MJW18020

Preferred Devices

NPN Silicon Power Transistors High Voltage Planar

The MJW18020 planar High Voltage Power Transistor is specifically Designed for motor control applications, high power supplies and UPS's for which the high reproducibility of DC and Switching parameters minimizes the dead time in bridge configurations.

Features

- High and Excellent Gain Linearity
- Fast and Very Tight Switching Times Parameters t_{si} and t_{fi}
- Very Stable Leakage Current due to the Planar Structure
- High Reliability
- Pb−Free Package is Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Sustaining Voltage	V_{CEO}	450	Vdc
Collector−Base Breakdown Voltage	V_{CES}	1000	Vdc
Collector−Base Voltage	V_{CBO}	1000	Vdc
Emitter−Base Voltage	V_{EBO}	9.0	Vdc
Collector Current − Continuous − Peak (Note 1)	I_C	30 45	Adc
Base Current − Continuous − Peak (Note 1)	I_B	6.0 10	Adc
Total Power Dissipation @ T_C = 25°C Derate Above 25°C	P_D	250 2.0	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	0.5	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	50	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	T_L	275	°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.

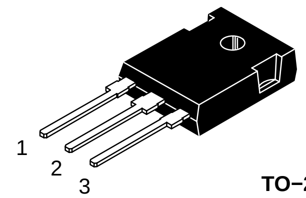
1. Pulse Test: Pulse Width = 5 μs, Duty Cycle ≤ 10%.

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

ON Semiconductor®

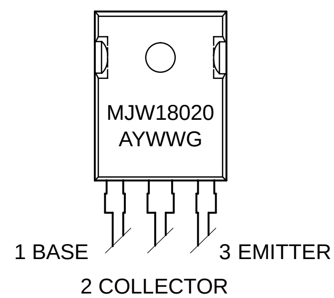
http://onsemi.com

30 AMPERES
1000 VOLTS BV_{CES}
450 VOLTS BV_{CEO}, 250 WATTS



TO−247
CASE 340L

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
MJW18020	TO−247	30 Units/Rail
MJW18020G	TO−247 (Pb−Free)	30 Units/Rail

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	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−Emitter Sustaining Voltage (I_C = 100 mAdc, I_B = 0)		$V_{CEO(sus)}$	450	−	−	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)		I_{CES}	−	−	100	μAdc
(T_C = 125°C)					500	
Emitter Cutoff Current (V_{CE} = 9 Vdc, I_C = 0)		I_{EBO}	−	−	100	μAdc
ON CHARACTERISTICS						
DC Current Gain	(I_C = 3 Adc, V_{CE} = 5 Vdc)	h_{FE}	14		34	
	(T_C = 125°C)		−	30	−	
	(I_C = 10 Adc V_{CE} = 2 Vdc)		8	16		
	(T_C = 125°C)		5	14	−	
	(I_C = 20 Adc V_{CE} = 2 Vdc)		5.5	9	−	
	(T_C = 125°C)		4	7	−	
	(I_C = 10 mAdc V_{CE} = 5 Vdc)		14	25	−	
Base−Emitter Saturation Voltage	(I_C = 10 Adc, I_B = 2 Adc)	$V_{BE(sat)}$	−	0.97	1.25	Vdc
	(I_C = 20 Adc, I_B = 4 Adc)			1.15	1.5	
Collector−Emitter Saturation Voltage	(I_C = 10 Adc, I_B = 2 Adc)	$V_{CE(sat)}$	−	0.2	0.6	Vdc
	(T_C = 125°C)		−	0.3	−	
	(I_C = 20 Adc, I_B = 4 Adc)		−	0.5	1.5	
	(T_C = 125°C)		−	0.9	2.0	
DYNAMIC CHARACTERISTICS						
Current Gain Bandwidth Product (I_C = 1 Adc, V_{CE} = 10 Vdc, f_{test} = 1 MHz)		f_T	−	13	−	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f_{test} = 1 MHz)		C_{ob}	−	300	500	pF
Input Capacitance (V_{EB} = 8.0)		C_{ib}	−	7000	9000	pF
SWITCHING CHARACTERISTICS: Resistive Load (D.C. = 10%, Pulse Width = 70 μs)						
Turn−On Time	(I_C = 10 Adc, I_{B1} = I_{B2} = 2 Adc, Vcc = 125 V)	t_{On}	−	540	750	ns
Storage Time		t_s	−	4.75	6	μs
Fall Time		t_f	−	380	500	ns
Turn−Off Time		t_{Off}	−	5.2	6.5	μs
Turn−On Time	(I_C= 20 Adc, I_{B1} = I_{B2} = 4 Adc, Vcc = 125 V)	t_{On}	−	965	1200	ns
Storage Time		t_s	−	2.9	3.5	μs
Fall Time		t_f	−	350	500	ns
Turn−Off Time		t_{Off}	−	3.25	4	μs
SWITCHING CHARACTERISTICS: Inductive Load (V_{clamp}= 300 V , Vcc = 15 V, L = 200 μH)						
Fall Time	(I_C = 10 Adc, I_{B1} = I_{B2} = 2 Adc)	t_{fi}	−	142	250	ns
Storage Time		t_{si}	−	4.75	6	μs
Crossover Time		t_c	−	320	500	ns
Fall Time	(I_C = 20 Adc, I_{B1} = I_{B2} = 4 Adc)	t_{fi}	−	350	500	ns
Storage Time		t_{si}	−	3.0	3.5	μs
Crossover Time		t_c	−	500	750	ns

TYPICAL CHARACTERISTICS

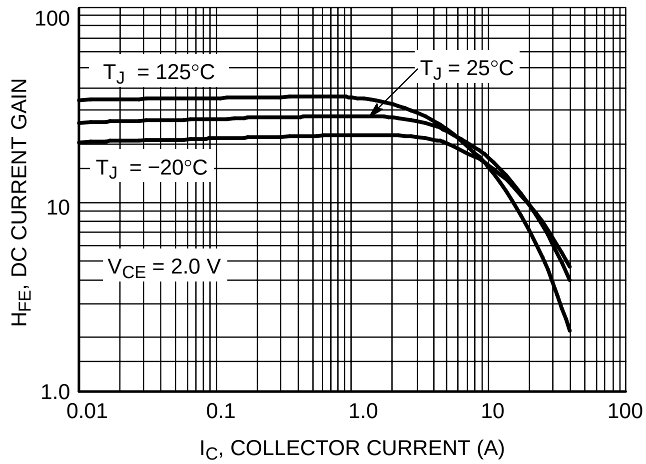


Figure 1. DC Current Gain, V_{CE} = 2.0 V

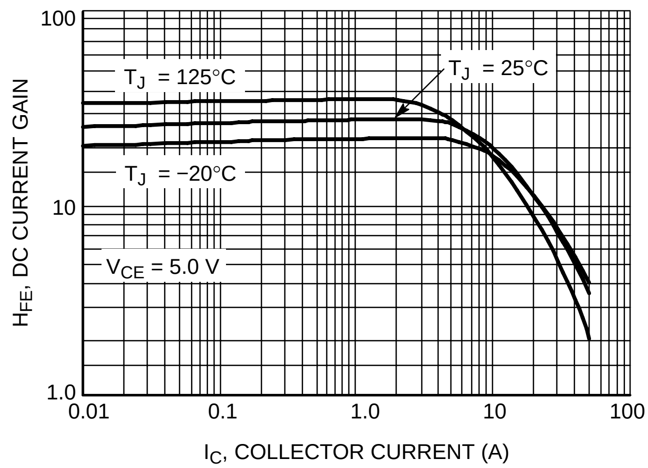


Figure 2. DC Current Gain, V_{CE} = 5.0 V

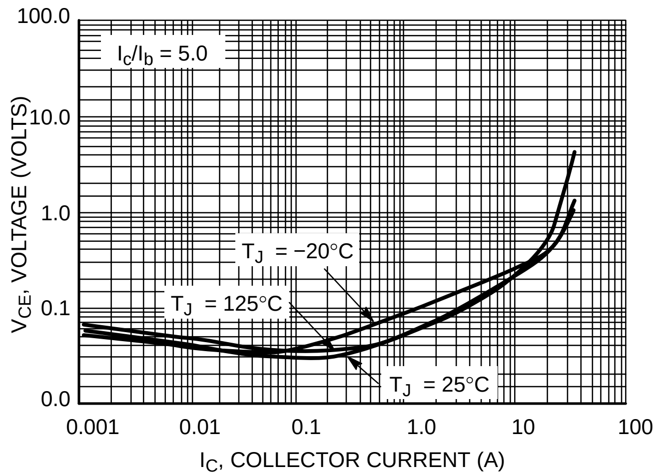


Figure 3. Typical Collector−Emitter Saturation Voltage, I_C/I_B = 5.0

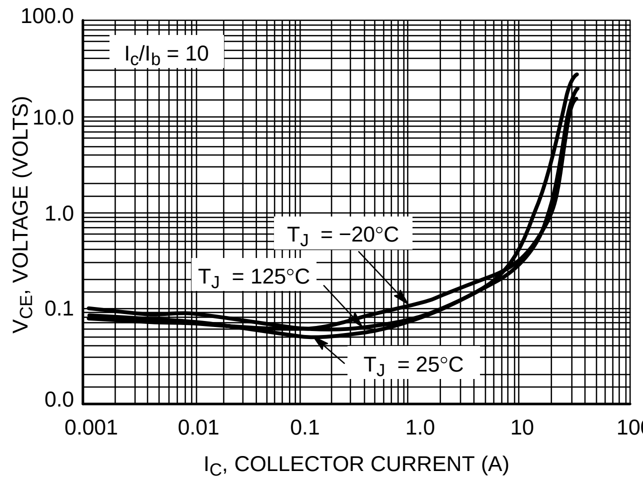


Figure 4. Typical Collector−Emitter Saturation Voltage, I_C/I_B = 10

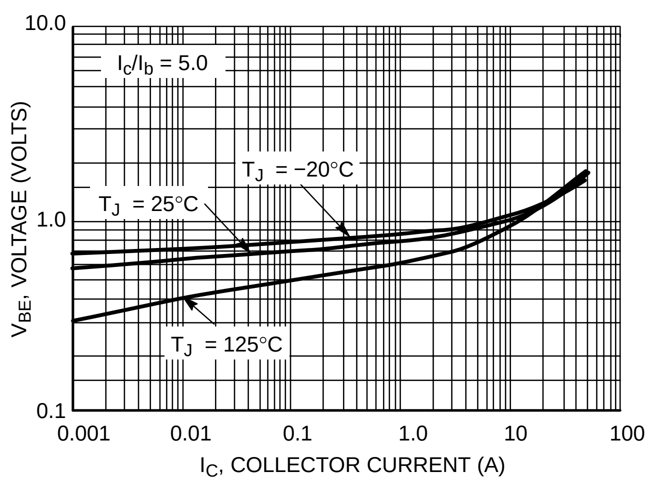


Figure 5. Typical Base−Emitter Saturation Voltage, I_C/I_B = 5.0

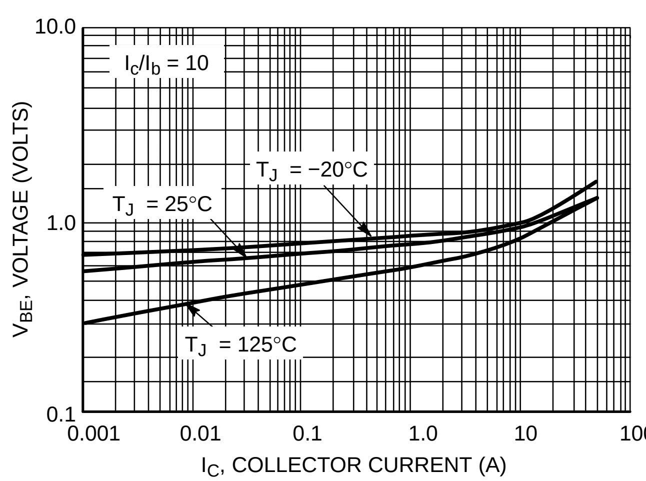


Figure 6. Typical Base−Emitter Saturation Voltage, I_C/I_B = 10

TYPICAL CHARACTERISTICS

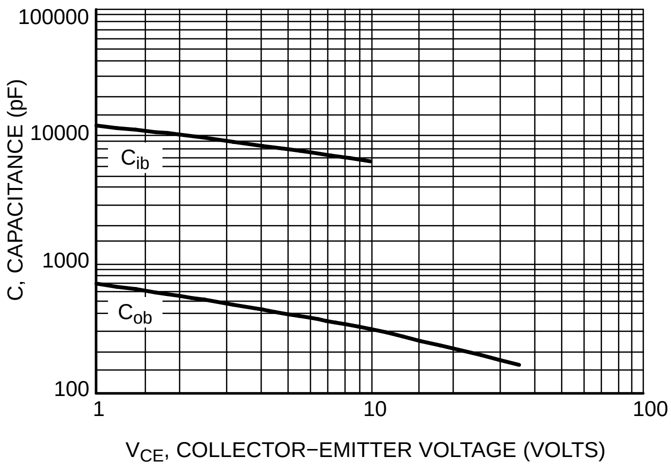


Figure 7. Typical Capacitance

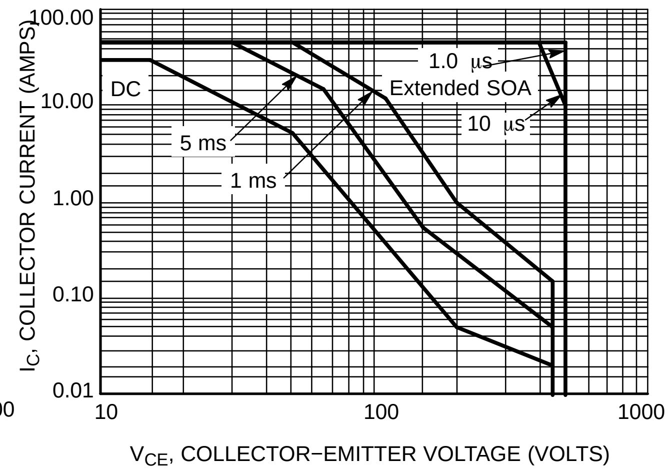


Figure 8. Forward Bias Safe Operating Area

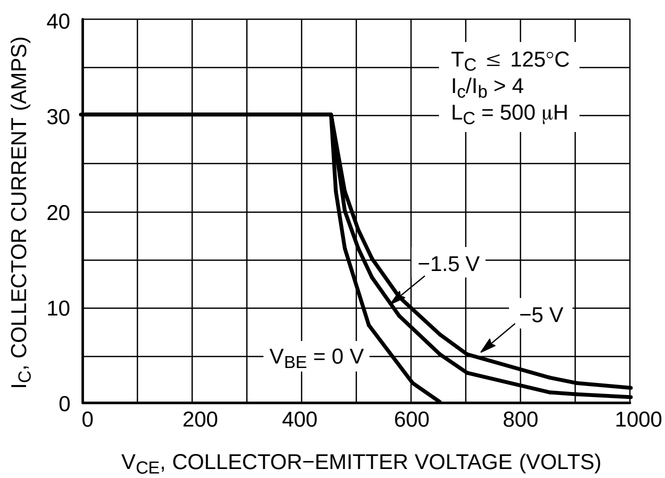
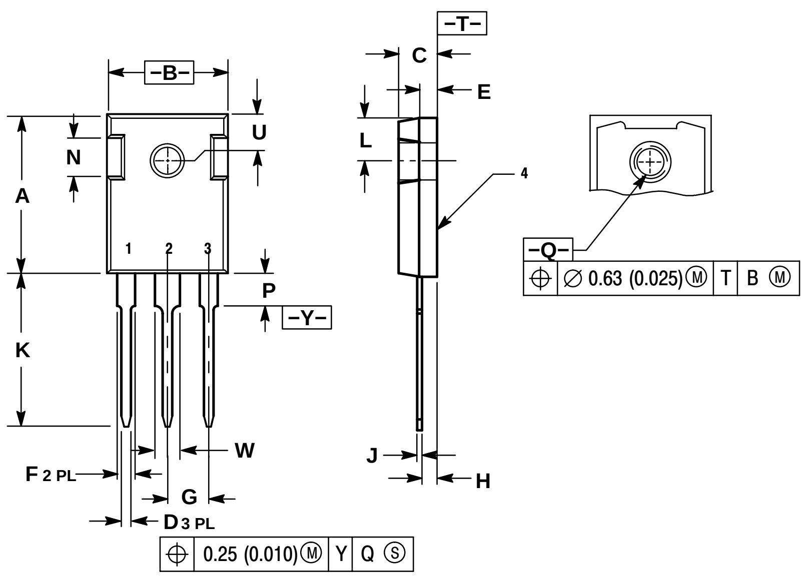


Figure 9. Reverse Bias Safe Operating Area

PACKAGE DIMENSIONS

TO−247 PSI
CASE 340L−02
ISSUE D



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

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	20.32	21.08	0.800	8.30
B	15.75	16.26	0.620	0.640
C	4.70	5.30	0.185	0.209
D	1.00	1.40	0.040	0.055
E	2.20	2.60	0.087	0.102
F	1.65	2.13	0.065	0.084
G	5.45 BSC		0.215 BSC	
H	1.50	2.49	0.059	0.098
J	0.40	0.80	0.016	0.031
K	20.06	20.83	0.790	0.820
L	5.40	6.20	0.212	0.244
N	4.32	5.49	0.170	0.216
P	−−−	4.50	−−−	0.177
Q	3.55	3.65	0.140	0.144
U	6.15 BSC		0.242 BSC	
W	2.87	3.12	0.113	0.123

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