Complementary Power Transistors

DPAK For Surface Mount Applications

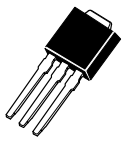
PNP
MJD2955
NPN
MJD3055

SILICON
POWER TRANSISTORS
10 AMPERES
60 VOLTS
20 WATTS

Designed for general purpose amplifier and low speed switching applications.

- Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)
- Straight Lead Version in Plastic Sleeves ("–1" Suffix)
- Lead Formed Version Available in 16 mm Tape and Reel ("T4" Suffix)
- Electrically Similar to MJE2955 and MJE3055
- DC Current Gain Specified to 10 Amperes
- High Current Gain–Bandwidth Product —
  f_T = 2.0 MHz (Min) @ I_C
  = 500 mAdc

CASE 369A–13



CASE 369–07

MAXIMUM RATINGS

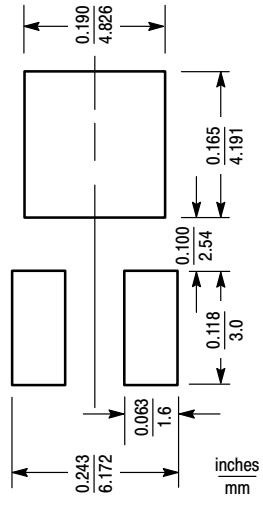
Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	60	Vdc
Collector–Base Voltage	V_{CB}	70	Vdc
Emitter–Base Voltage	V_{EB}	5	Vdc
Collector Current	I_C	10	Adc
Base Current	I_B	6	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D†	20 0.16	Watts W/°C
Total Power Dissipation (1) @ T_A = 25°C Derate above 25°C	P_D	1.75 0.014	Watts W/°C
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	$R_{\theta JC}$	6.25	°C/W
Thermal Resistance, Junction to Ambient (1)	$R_{\theta JA}$	71.4	°C/W

(1) These ratings are applicable when surface mounted on the minimum pad sizes recommended.
†Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed.

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 (1) (I_C = 30 mAdc, I_B = 0)	$V_{CEO(sus)}$	60	—	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc, I_B = 0)	I_{CEO}	—	50	μAdc
Collector Cutoff Current (V_{CE} = 70 Vdc, $V_{EB(off)}$ = 1.5 Vdc) (V_{CE} = 70 Vdc, $V_{EB(off)}$ = 1.5 Vdc, T_C = 150°C)	I_{CEX}	 — —	 0.02 2	mAdc
Collector Cutoff Current (V_{CB} = 70 Vdc, I_E = 0) (V_{CB} = 70 Vdc, I_E = 0, T_C = 150°C)	I_{CBO}	 — —	 0.02 2	mAdc
Emitter Cutoff Current (V_{BE} = 5 Vdc, I_C = 0)	I_{EBO}	—	0.5	mAdc
ON CHARACTERISTICS				
DC Current Gain (1) (I_C = 4 Adc, V_{CE} = 4 Vdc) (I_C = 10 Adc, V_{CE} = 4 Vdc)	h_{FE}	 20 5	 100 —	—
Collector–Emitter Saturation Voltage (1) (I_C = 4 Adc, I_B = 0.4 Adc) (I_C = 10 Adc, I_B = 3.3 Adc)	$V_{CE(sat)}$	 — —	 1.1 8	Vdc
Base–Emitter On Voltage (1) (I_C = 4 Adc, V_{CE} = 4 Vdc)	$V_{BE(on)}$	—	1.8	Vdc
DYNAMIC CHARACTERISTICS				
Current–Gain — Bandwidth Product (I_C = 500 mAdc, V_{CE} = 10 Vdc, f = 500 kHz)	f_T	2	—	MHz

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

TYPICAL CHARACTERISTICS

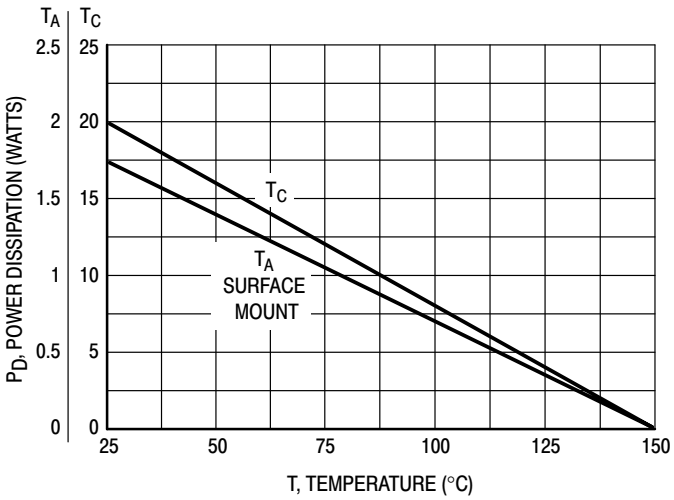


Figure 1. Power Derating

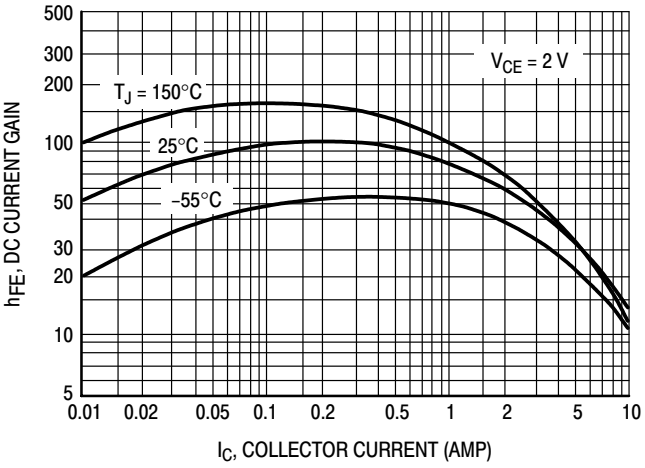


Figure 2. DC Current Gain

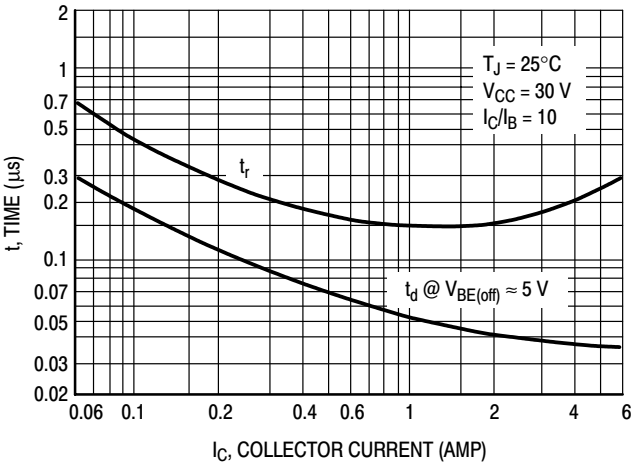


Figure 3. Turn−On Time

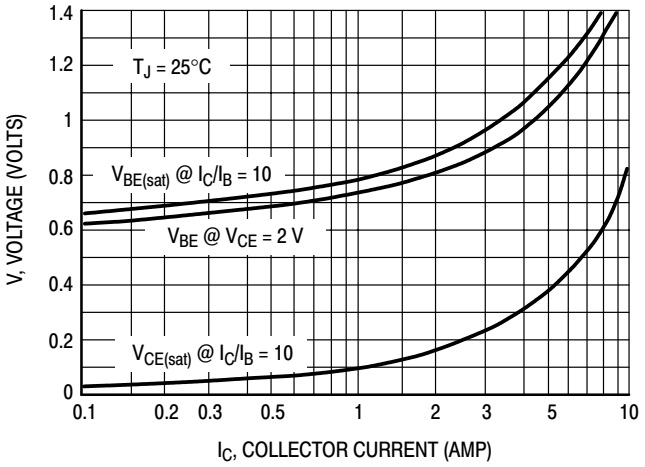


Figure 4. “On” Voltages, MJD3055

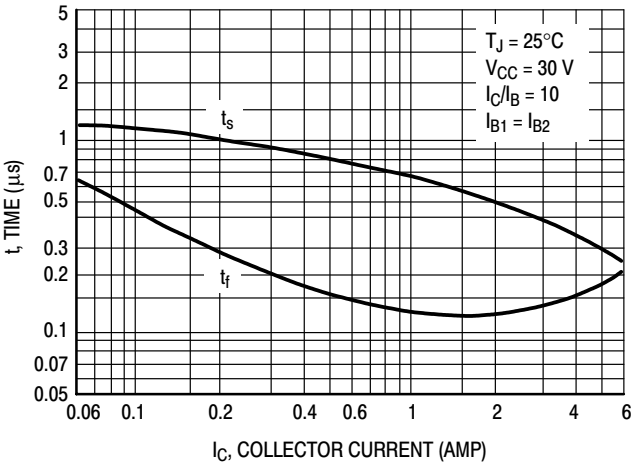


Figure 5. Turn−Off Time

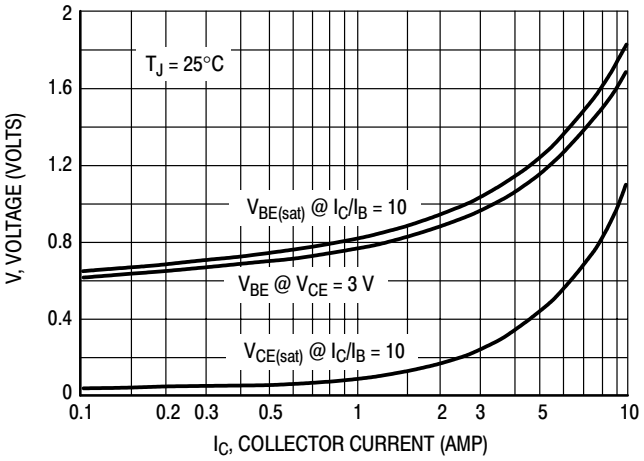


Figure 6. "On" Voltages, MJD2955

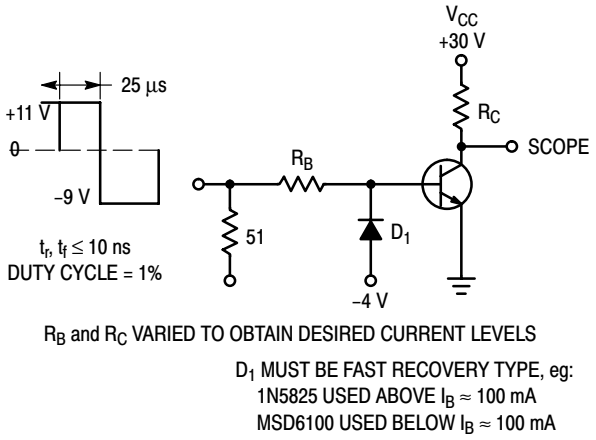


Figure 7. Switching Time Test Circuit

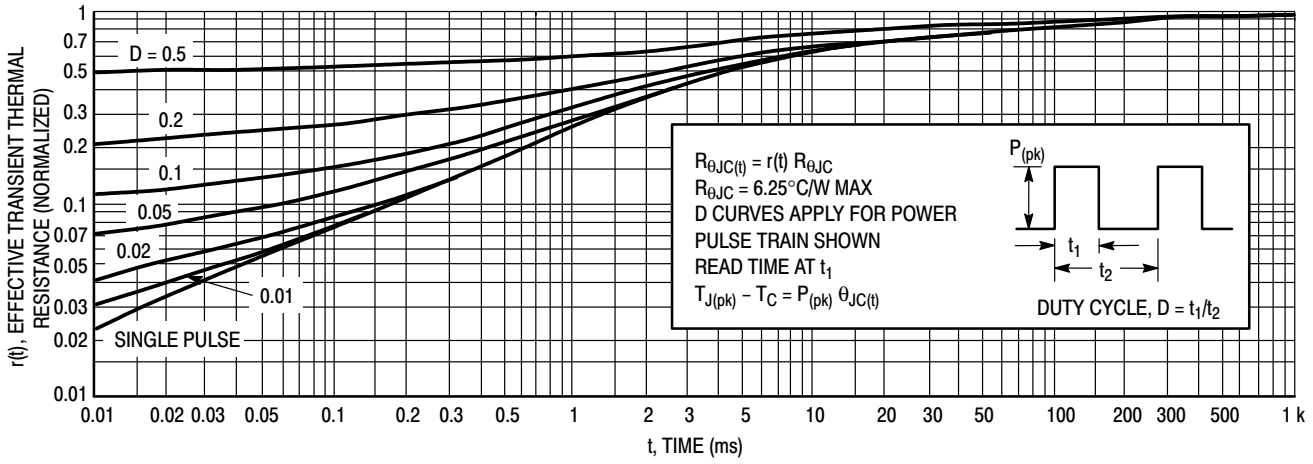


Figure 8. Thermal Response

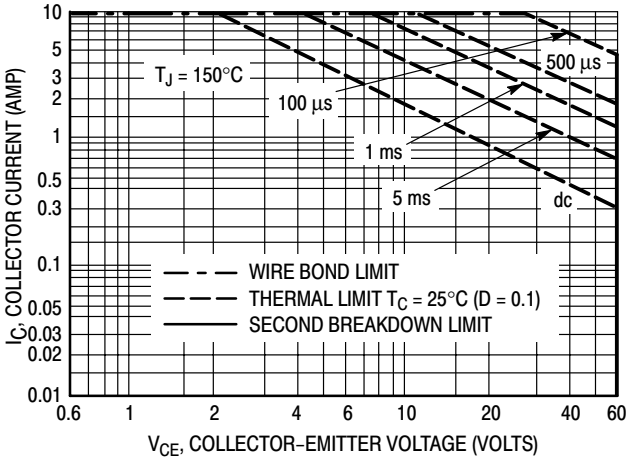


Figure 9. Maximum Forward Bias Safe Operating Area

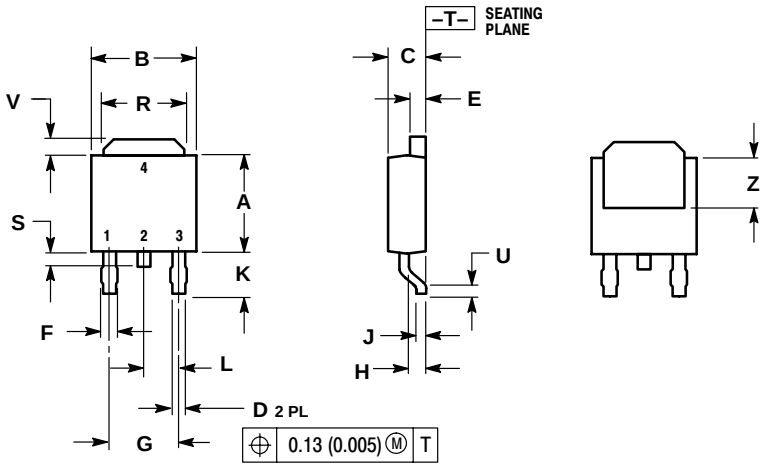
FORWARD BIAS SAFE OPERATING AREA INFORMATION

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 9 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 8. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

PACKAGE DIMENSIONS

DPAK
CASE 369A–13
ISSUE AA

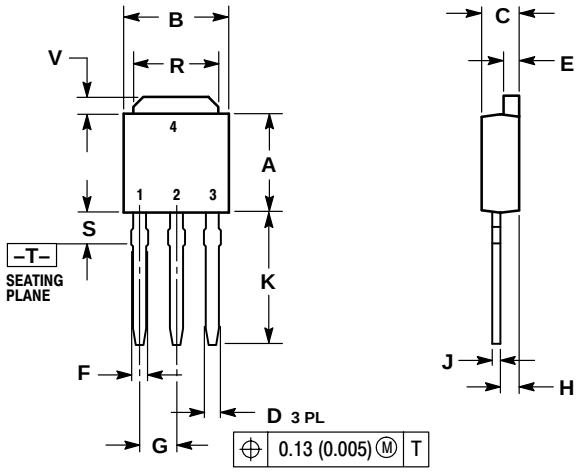


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	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	---

PACKAGE DIMENSIONS

DPAK
CASE 369–07
ISSUE M



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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

Notes

PUBLICATION ORDERING INFORMATION

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