

MJD31, MJD31C (NPN), MJD32, MJD32C (PNP)

MJD31C and MJD32C are Preferred Devices

Complementary Power Transistors

DPAK For Surface Mount Applications

Designed for general purpose amplifier and low speed switching applications.

Features

- Lead Formed for Surface Mount Applications in Plastic Sleeves
- Straight Lead Version in Plastic Sleeves ("1" Suffix)
- Lead Formed Version in 16 mm Tape and Reel ("T4" Suffix)
- Electrically Similar to Popular TIP31 and TIP32 Series
- Epoxy Meets UL 94, V-0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B > 8000 V
Machine Model, C > 400 V
- Pb-Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Collector-Emitter Voltage MJD31, MJD32 MJD31C, MJD32C	V_{CEO}	40 100	Vdc
Collector-Base Voltage MJD31, MJD32 MJD31C, MJD32C	V_{CB}	40 100	Vdc
Emitter-Base Voltage	V_{EB}	5	Vdc
Collector Current – Continuous – Peak	I_C	3 5	Adc
Base Current	I_B	1	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	15 0.12	W W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.56 0.012	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	8.3	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient*	$R_{\theta JA}$	80	$^\circ\text{C/W}$
Lead Temperature for Soldering Purposes	T_L	260	$^\circ\text{C}$

*These ratings are applicable when surface mounted on the minimum pad sizes recommended.

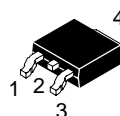


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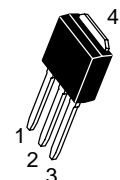
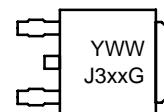
<http://onsemi.com>

SILICON POWER TRANSISTORS 3 AMPERES 40 AND 100 VOLTS 15 WATTS

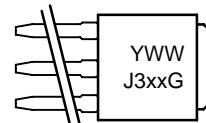
MARKING DIAGRAMS



DPAK
CASE 369C
STYLE 1



DPAK-3
CASE 369D
STYLE 1



Y = Year
WW = Work Week
xx = 1, 1C, 2, or 2C
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

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ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage (Note 1) (I _C = 30 mAdc, I _B = 0)	MJD31, MJD32 MJD31C, MJD32C	V _{CEO(sus)}	40 100	– –	Vdc
Collector Cutoff Current (V _{CE} = 40 Vdc, I _B = 0) (V _{CE} = 60 Vdc, I _B = 0)	MJD31, MJD32 MJD31C, MJD32C	I _{CEO}	–	50	μAdc
Collector Cutoff Current (V _{CE} = Rated V _{CEO} , V _{EB} = 0)		ICES	–	20	μAdc
Emitter Cutoff Current (V _{BE} = 5 Vdc, I _C = 0)		I _{EBO}	–	1	mAdc

ON CHARACTERISTICS (Note 1)

DC Current Gain (I _C = 1 Adc, V _{CE} = 4 Vdc) (I _C = 3 Adc, V _{CE} = 4 Vdc)		h _{FE}	25 10	– 50	–
Collector–Emitter Saturation Voltage (I _C = 3 Adc, I _B = 375 mAdc)		V _{CE(sat)}	–	1.2	Vdc
Base–Emitter On Voltage (I _C = 3 Adc, V _{CE} = 4 Vdc)		V _{BE(on)}	–	1.8	Vdc

DYNAMIC CHARACTERISTICS

Current Gain – Bandwidth Product (Note 2) (I _C = 500 mAdc, V _{CE} = 10 Vdc, f _{test} = 1 MHz)		f _T	3	–	MHz
Small–Signal Current Gain (I _C = 0.5 Adc, V _{CE} = 10 Vdc, f = 1 kHz)		h _{fe}	20	–	–

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

2. f_T = |h_{fe}| • f_{test}.

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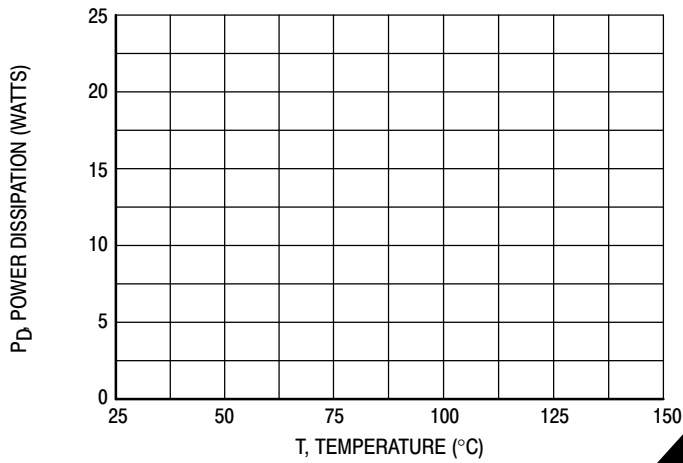


Figure 1. Power Derating

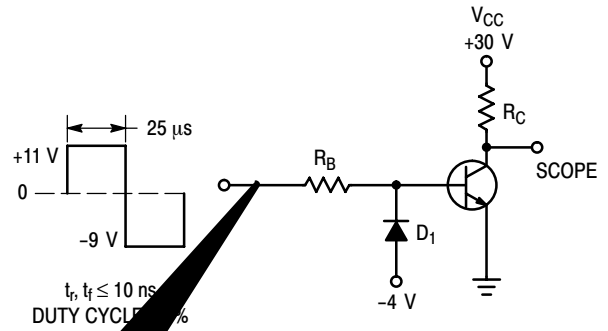
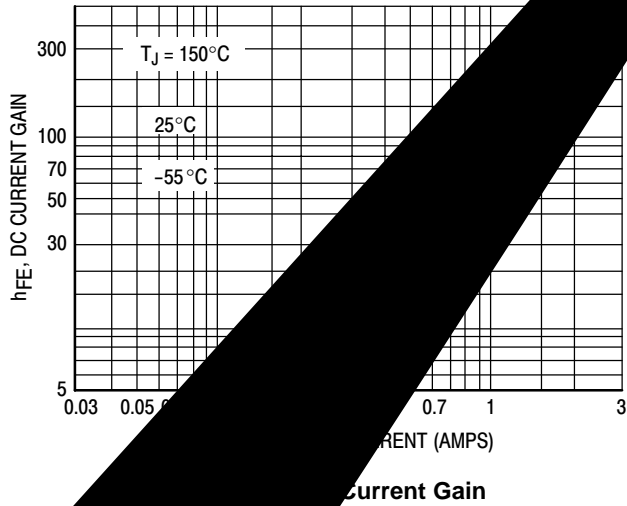
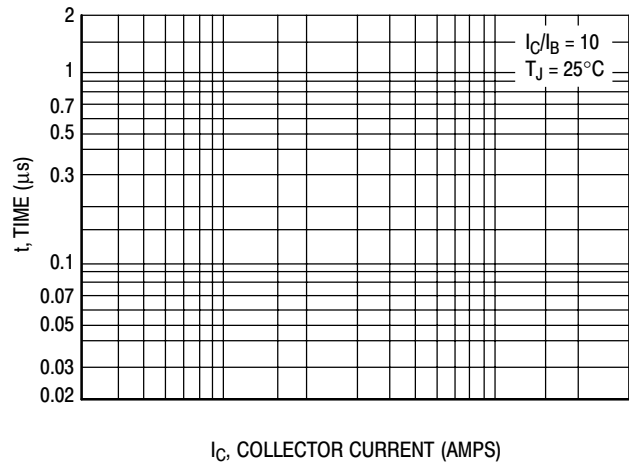


Figure 2. Switching Time Test Circuit

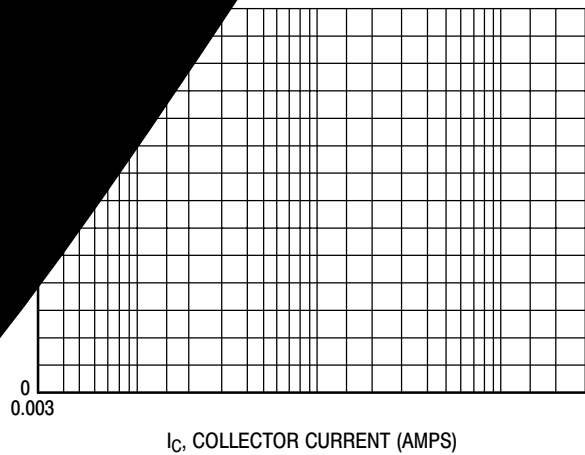


Current Gain



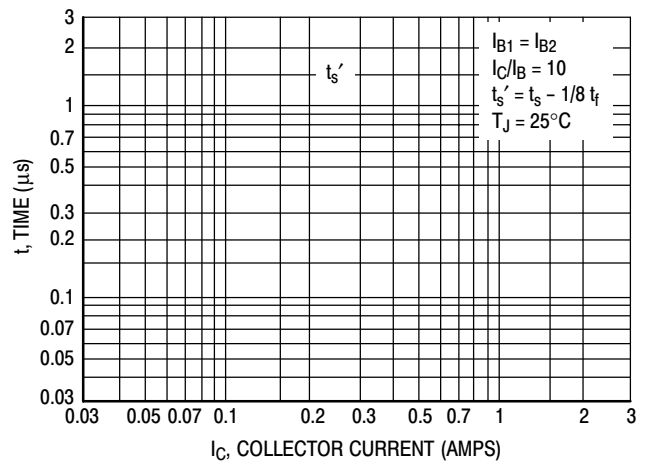
I_C , COLLECTOR CURRENT (AMPS)

Figure 4. Turn-On Time



I_C , COLLECTOR CURRENT (AMPS)

Figure 5. "On" Voltages



I_C , COLLECTOR CURRENT (AMPS)

MJD31, MJD31C (NPN)

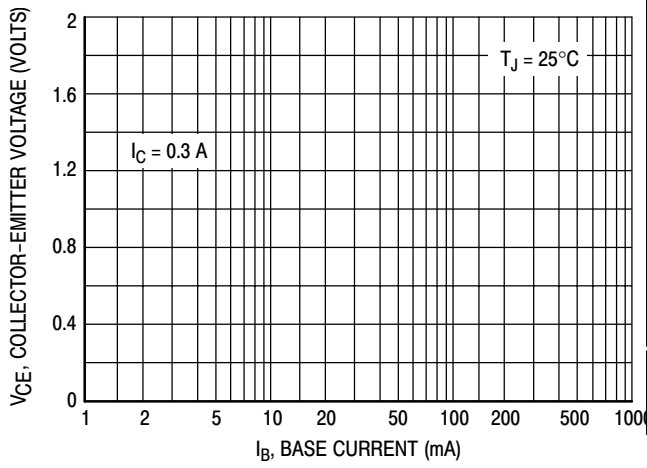
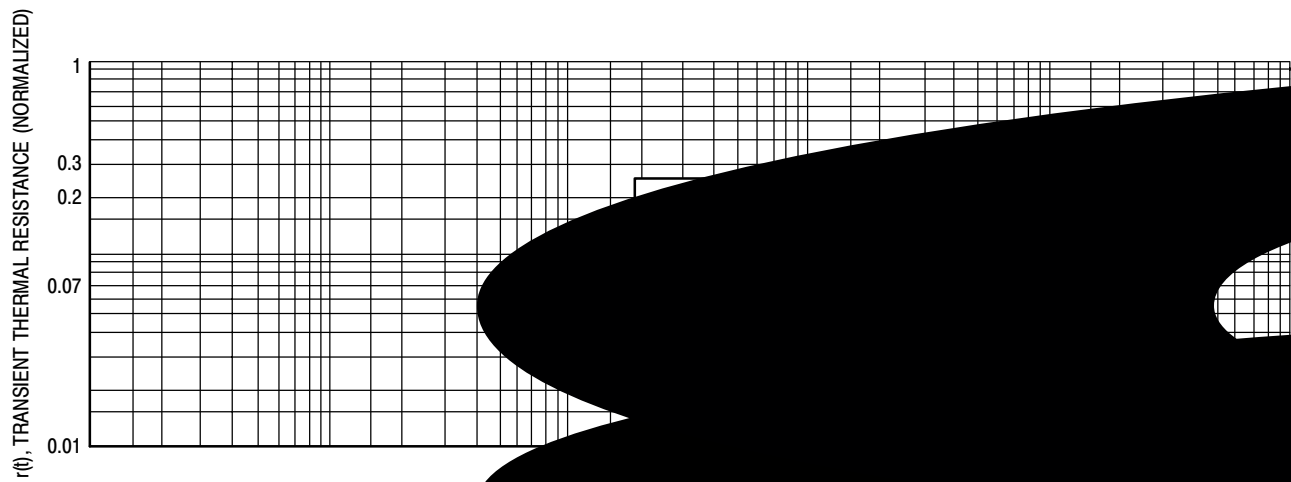


Figure 7. Collector Saturation Region



MJD31, MJD31C (NPN), MJD32, MJD32C (PNP)

ORDERING INFORMATION

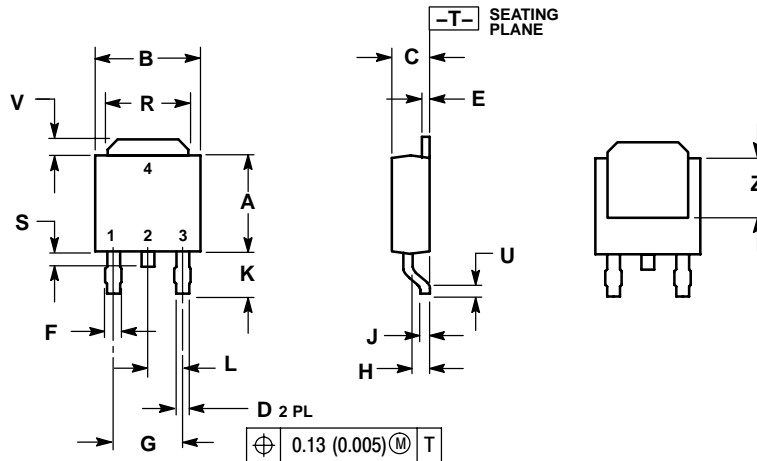
Device	Package Type	Package	Shipping†
MJD31C	DPAK	369C	75 Units / Rail
MJD31CG	DPAK (Pb-Free)	369C	75 Units / Rail
MJD31C1	DPAK-3	369D	75 Units / Rail
MJD31C1G	DPAK-3 (Pb-Free)	369D	75 Units / Rail
MJD31CRL	DPAK	369C	1800 Tape & Reel
MJD31CRLG	DPAK (Pb-Free)	369C	1800 Tape & Reel
MJD31CT4	DPAK	369C	2500 Tape & Reel
MJD31CT4G	DPAK (Pb-Free)	369C	2500 Tape & Reel
MJD31T4	DPAK	369C	2500 Tape & Reel
MJD31T4G	DPAK (Pb-Free)	369C	2500 Tape & Reel
MJD32C	DPAK	369C	75 Units / Rail
MJD32CG	DPAK (Pb-Free)	369C	75 Units / Rail
MJD32C1	DPAK-3	369D	75 Units / Rail
MJD32C1G	DPAK-3 (Pb-Free)	369D	75 Units / Rail
MJD32CRL	DPAK	369C	1800 Tape & Reel
MJD32CRLG	DPAK (Pb-Free)	369C	1800 Tape & Reel
MJD32CT4	DPAK	369C	2500 Tape & Reel
MJD32CT4G	DPAK (Pb-Free)	369C	2500 Tape & Reel
MJD32RL	DPAK	369C	1800 Tape & Reel
MJD32RLG	DPAK (Pb-Free)	369C	1800 Tape & Reel
MJD32T4	DPAK	369C	2500 Tape & Reel
MJD32T4G	DPAK (Pb-Free)	369C	2500 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MJD31, MJD31C (NPN), MJD32, MJD32C (PNP)

PACKAGE DIMENSIONS

DPAK
CASE 369C
ISSUE O

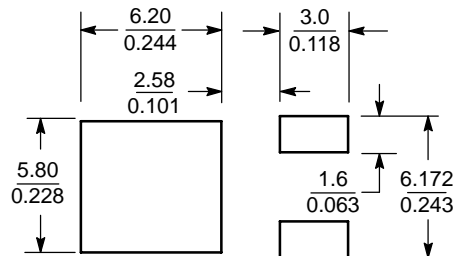


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.22
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
G	0.180 BSC		4.58 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.180	0.215	4.57	5.45
S	0.025	0.040	0.63	1.01
U	0.020	---	0.51	---
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

SOLDERING FOOTPRINT*



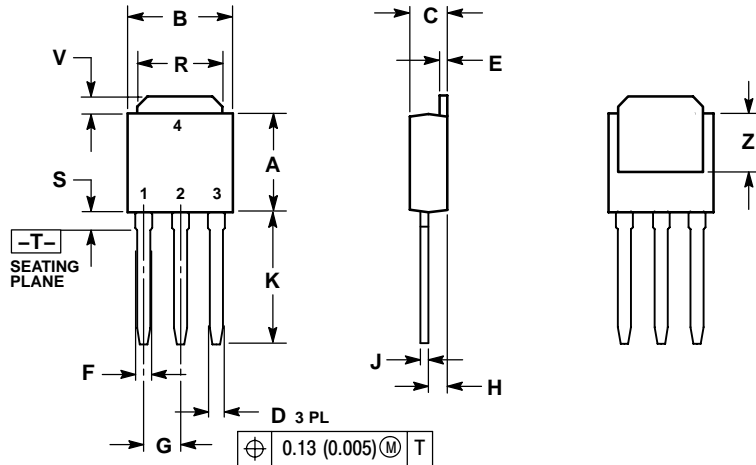
SCALE 3:1 $\left(\frac{\text{mm}}{\text{inches}} \right)$

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

MJD31, MJD31C (NPN), MJD32, MJD32C (PNP)

PACKAGE DIMENSIONS

DPAK-3
CASE 369D-01
ISSUE B




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
G	0.090 BSC		2.29 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.180	0.215	4.45	5.45
S	0.025	0.040	0.63	1.01
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

- STYLE 1:
- PIN 1. BASE
 2. COLLECTOR
 3. EMITTER
 4. COLLECTOR

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