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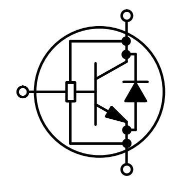
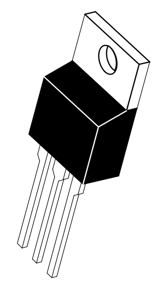
MJE18002D2

Advance Information

High Speed, High Gain Bipolar NPN Power Transistor with Integrated Collector-Emitter Diode and Built-in Efficient Antisaturation Network

POWER TRANSISTORS
2 AMPERES
1000 VOLTS
50 WATTS





CASE 221A–06
TO–220AB

The MJE18002D2 use a newly developed technology, so called H2BIP*, to design the state of art transistor dedicated to the Electronic Light Ballast and PFC** circuit.

The main advantages brought by these new transistors are:

- Improved Global Efficiency Due to the Low Base Drive Requirements
- DC Current Gain Typically Centered at 45
- Extremely Low Storage Time Variation, Thanks to the Antisaturation Network
- Easy to Use Thanks to the Integrated Collector/Emitter Diode

The MOTOROLA "Sig Sixma" philosophy provides tight and reproductible parameter distribution.

* High speed High gain BIPolar transistor
** Power Factor Control

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Sustaining Voltage	V_{CEO}	450	Vdc
Collector–Base Breakdown Voltage	V_{CBO}	1000	Vdc
Collector–Emitter Breakdown Voltage	V_{CES}	1000	Vdc
Emitter–Base Voltage	V_{EBO}	12	Vdc
Collector Current — Continuous — Peak (1)	I_C I_{CM}	2 5	Adc
Base Current — Continuous — Peak (1)	I_B I_{BM}	1 2	Adc
*Total Device Dissipation @ T_C = 25°C *Derate above 25°C	P_D	50 0.4	Watt W/°C
Operating and Storage Temperature	T_J, T_{stg}	–65 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.5 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/8″ from case for 5 seconds	T_L	260	°C

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle ≤ 10%.

This document contains information on a new product. Specifications and information herein are subject to change without notice.

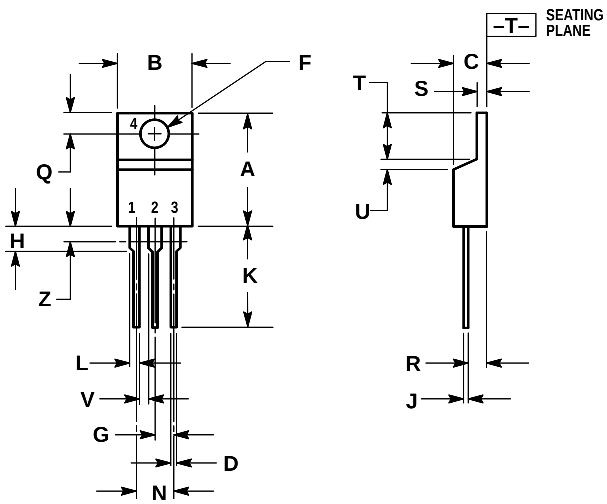
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Sustaining Voltage (I_C = 100 mA, L = 25 mH)		$V_{CEO(sus)}$	450	570		Vdc
Collector Cutoff Current (V_{CE} = Rated V_{CEO}, I_B = 0)		I_{CEO}			100	µAdc
Collector Cutoff Current (V_{CE} = Rated V_{CES}, V_{EB} = 0) (V_{CE} = 500 V, V_{EB} = 0)	@ T_C = 25°C @ T_C = 125°C @ T_C = 125°C	I_{CES}			100 500 100	µAdc
Emitter–Cutoff Current (V_{EB} = 10 Vdc, I_C = 0)		I_{EBO}			100	µAdc
ON CHARACTERISTICS						
Base–Emitter Saturation Voltage (I_C = 0.4 Adc, I_B = 40 mAdc) (I_C = 1 Adc, I_B = 0.2 Adc)	 @ T_C = 25°C @ T_C = 25°C	$V_{BE(sat)}$		 0.78 0.87	 1 1.1	Vdc
Collector–Emitter Saturation Voltage (I_C = 0.4 Adc, I_B = 40 mAdc)	 @ T_C = 25°C @ T_C = 125°C	$V_{CE(sat)}$		 0.36 0.5	 0.6 1	Vdc
(I_C = 1 Adc, I_B = 0.2 Adc)	@ T_C = 25°C @ T_C = 125°C			0.4 0.65	0.75 1.2	
DC Current Gain (I_C = 0.4 Adc, V_{CE} = 1 Vdc)	 @ T_C = 25°C @ T_C = 125°C	h_{FE}	 14 8	 25 15		—
(I_C = 1 Adc, V_{CE} = 1 Vdc)	@ T_C = 25°C @ T_C = 125°C		6 4	10 6		
DYNAMIC CHARACTERISTICS						
Current Gain Bandwidth (I_C = 0.5 Adc, V_{CE} = 10 Vdc, f = 1 MHz)		f_T		13		MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1 MHz)		C_{ob}		50	100	pF
Input Capacitance (V_{EB} = 8 Vdc)		C_{ib}		340	500	pF
DIODE CHARACTERISTICS						
Forward Diode Voltage (I_{EC} = 1 Adc)	 @ T_C = 25°C	V_{EC}		1.2	1.5	V
(I_{EC} = 0.2 Adc)	@ T_C = 25°C @ T_C = 125°C			0.9 0.6	1.2	
(I_{EC} = 0.4 Adc)	@ T_C = 25°C @ T_C = 125°C			1 0.6	1.3	
Forward Recovery Time (I_F = 0.2 Adc, di/dt = 10 A/µs)	 @ T_C = 25°C	t_{fr}		540		ns
(I_F = 0.4 Adc, di/dt = 10 A/µs)	@ T_C = 25°C			517		
(I_F = 1 Adc, di/dt = 10 A/µs)	@ T_C = 25°C			480		

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

Characteristic				Symbol	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS: Resistive Load (D.C. ≤ 10%, Pulse Width = 20 µs)								
Turn–on Time	I_C = 1 Adc, I_{B1} = 0.2 Adc, I_{B2} = 0.5 Adc, V_{CC} = 300 Vdc		@ T_C = 25°C @ T_C = 125°C	t_{on}		100 94	150	ns
Turn–off Time			@ T_C = 25°C @ T_C = 125°C	t_{off}	0.95	 1.5	1.25	µs
SWITCHING CHARACTERISTICS: Inductive Load (V_{clamp} = 300 V, V_{CC} = 15 V, L = 200 µH)								
Fall Time	I_C = 0.4 Adc, I_{B1} = 40 mAdc, I_{B2} = 0.2 Adc		@ T_C = 25°C @ T_C = 125°C	t_f		130 120	175	ns
Storage Time			@ T_C = 25°C @ T_C = 125°C	t_s		0.55 0.7	0.65	µs
Crossover Time			@ T_C = 25°C @ T_C = 125°C	t_c		110 100	175	ns
Fall Time	I_C = 0.8 Adc, I_{B1} = 160 mAdc, I_{B2} = 160 mAdc		@ T_C = 25°C @ T_C = 125°C	t_f		130 140	175	ns
Storage Time			@ T_C = 25°C @ T_C = 125°C	t_s	2.1	 3	2.4	µs
Crossover Time			@ T_C = 25°C @ T_C = 125°C	t_c		275 350	350	ns
Fall Time	I_C = 1 Adc, I_{B1} = 0.2 Adc, I_{B2} = 0.5 Adc		@ T_C = 25°C @ T_C = 125°C	t_f		100 100	150	ns
Storage Time			@ T_C = 25°C @ T_C = 125°C	t_s		1.05 1.45	1.2	µs
Crossover Time			@ T_C = 25°C @ T_C = 125°C	t_c		100 115	150	ns
DYNAMIC SATURATION VOLTAGE								
Dynamic Saturation Voltage: Determined 1 µs and 3 µs respectively after rising I_{B1} reaches 90% of final I_{B1}	I_C = 0.4 Adc, I_{B1} = 40 mA, V_{CC} = 300 V	@ 1 µs	@ T_C = 25°C	$V_{CE(dsat)}$		7.4		V
		@ 3 µs	@ T_C = 25°C			2.5		
	I_C = 1 Adc, I_{B1} = 0.2 A, V_{CC} = 300 V	@ 1 µs	@ T_C = 25°C			11.7		
		@ 3 µs	@ T_C = 25°C			1.3		

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	——	1.15	——
Z	——	0.080	——	2.04

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

CASE 221A–06
TO–220AB
ISSUE Y

How to reach us:
USA / EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1–800–441–2447

MFAX: RMFAX0@email.sps.mot.com – TOUCHTONE (602) 244–6609
INTERNET: http://Design–NET.com

JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, Toshikatsu Otsuki,
6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 03–3521–8315

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298