

## Features

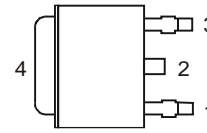
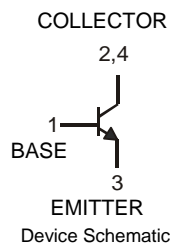
- Epitaxial Planar Die Construction
- High Collector-Emitter Voltage
- Ideally Suited for Automated Assembly Processes
- Ideal for Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

## Mechanical Data

- Case: 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 annealed over Copper Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.34 grams (approximate)



Top View



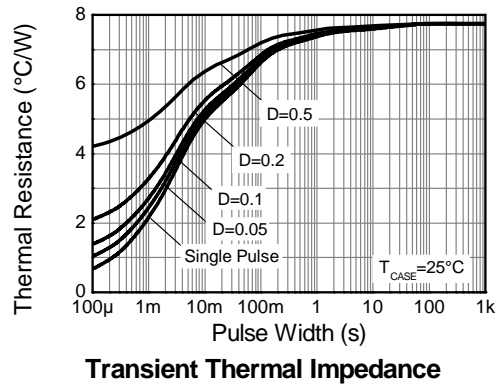
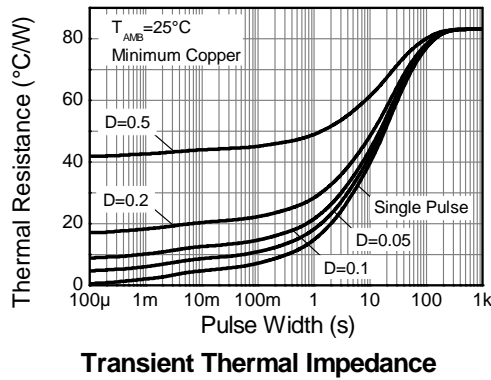
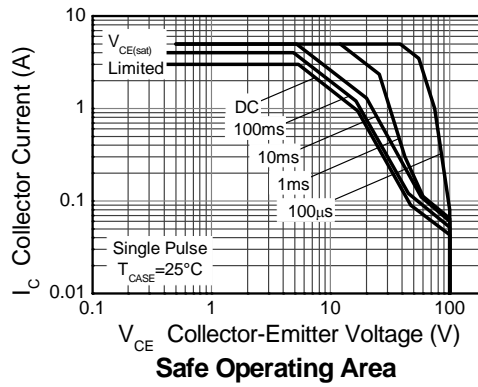
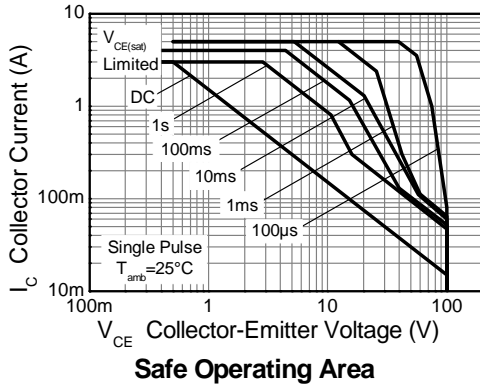
## Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	100	V
Collector-Emitter Voltage	$V_{CEO}$	100	V
Emitter-Base Voltage	$V_{EBO}$	5	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

Characteristic	Symbol	Value	Unit
Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	15	W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	8.33	$^\circ\text{C/W}$
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 3)	$P_D$	1.5	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	80	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Typical Characteristics**



**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
<b>OFF CHARACTERISTICS</b>						
Collector-Emitter Sustaining Voltage (Note 4)	$V_{(SUS)CEO}$	100	—	—	V	$I_C = 30\text{mA}, I_B = 0$
Collector Cut-off Current	$I_{CEO}$	—	—	50	$\mu\text{A}$	$V_{CB} = 60\text{V}, I_B = 0$
Collector Cut-off Current	$I_{CES}$	—	—	20	$\mu\text{A}$	$V_{CE} = 100\text{V}, V_{EB} = 0$
Emitter Cut-off Current	$I_{EBO}$	—	—	1.0	mA	$V_{EB} = 5.0\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 4)</b>						
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	1.2	V	$I_C = 3.0\text{A}, I_B = 375\text{mA}$
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	—	—	1.8	V	$V_{CE} = 4.0\text{V}, I_C = 3\text{A}$
DC Current Gain	$h_{FE}$	25 10	—	— 50	—	$V_{CE} = 4.0\text{V}, I_C = 1\text{A}$ $V_{CE} = 4.0\text{V}, I_C = 3\text{A}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Current Gain-Bandwidth Product	$f_T$	3.0	—	—	MHz	$I_C = 500\text{mA}, V_{CE} = 10\text{V}, f = 1\text{MHz}$
Small Signal Current Gain	$h_{fe}$	20	—	—	—	$V_{CE} = 10\text{V}, I_C = 0.5\text{A}, f = 1\text{KHz}$

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB with minimum recommended pad layout.
  4. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

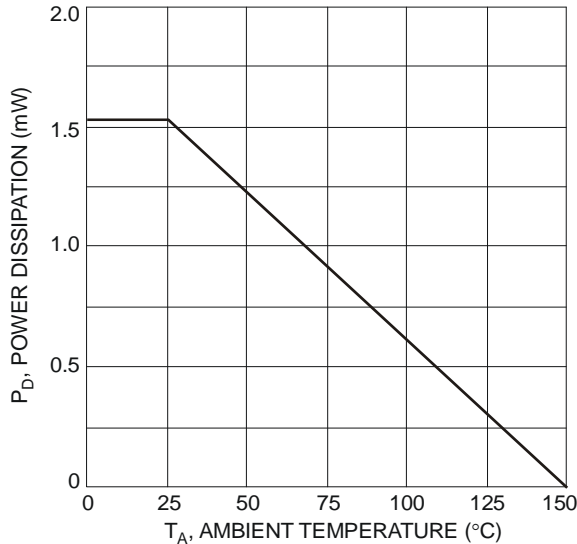


Fig. 1 Power Dissipation vs. Ambient Temperature

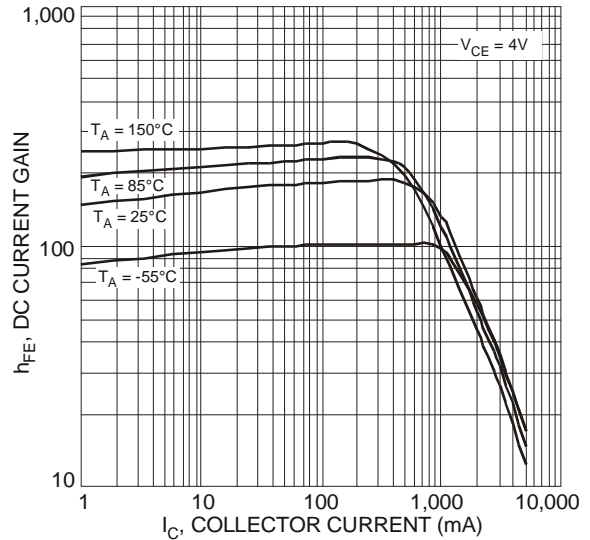


Fig. 2 Typical DC Current Gain vs. Collector Current

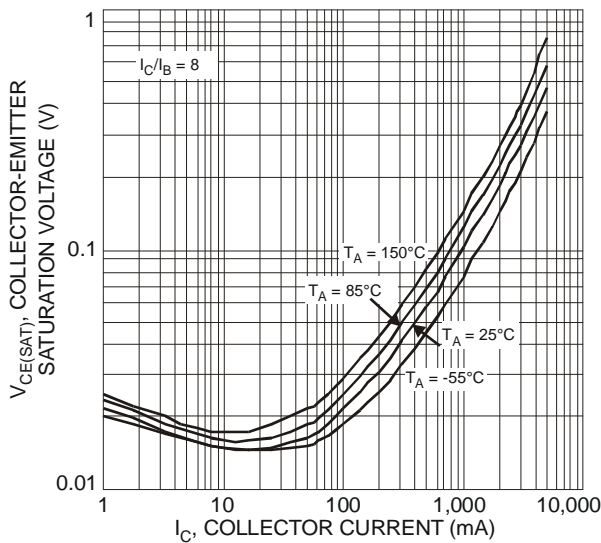


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

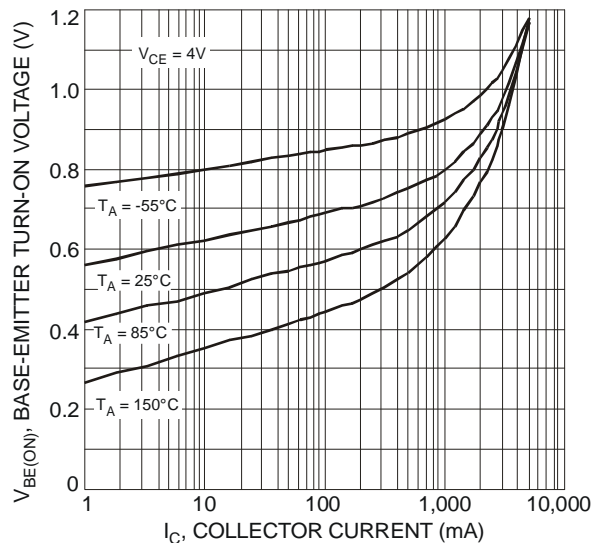


Fig. 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

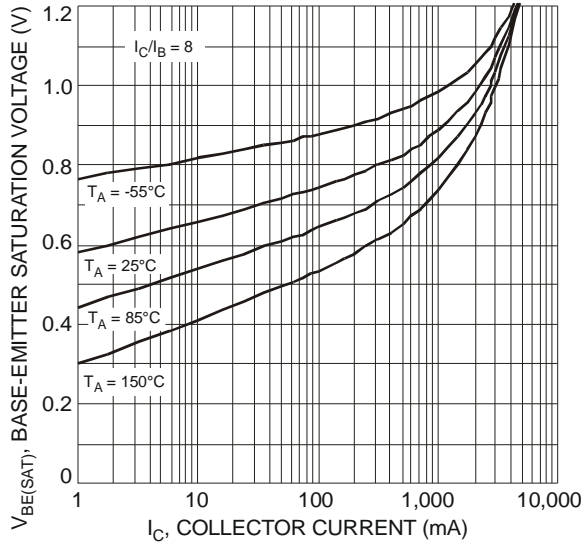


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

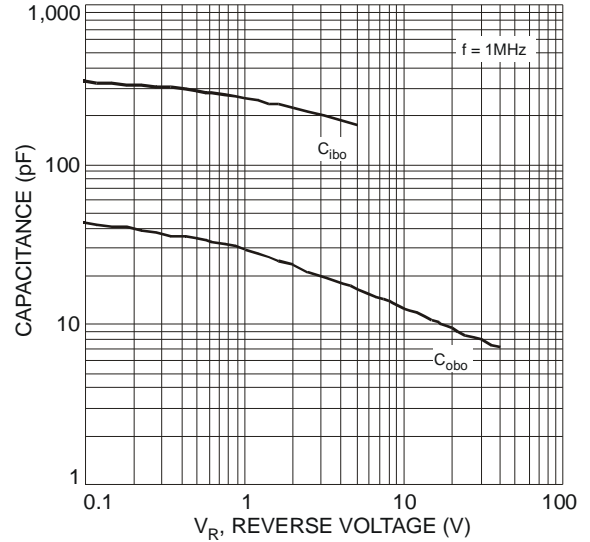


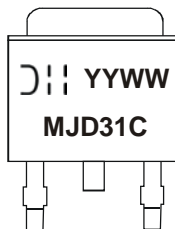
Fig. 6 Typical Capacitance Characteristics

**Ordering Information** (Note 5)

Part Number	Case	Packaging
MJD31C-13	DPAK	2500/Tape & Reel

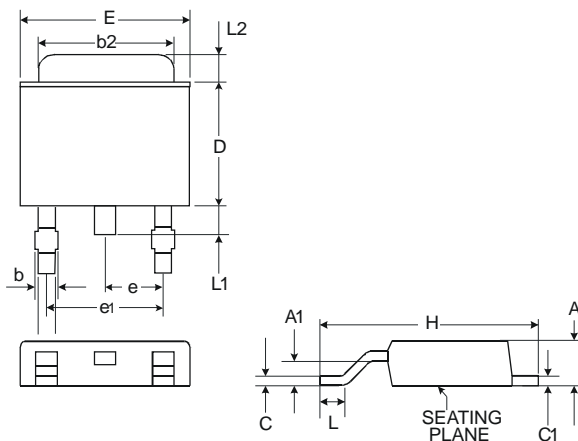
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



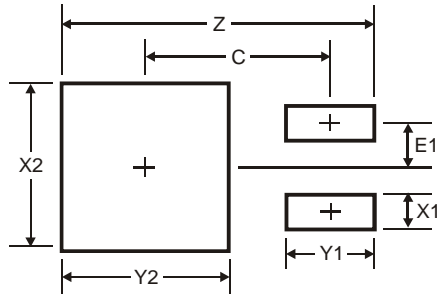
MJD31C = Product Type Marking Code  
 ☺ = Manufacturers' code marking  
 YYWW = Date Code Marking  
 YY = Last Digit of Year, (ex: 08 = 2008)  
 WW = Week Code 01-52

**Package Outline Dimensions**



DPAK		
Dim	Min	Max
A	2.18	2.40
A1	0.89	1.14
b	0.61 Typ	
b2	5.20	5.50
C	0.45	0.58
C1	0.45	0.58
D	5.40	6.20
E	6.35	6.80
e	2.28 Typ	
e1	4.57 Typ	
H	9.00	10.40
L	0.51	—
L1	0.64	1.02
L2	0.88	1.27
<b>All Dimensions in mm</b>		

## Suggested Pad Layout



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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