MJD5731

Preferred Device

High Voltage PNP Silicon Power Transistors

. . . designed for line operated audio output amplifier, SWITCHMODE™ power supply drivers and other switching applications.

- 350 V (Min) - $V_{CEO(sus)}$
- 1.0 A Rated Collector Current
- PNP Complements to the MJD47 thru MJD50 Series

MAXIMUM RATINGS

Rating	Symbol	MJD5731	Unit
Collector-Emitter Voltage	V_{CEO}	350	Vdc
Emitter-Base Voltage	V_{EB}	5	Vdc
Collector Current- Continuous Peak	I_C	1.0 3.0	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	 15 0.12	 Watts W/°C
Total Power Dissipation (1) @ T_A = 25°C Derate above 25°C	P_D	 1.56 0.0125	 Watts W/°C
Unclamped Inductive Load Energy (See Figure)	E	20	mJ
Operating and Storage Junction Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL CHARACTERISTICS

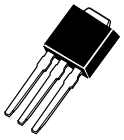
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	8.33	°C/W
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	80	°C/W
Lead Temperature for Soldering	T_L	260	°C

1. These ratings are applicable when surface mounted on the minimum pad size recommended.

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SILICON
POWER TRANSISTORS
1.0 A, 350 V
15 W

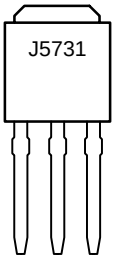


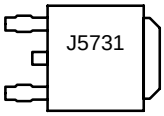
DPAK
CASE 369



DPAK
CASE 369A
Style 1

MARKING DIAGRAM





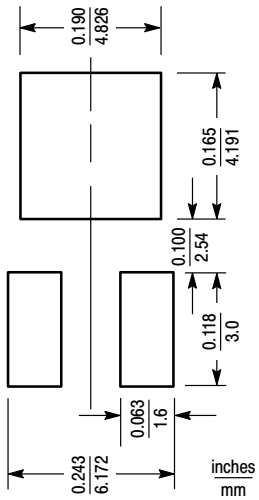
xx = Specific Device Code
A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week

ORDERING INFORMATION

Device	Package	Shipping
MJD5731T4	DPAK	2500/ Tape & Reel

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

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MINIMUM PAD SIZES RECOMMENDED FOR SURFACE MOUNTED APPLICATIONS

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage (Note 2) (I_C = 30 mAdc, I_B = 0)	$V_{CEO(sus)}$	350	-	Vdc
Collector Cutoff Current (V_{CE} = 250 Vdc, I_B = 0)	I_{CEO}	-	0.1	mAdc
Collector Cutoff Current (V_{CE} = 350 Vdc, V_{BE} = 0)	I_{CES}	-	0.01	mAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)	I_{EBO}	-	0.5	mAdc
ON CHARACTERISTICS (Note 2)				
DC Current Gain (I_C = 0.3 Adc, V_{CE} = 10 Vdc) (I_C = 1.0 Adc, V_{CE} = 10 Vdc)	h_{FE}	 30 10	 175 -	-
Collector-Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 0.2 Adc)	$V_{CE(sat)}$	-	1.0	Vdc
Base-Emitter On Voltage (I_C = 1.0 Adc, V_{CE} = 10 Vdc)	$V_{BE(on)}$	-	1.5	Vdc
DYNAMIC CHARACTERISTICS				
Current Gain - Bandwidth Product (I_C = 0.2 Adc, V_{CE} = 10 Vdc, f = 2.0 MHz)	f_T	10	-	MHz
Small-Signal Current Gain (I_C = 0.2 Adc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{fe}	25	-	-

2. Pulse Test: Pulse Width $\leq$ 300 μs, Duty Cycle $\leq$ 2.0%.

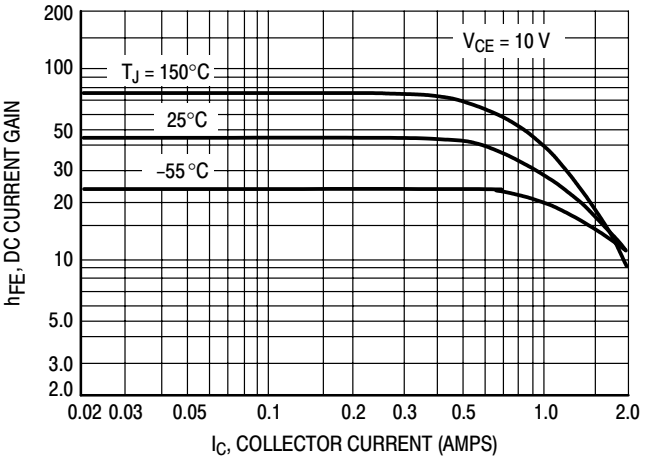


Figure 1. DC Current Gain

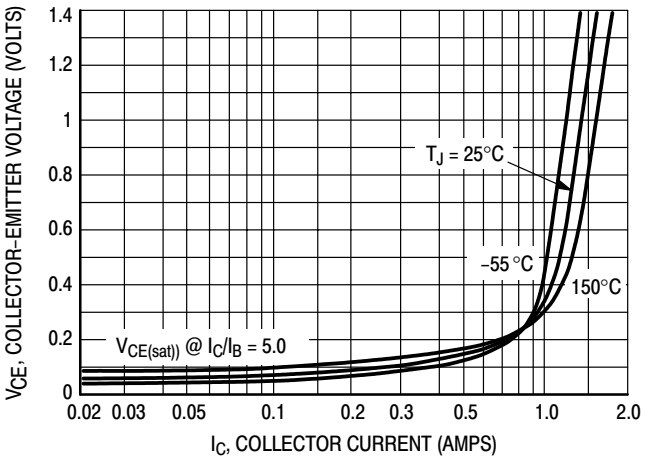


Figure 2. Collector-Emitter Saturation Voltage

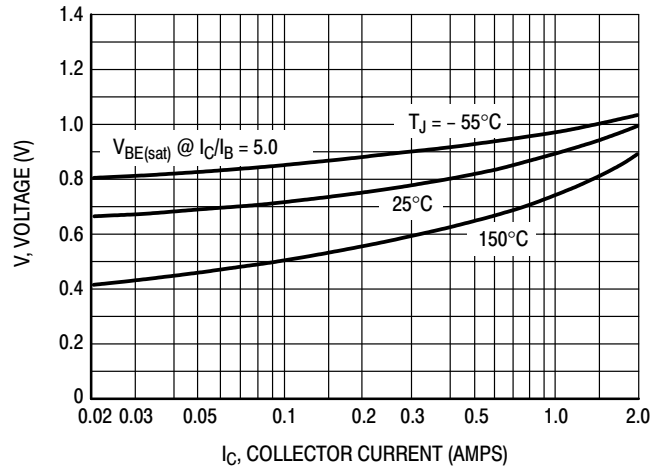


Figure 3. Base-Emitter Voltage

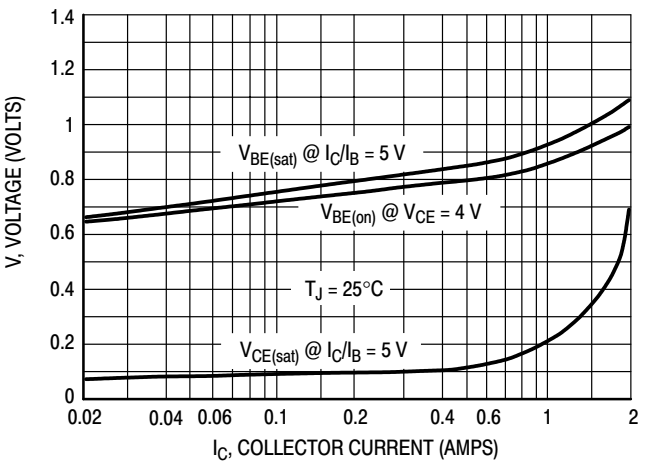


Figure 4. "On" Voltages

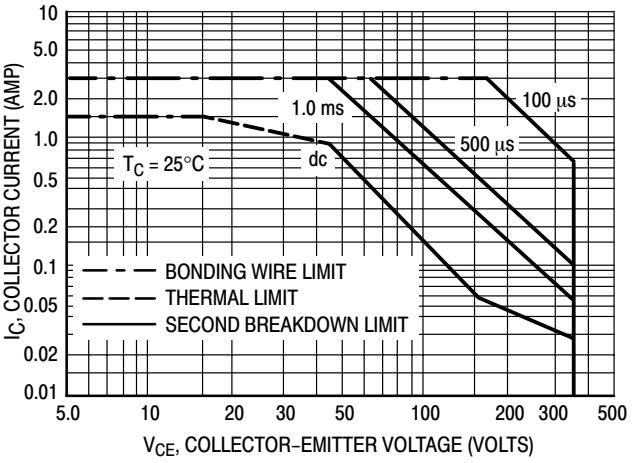


Figure 5. Forward Bias Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on $T_{J(pk)}$ = 150°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq$ 150°C. $T_{J(pk)}$ may be calculated from the data in Figure 6. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

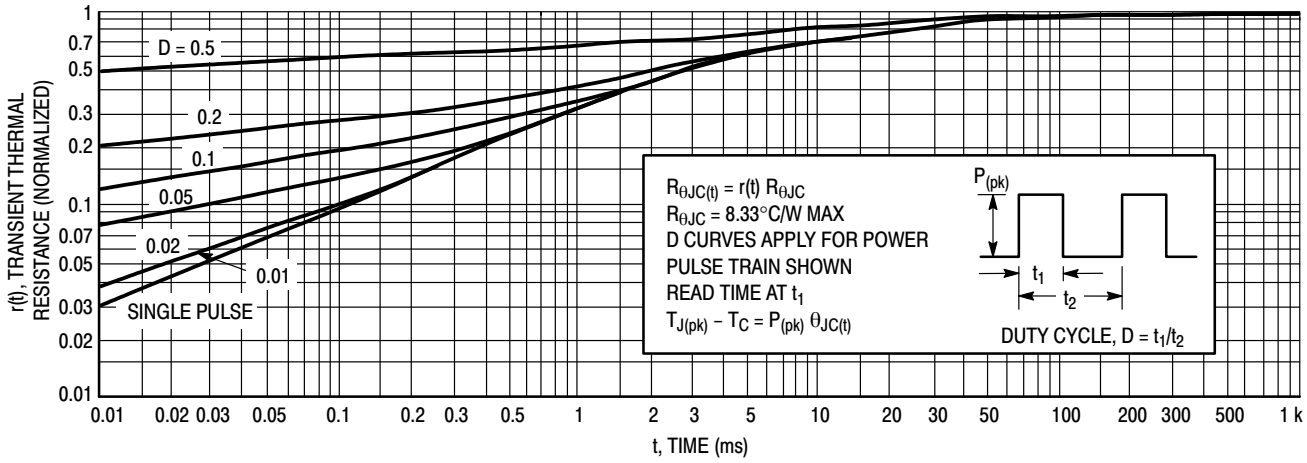


Figure 6. Thermal Response

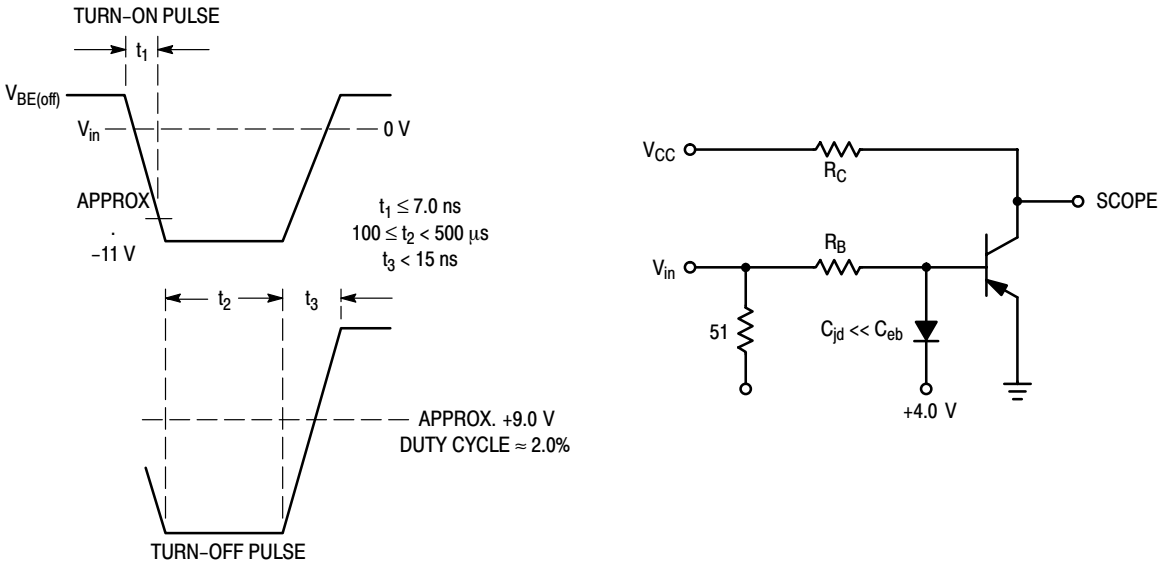


Figure 7. Switching Time Equivalent Circuit

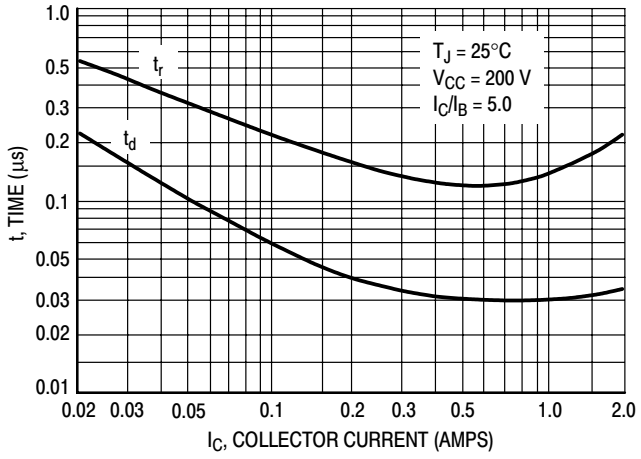


Figure 8. Turn-On Resistive Switching Times

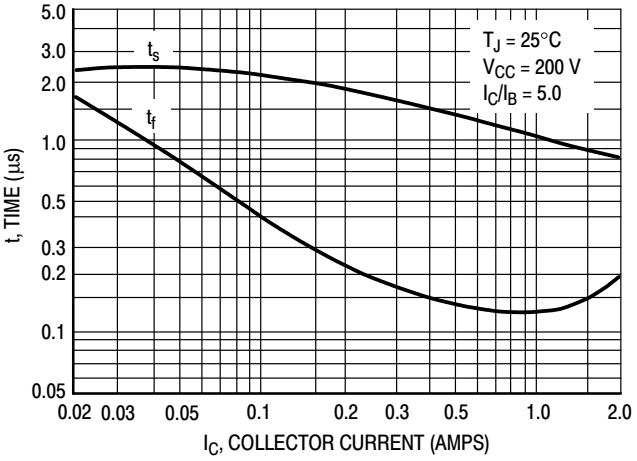
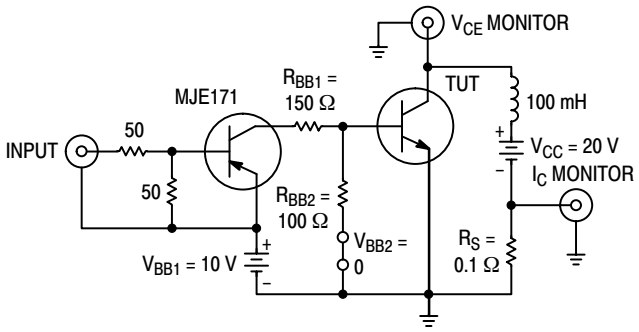


Figure 9. Resistive Turn-Off Switching Times

Test Circuit



Voltage and Current Waveforms

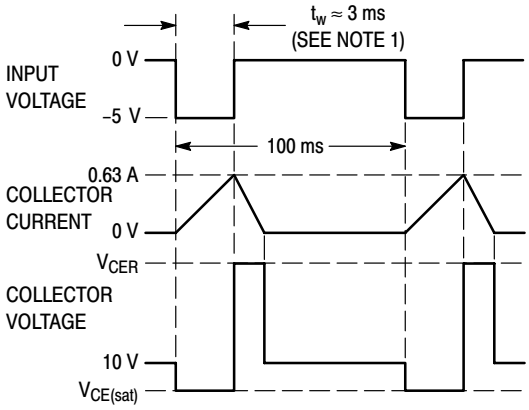
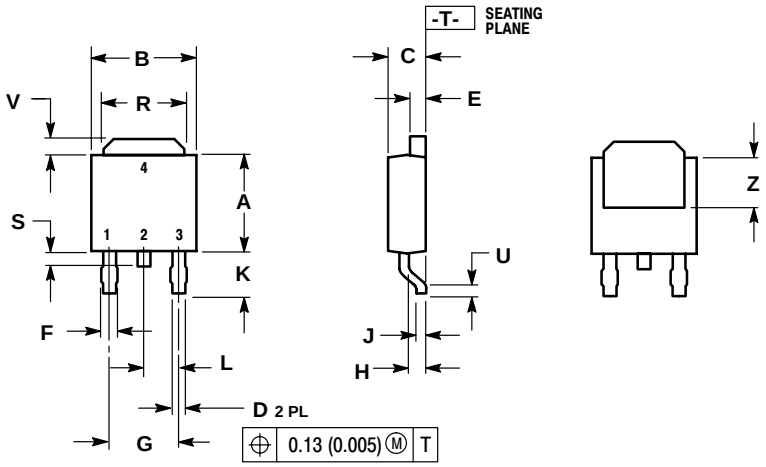


Figure 10. Inductive Load Switching

PACKAGE DIMENSIONS

DPAK
CASE 395A-13
ISSUE AB



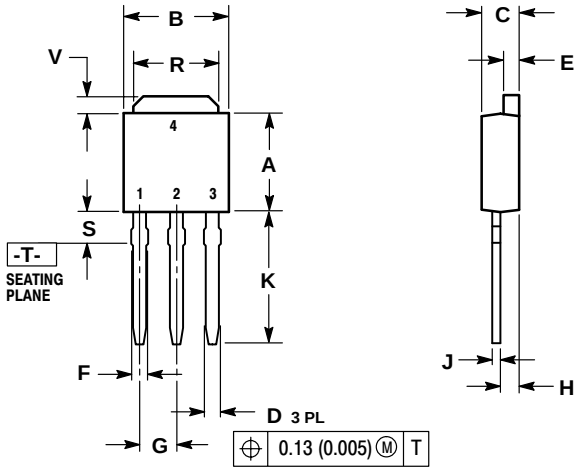
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.235	0.250	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	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
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	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	---	0.51	---
V	0.030	0.050	0.77	1.27
Z	0.138	---	3.51	---

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

PACKAGE DIMENSIONS

DPAK
CASE 395-07
ISSUE M



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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.235	0.250	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	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
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	0.175	0.215	4.45	5.46
S	0.050	0.090	1.27	2.28
V	0.030	0.050	0.77	1.27

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