PART OBSOLETE
NO ALTERNATE PART

APT13005DI

450V NPN HIGH VOLTAGE POWER TRANSISTOR

Features

- BV_{CEO} > 450V
- BV_{CES} > 700V
- BV_{EBO} > 9V
- I_C = 4A High Collector Current
- Integrated Anti-Parallel Diode to act as free-wheeling diode
- Anti-Saturation feature
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

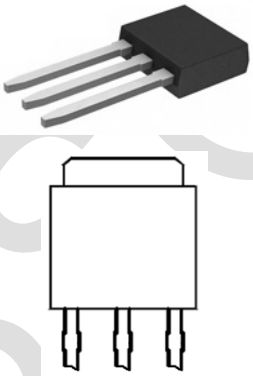
- Case: TO251
- Case Material: Molded Plastic, "Green" Molding Compound UL Flammability Classification Rating 94V-0
- Terminals: Finish - Matte Tin Finish Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 340mg (Approximate)

Applications

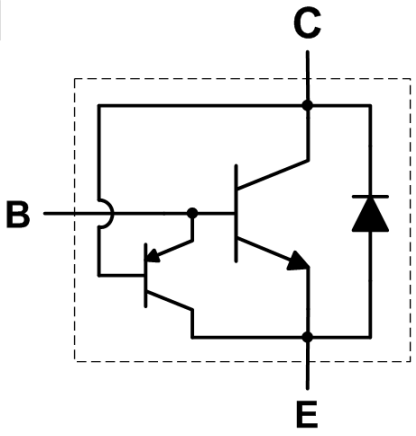
Low power AC-DC SMPS for:

- Battery Chargers for Mobile Phone / Tablets / Smartphones
- Power Supply for DVD / STB
- LED Lighting

TO251



Front Face View
Pin-Out



Device Schematic

Ordering Information (Note 4)

Product	Package	Marking	Quantity
APT13005DI-G1	TO251	APT13005DI-G1	3600 per Box in Tubes

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds..
4. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

TO251

= Manufacturers' code marking
APT13005DI-G1 = Product Type Marking ID
YWW = Date Code Marking
e.g. 312 = Year 2013, Week 12.
8 = Assembly site code
XX = Batch Number

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	700	V
Collector-Emitter Voltage	V_{CEO}	450	V
Emitter-Base Voltage	V_{EBO}	9	V
Collector Current	I_C	4	A
Peak Collector Current	I_{CM}	8	A
Base Current	I_B	2	A
Peak Base Current	I_{BM}	4	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation @T_C = +25°C	P_D	25	W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	5.0	°C/W
Operating and Storage Temperature Range	T_J,T_{STG}	-65 to +150	°C

ESD Ratings (Note 5)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Note: 5. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Safe Operating Areas (@T_A = +25°C, unless otherwise specified.)

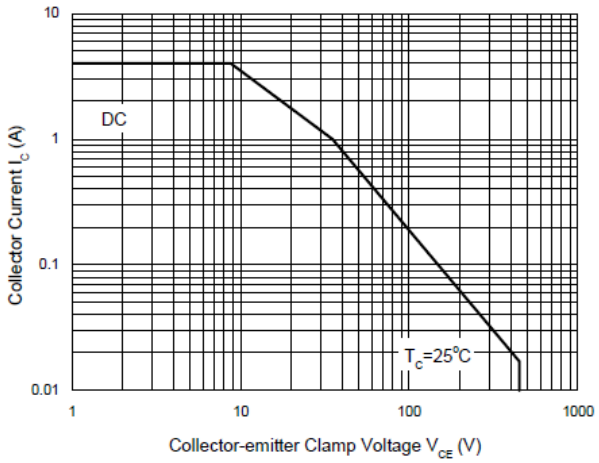


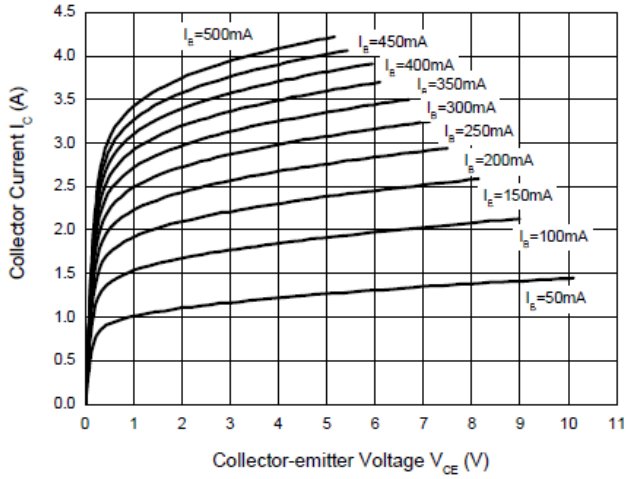
Figure 6. Safe Operating Areas
(TO-251 Package)

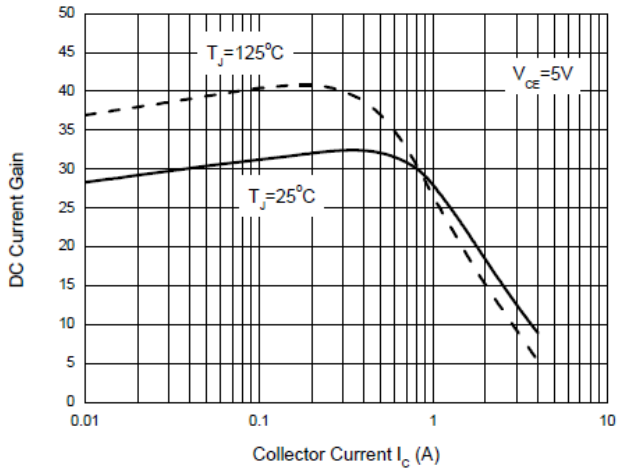
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

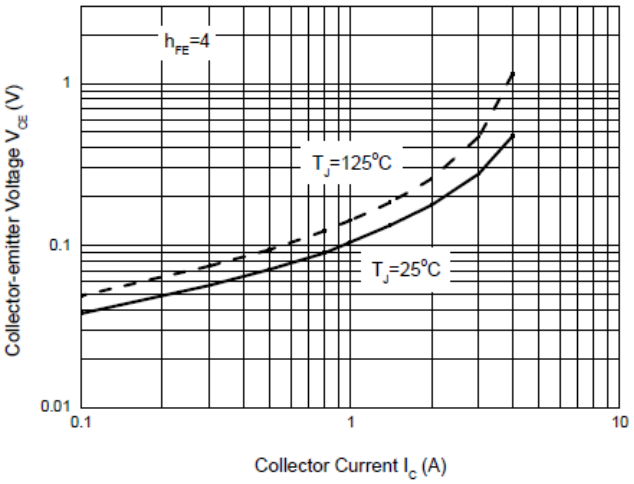
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	BV_{CES}	700	—	—	V	I_C = 100μA, V_{BE} = 0V
Collector-Emitter Breakdown Voltage	BV_{CEO}	450	—	—	V	I_C = 100μA
Emitter-Base Breakdown Voltage	BV_{EBO}	9	—	—	V	I_E = 100μA
Collector Cutoff Current	I_{CEV}	—	—	10	μA	V_{CE} = 700V, V_{BE} = -1.5V
DC current transfer Static ratio (Note 6)	h_{FE}	15 8	—	35 35	— —	I_C = 1A, V_{CE} = 5V I_C = 2A, V_{CE} = 5V
Collector-Emitter Saturation Voltage (Note 6)	$V_{CE(sat)}$	— — —	— — —	0.3 0.6 0.9	V	I_C = 1A, I_B = 0.2A I_C = 2A, I_B = 0.5A I_C = 4A, I_B = 1A
Base-Emitter Saturation Voltage (Note 6)	$V_{BE(sat)}$	— —	— —	1.1 1.3	V	I_C = 1A, I_B = 0.2A I_C = 2A, I_B = 0.5A
Output Capacitance	C_{ob}	—	45	—	pF	V_{CB} = 10V, f = 0.1MHz
Transition Frequency	f_T	4	—	—	MHz	I_C = 0.5A, V_{CE} = 10V
Turn-on Time with Resistive Load	t_{on}	—	—	0.7	μs	I_C = 2A, V_{CC} = 125V I_{B1} = -I_{B2} = 0.4A
Storage Time with Resistive Load	t_s	—	—	4.0		
Fall Time with Resistive Load	t_f	—	—	0.8		

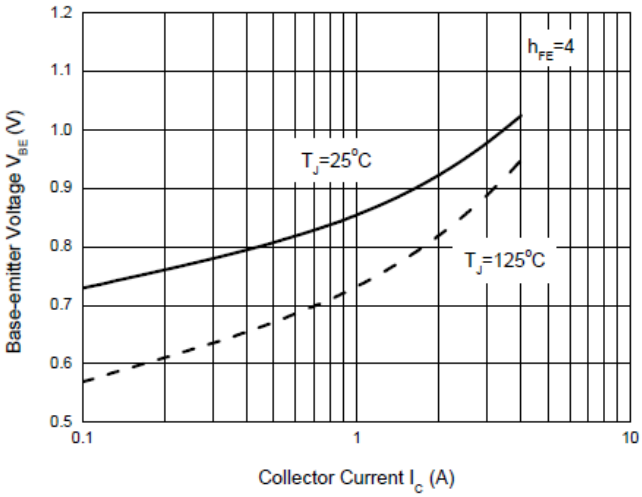
Note: 6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)





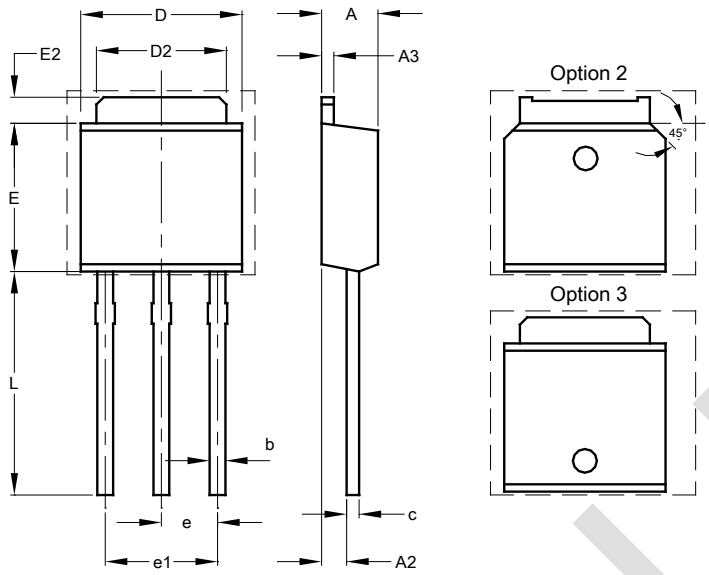




Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

TO251



TO251		
Dim	**Min**	**Max**
A	2.200	2.400
A2	0.890	1.150
A3	0.450	0.550
b	0.550	0.740
c	0.450	0.570
D	6.400	6.750
D2	5.200	5.400
E	5.950	6.250
E2	0.900	1.250
e	2.240	2.340
e1	4.430	4.730
L	8.900	9.500
All Dimensions in mm		

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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