



Ideal Power

Technical Specifications

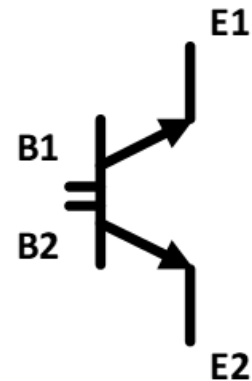
B-TRAN™, 1200V/50A

Bidirectional, Double-Sided Cooling, TO-264 Package

Part Number: IPAD01205A04

Key Features:

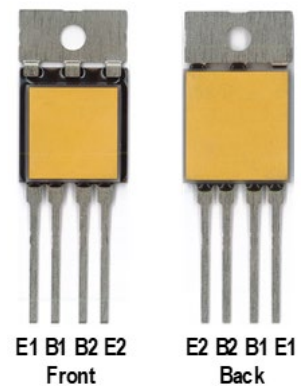
- Bidirectional Switching Operation
- Ultra-Low On-State Voltage Drop
- Low Switching Losses
- Double-Sided Cooling
- Reduction of System Components
- Switching Frequency: 30 KHZ
- Low Parasitic Inductance and Capacitance



Device Circuit Symbol

Applications:

- Solid-State Circuit Breaker
- Battery Disconnect Switch
- Common-Emitter Applications
- T-Type Inverter
- Matrix Converter



Typical Appearance



idealpower.com

(512)264-1542

5508 Highway 290 West, Suite 120
Austin, TX 78735



1 B-TRAN™ DC Electrical Characteristics

Maximum Ratings

Parameter	Symbol	Value	Unit
Blocking voltage	V_{BR}	1200	V
DC emitter current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_E	50 25	A A
Pulsed emitter current	I_{Epulse}	100	A
Emitter-Base breakdown voltage	V_{EB}	50	V
Short circuit withstand time	t_{SC}	15	μs
Power dissipation $T_C = 25^\circ\text{C}$ Power dissipation $T_C = 100^\circ\text{C}$	P_{tot}	400 100	W
Operating junction temperature	T_{vj}	-40...+125	$^\circ\text{C}$

Static Characteristics ($T_j = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Blocking voltage	$V_{BR(E1B2)}$ or $V_{BR(E2B1)}$	$I_{E1E2} = 100 \mu\text{A}$	1200	1300	-	V
Emitter-Emitter saturation voltage	$V_{E1E2(on)}$	V_{B1E1} or V_{B2E2} $= 1.5\text{V}, I_{E1E2} = 30\text{A}$	---	0.6	0.8	V
Base-Emitter voltage (on-state)	V_{B1E1} or V_{B2E2}	I_{B1E1} or I_{B2E2} $= 1\text{A}$	0.8	1	1.5	V
Emitter-Base breakdown voltage (off-state)	$V_{R(B1E1)}$ or $V_{R(B2E2)}$	I_{E1B1} or I_{E2B2} $= 1\text{mA}$	35	50	80	V
Emitter leakage current	I_{E1B2} or I_{E2B1}	at V_{E1B2} or V_{E2B1} $= 1200\text{V}$	---	50	100	μA
DC current gain	h_{FE}	$I_{E1E2} = 15\text{A}$		7	9	
	h_{FE}	$I_{E1E2} = 30\text{A}$		5	7	





Ideal Power

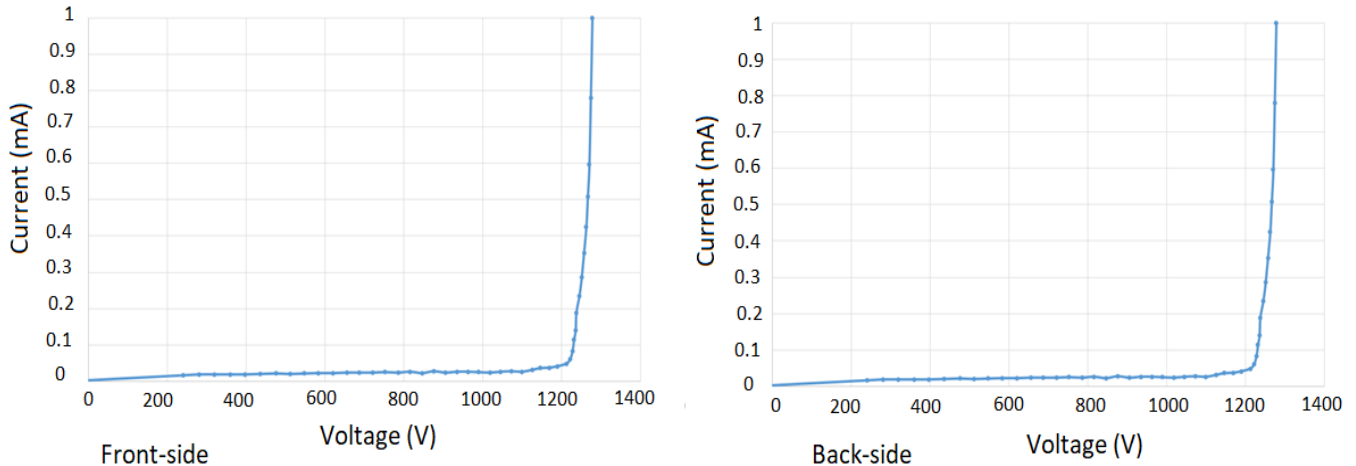


Figure 1: Breakdown voltage test curves: Front-side $V_{BR(E1B2)}$ & Back-side $V_{BR(E2B1)}$

2 B-TRAN™ Switching Characteristics

Switching Characteristics, Inductive Load ($T_j = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Value	Unit
Turn-on delay time	$t_{d(on)}$	$V_{E1E2} = 600\text{ V}, I_{E1E2} = 30\text{ A}$ V_{B1E1} or $V_{B2E2} = 1\text{ V}$	50	ns
Rise time	t_r		100	ns
Turn-off delay time	$t_{d(off)}$		400	ns
Fall time	t_f		200	ns
Turn-on energy	E_{on}		0.5	mJ
Turn-off energy	E_{off}		1.8	mJ
Total switching energy	E_{ts}		2.3	mJ



idealpower.com

(512)264-1542

5508 Highway 290 West, Suite 120
Austin, TX 78735



Ideal Power

Switching Characteristics, Inductive Load ($T_j = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Value	Unit
Turn-on delay time	$t_{d(on)}$	$V_{E1E2} = 800\text{ V}$, $I_{E1E2} = 15\text{ A}$ V_{B1E1} or $V_{B2E2} = 1\text{ V}$	50	ns
Rise time	t_r		100	ns
Turn-off delay time	$t_{d(off)}$		400	ns
Fall time	t_f		200	ns
Turn-on energy	E_{on}		0.5	mJ
Turn-off energy	E_{off}		1.8	mJ
Total switching energy	E_{ts}		2.3	mJ

$V_{E1E2(on)}$ Test: $I_{E1E2(on)}$ at 30A, $V_{E1E2(on)} = 0.61\text{V}$

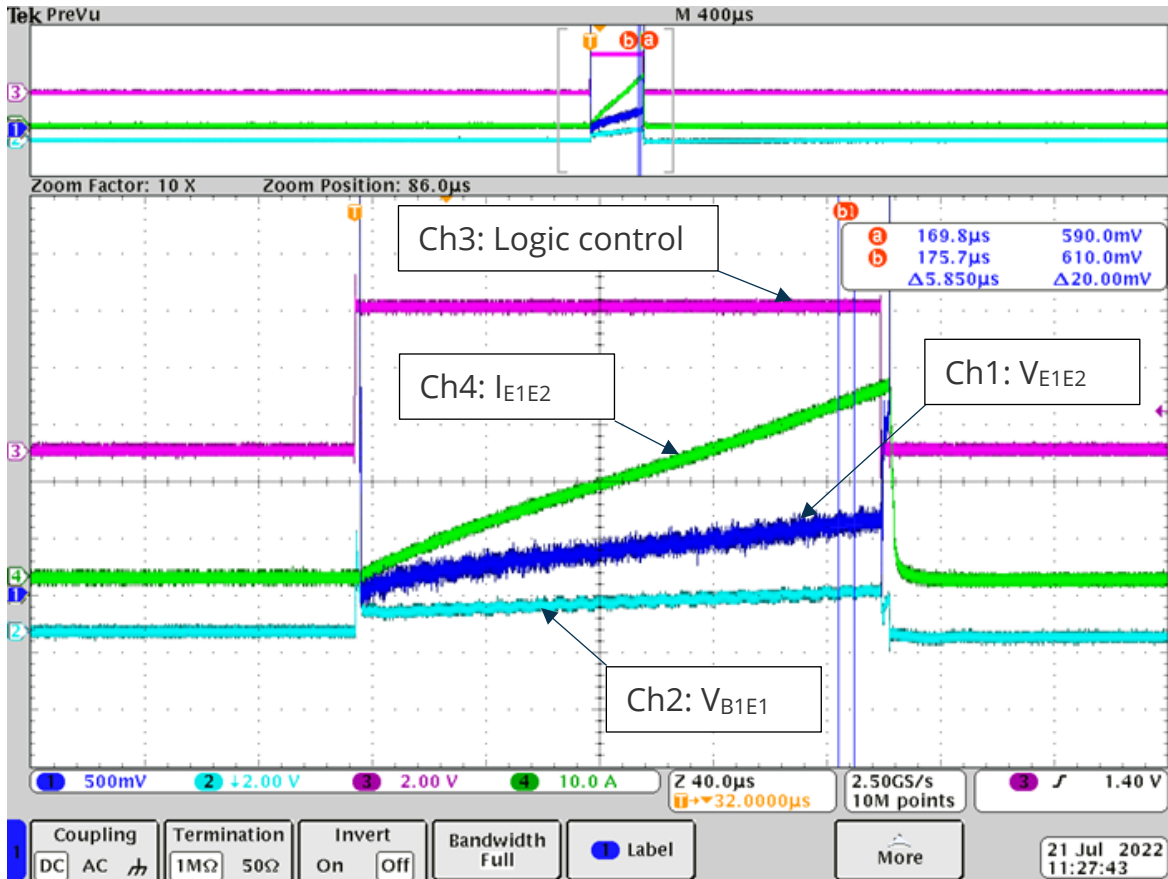


Figure 2: $V_{E1E2(on)}$ test waveforms



idealpower.com

(512)264-1542

5508 Highway 290 West, Suite 120
Austin, TX 78735



Ideal Power

Double Pulse Test (DPT) Conditions: $V_{E1E2} = 800V$, $I_{E1E2} = 15A$

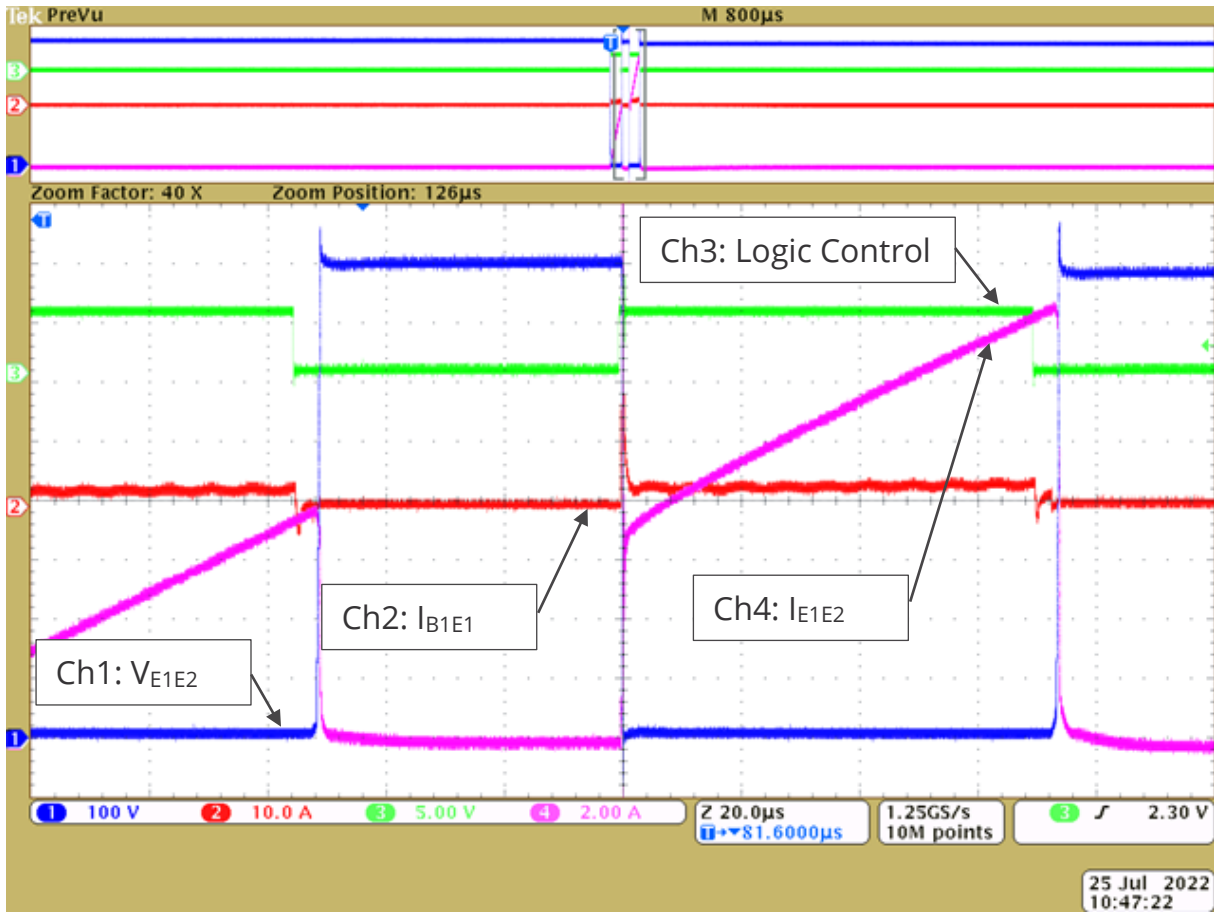


Figure 3: B-TRAN™ DPT waveforms



idealspower.com

(512)264-1542

5508 Highway 290 West, Suite 120
Austin, TX 78735

3 B-TRAN™ Package Information

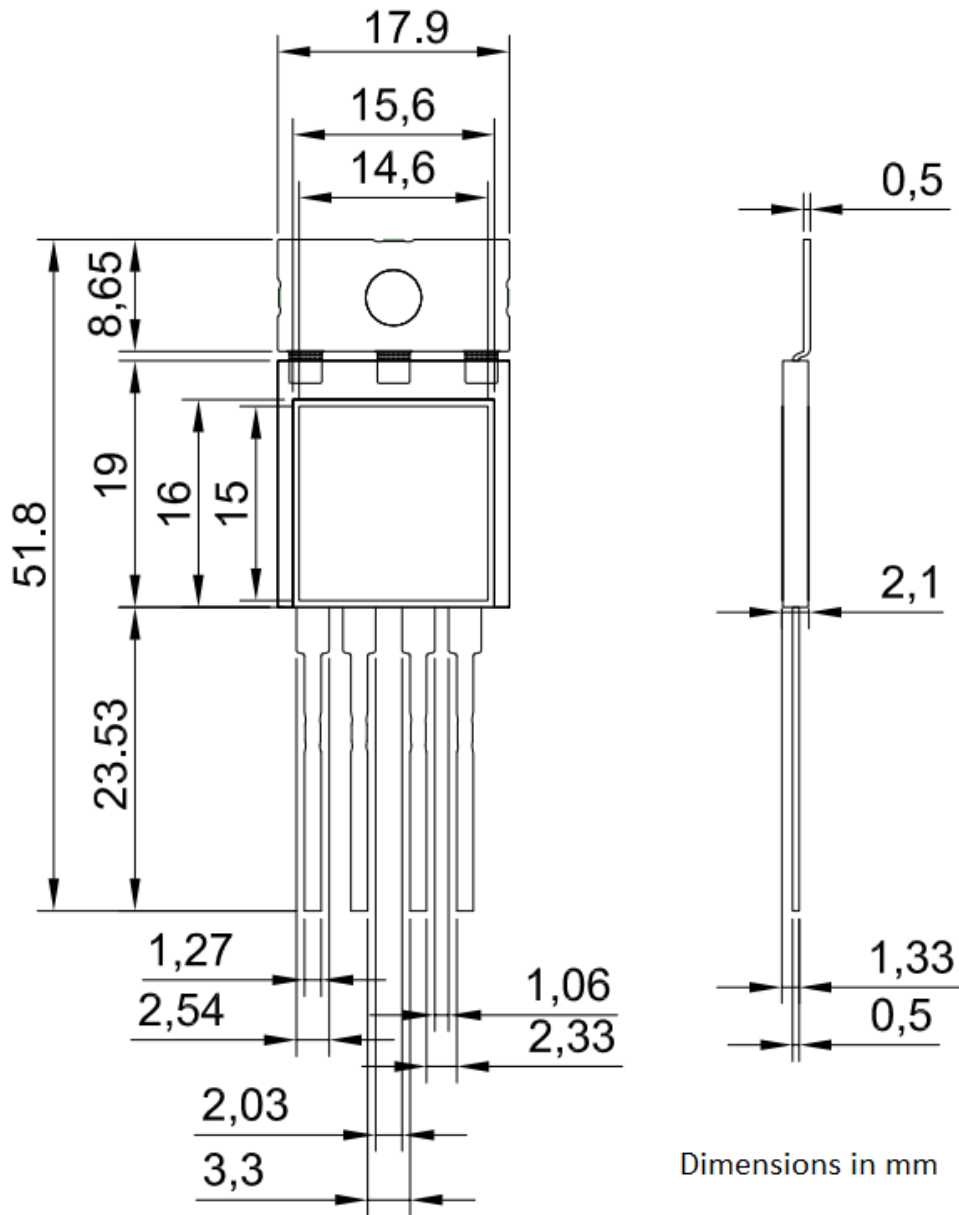


Figure 4: Mechanical outline of TO-264 package



Ideal Power

Important Notices

B-TRAN™ specifications are subject to change. Information presented in this document is from the characterization of engineering lots. Ideal Power reserves the right to change limits, test conditions, and dimensions without notice. Information contained in this document are typical values and shall in no event be regarded as a guarantee of characteristics. With respect to any information regarding the application of the product, Ideal Power hereby disclaims all warranties and liabilities of any kind. IPAD01205A04 is an engineering sample stage device.

The information in this document is exclusively for trained technical staff. It is the responsibility of the customer's technical department to decide the suitability of the product in the customer's application and Ideal Power assumes no responsibility or liability whatsoever for the use of the information contained in this document.

For further information, please contact sales@ideалpower.com



idealpower.com

(512)264-1542

5508 Highway 290 West, Suite 120
Austin, TX 78735