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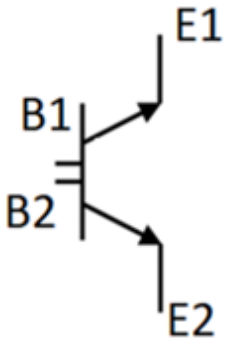
Technical Specifications

B-TRAN™, 1200V/50A, Double-Sided Cooling, TO-264 Package

Part Number : IPBD1205A4ES

Key Features:

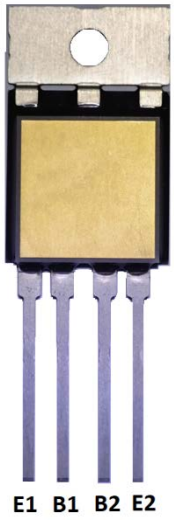
- Bidirectional Switching Operation
- Ultra-Low On-State Voltage Drop
- Low Switching Losses
- Double-Sided Cooling
- Reduction of System Components
- Switching Frequency: 30 KHZ
- Low Parasitic Inductance and Capacitance



Device Circuit Symbol

Applications:

- Solid-State Circuit Breakers
- Bidirectional Switching Converters
- Battery Disconnect Switch or Battery Test Systems
- IGBT Common-Emitter Applications
- Matrix Converters



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1 B-TRAN™ DC Electrical Characteristics

Maximum Ratings

Parameter	Symbol	Value	Unit
Emitter-emitter voltage	V_{EE}	1200	V
DC emitter current T_c = 25°C T_c = 100°C	I_E	 50 25	 A A
Pulsed emitter current	I_{Epuls}	100	A
Emitter-base voltage	V_{EB}	50	V
Short circuit withstand time	t_{SC}	15	µs
Power dissipation T_C = 25°C Power dissipation T_C = 100°C	P_{tot}	400 100	W
Operating junction temperature	T_{vj}	-40...+125	°C

Static Characteristics (T_j = 25°C)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Emitter-emitter breakdown voltage	$V_{(BR)EE}$	I_E = 100 µA	1200	1300	-	V
Emitter-emitter saturation voltage	$V_{ce(on)}$	V_{BE} = 1V I_E = 30A	---	0.6	0.8	V
Base-emitter voltage (on-state)	V_{BE}	B-TRAN™ ON	0.8	1	1.5	V
Emitter-base voltage (off-state)	$V_{(R)EB}$	B-TRAN™ OFF	35	50	80	V
Emitter leakage current	I_{CES}	@ V_{EE}=1200V	---	50	100	µA
DC current gain	h_{FE}	I_E = 15A		7	9	
	h_{FE}	I_E = 30A		5	7	

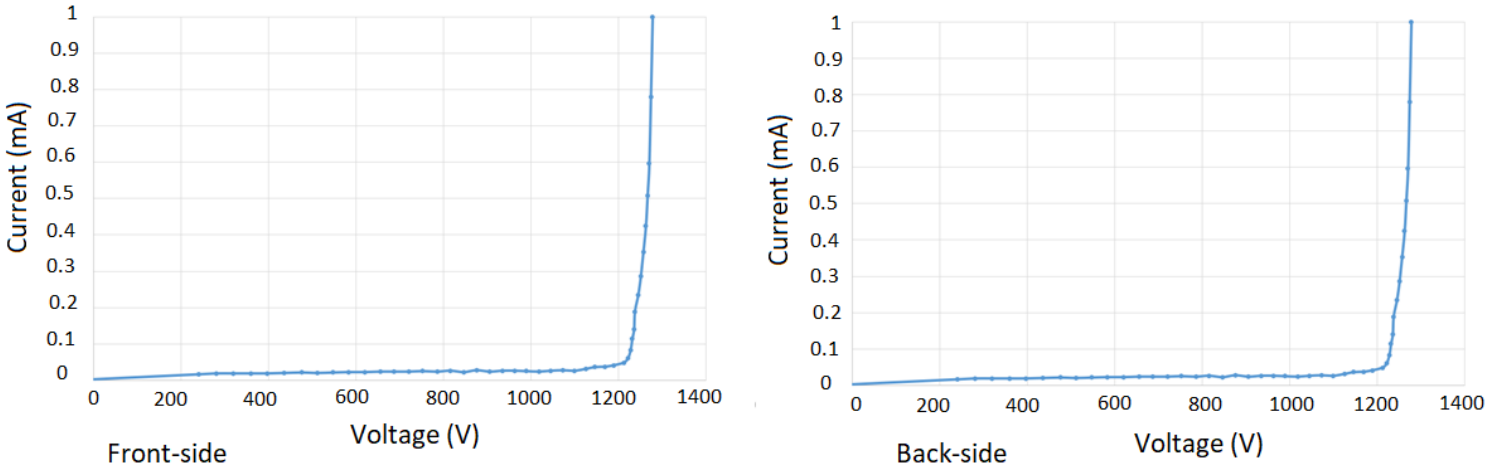

Figure 1: Breakdown voltage test curves ($V_{(BR)EE}$)

On-wafer measurement results:

- Breakdown voltage > 1300 V
- Leakage current < 50 µA

2 B-TRAN™ Switching Characteristics

Switching Characteristics, Inductive Load (T_j = 25°C)

Parameter	Symbol	Conditions	Value	Unit
Turn-on delay time	$t_{d(on)}$	V_{EE} = 600 V, I_E = 30 A	50	ns
Rise time	t_r	V_{BE} = 1 V	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

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Switching Characteristics, Inductive Load (T_j = 25°C)

Parameter	Symbol	Conditions	Value	Unit
Turn-on delay time	$t_{d(on)}$	V_{EE} = 800 V, I_E = 15 A	50	ns
Rise time	t_r	V_{BE} = 1 V	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

$V_{ce(on)}$ Test: $V_{ce(on)}$ at 30A: 0.61V Vdd 12V

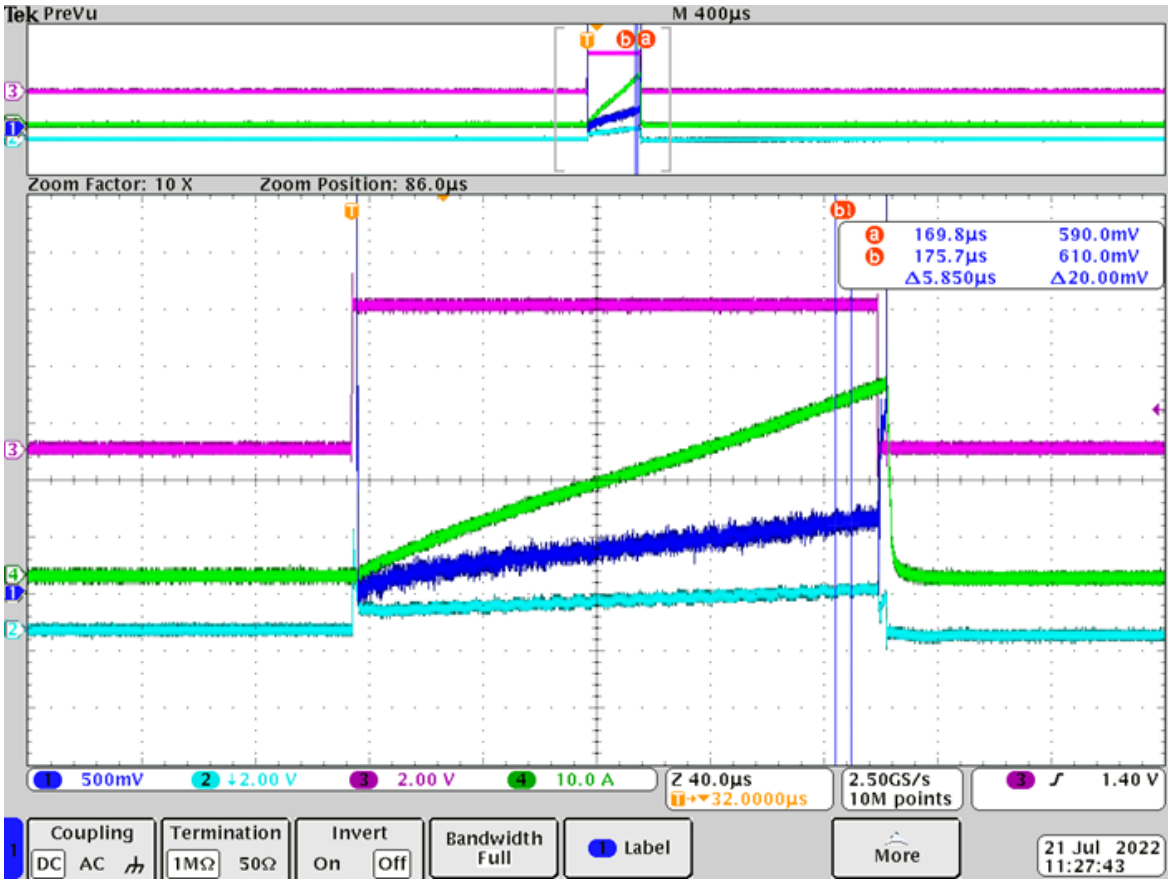

Figure 2: $V_{ce(on)}$ test waveforms

Double Pulse Test (DPT): Test Conditions: 800V, 15 A

Figure 3: B-TRAN™ DPT waveforms

3 B-TRAN™ Package Information

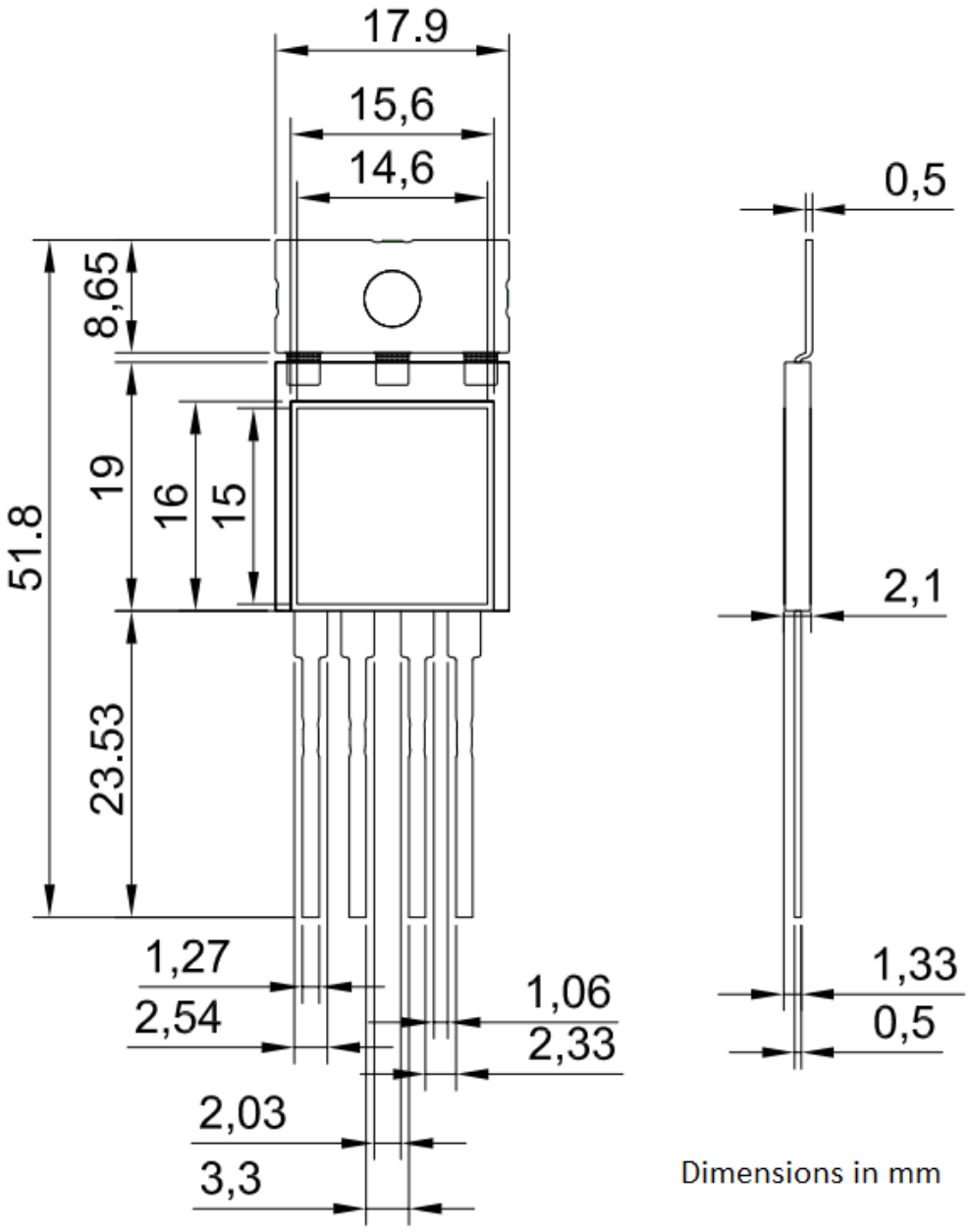

Figure 4: Mechanical outline of TO-264 package

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Important Notices

B-TRAN™ specifications are subject to change. Data 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.

Data 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. IPBD1205A4ES is an engineering sample stage device.

The data 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.

For further information, please contact sales@idealpower.com