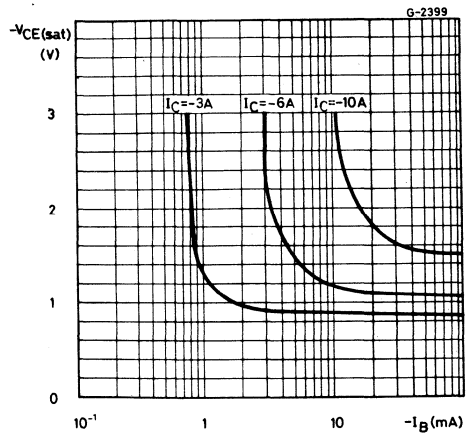
DC transconductance



Collector-emitter saturation voltage

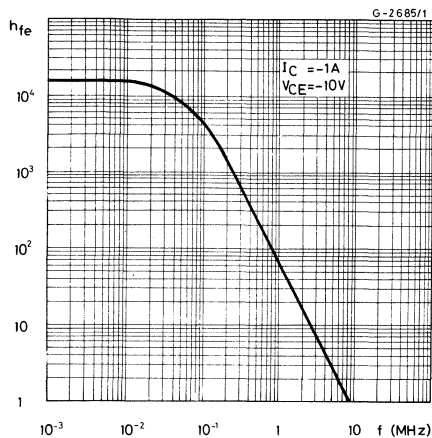


Collector-emitter saturation voltage

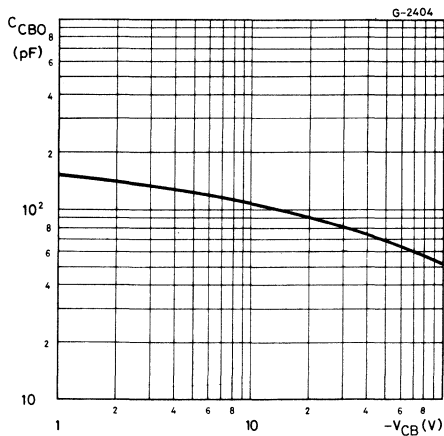


BDW 94
BDW 94A
BDW 94B
BDW 94C

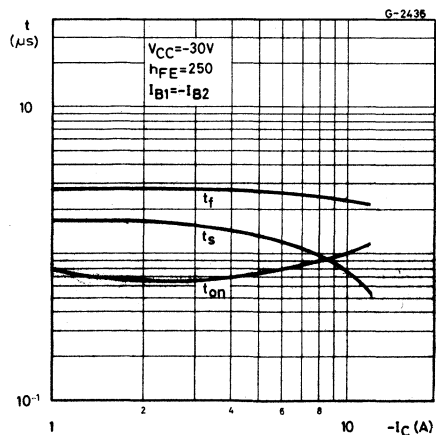
Small signal current gain



Collector-base capacitance



Saturated switching characteristics



Power rating chart

