Lead-free Green

100V HIGH VOLTAGE NPN SURFACE MOUNT TRANSISTOR

Features

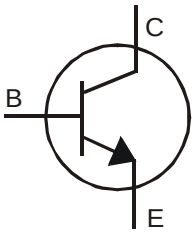
- Epitaxial Planar Die Construction
- High Collector-Emitter Voltage BV_{CEO} > 100V
- Ideally Suited for Automated Assembly Processes
- Ideal for Power Switching or Amplification Applications
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

Mechanical Data

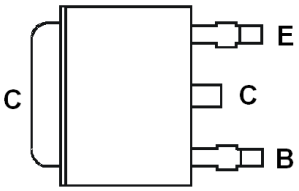
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.34 grams (approximate)

TO252 (DPAK)

Top View



Device Schematic



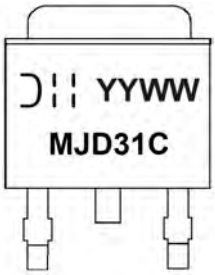
Pin Out Configuration
Top view

Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
MJD31C-13	AEC-Q101	MJD31C	13	16	2,500
MJD31CQ-13	Automotive	MJD31C	13	16	2,500

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
5. For packaging details, go to our website at http://www.diodes.com

Marking Information



MJD31C = Product Type Marking Code
= Manufacturers' code marking
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 10 = 2010)
WW = Week Code (01 – 53)

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

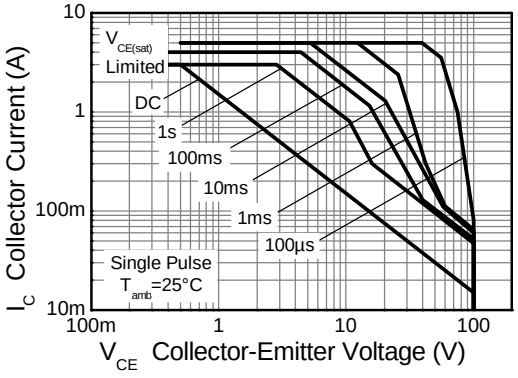
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage	V_{CEO}	100	V
Emitter-Base Voltage	V_{EBO}	6	V
Continuous Collector Current	I_C	3	A
Peak Pulse Collector Current	I_{CM}	5	A
Continuous Base Current	I_B	1	A

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

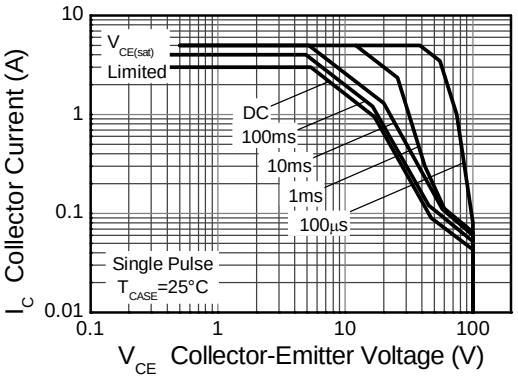
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P_D	1.56	W
Power Dissipation (Note 7)	P_D	15	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	80	°C/W
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	8.33	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 6. Device mounted on FR-4 PCB with minimum recommended pad layout.
7. Thermal resistance from junction to solder-point (on the exposed collector pad).

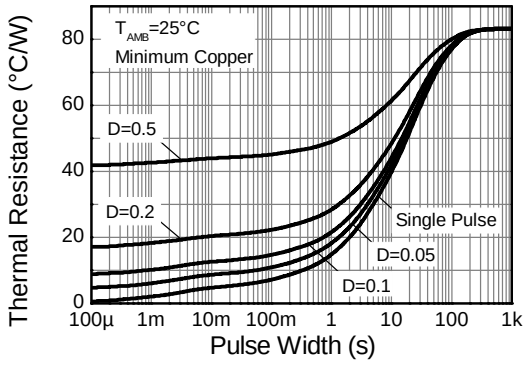
Thermal Characteristics



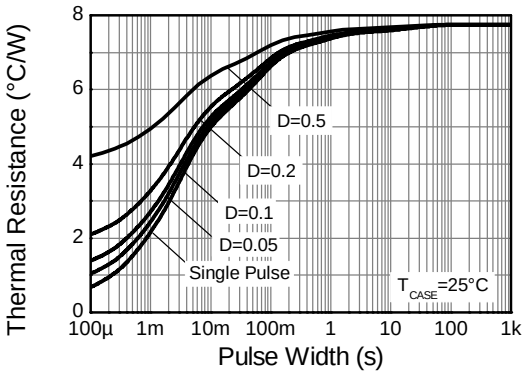
Safe Operating Area



Safe Operating Area



Transient Thermal Impedance



Transient Thermal Impedance

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	100	—	—	V	I_C = 30mA, I_B = 0
Collector Cut-off Current	I_{CEO}	—	—	1	μA	V_{CB} = 60V, I_B = 0
Collector Cut-off Current	I_{CES}	—	—	1	μA	V_{CE} = 100V, V_{EB} = 0
Emitter Cut-off Current	I_{EBO}	—	—	1	μA	V_{EB} = 5V, I_C = 0
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	—	1.2	V	I_C = 3.0A, I_B = 375mA
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(on)}$	—	—	1.8	V	I_C = 3A, V_{CE} = 4V
DC Current Gain (Note 8)	h_{FE}	25 10	—	— 50	—	V_{CE} = 4V, I_C = 1A V_{CE} = 4V, I_C = 3A
Current Signal Current Gain	H_{fe}	20	—	—	—	V_{CE} = 10V, I_C = 0.5A, f = 1KHz
Current Gain-Bandwidth Product	f_T	3.0	—	—	MHz	I_C = 500mA, V_{CE} = 10V, f = 1MHz

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

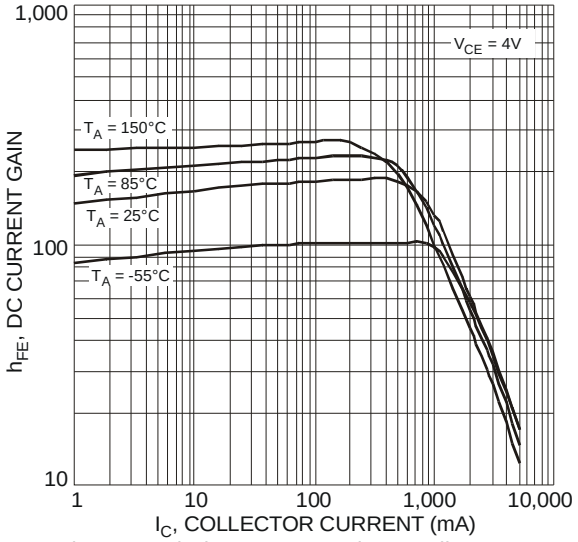


Figure 1 Typical DC Current Gain vs. Collector Current

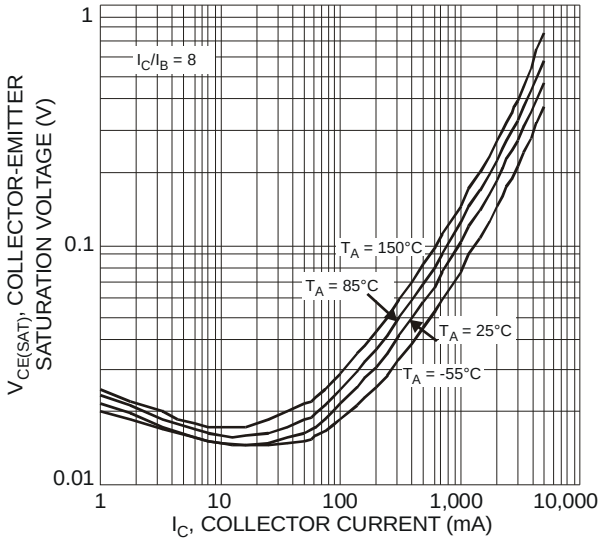


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

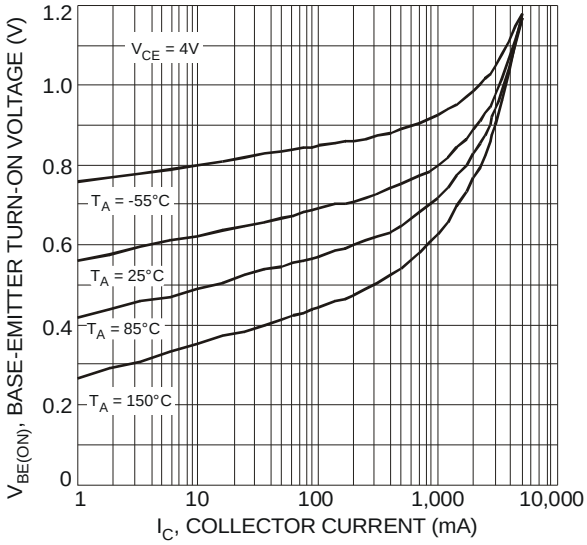


Figure 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

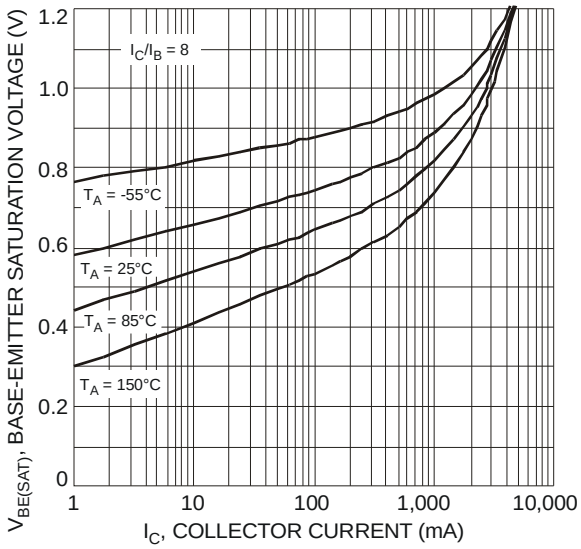


Figure 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

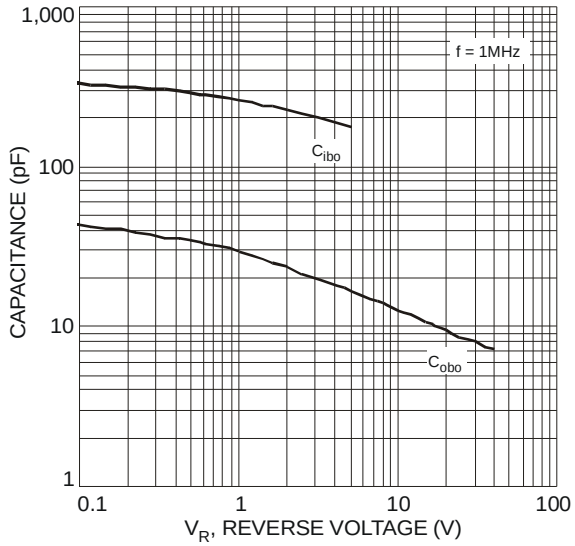
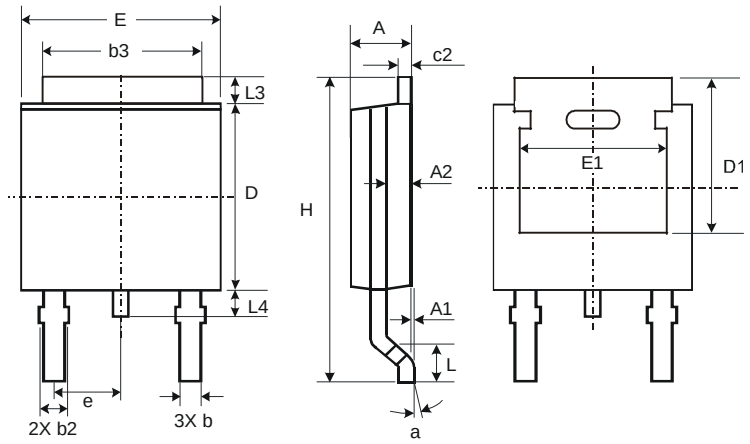


Figure 5 Typical Capacitance Characteristics

Package Outline Dimensions

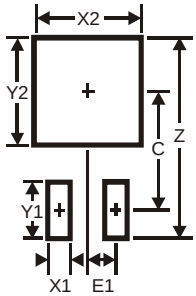
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



TO252			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	–	–
e	–	–	2.286
E	6.45	6.70	6.58
E1	4.32	–	–
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	–
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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