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MJH11017, MJH11019, MJH11021 (PNP)
MJH11018, MJH11020, MJH11022 (NPN)

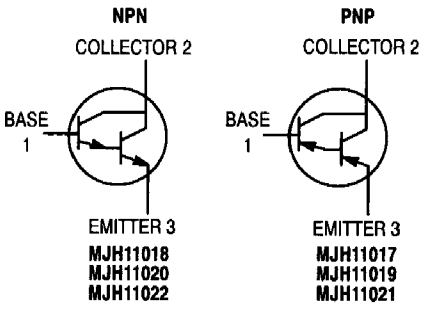
Complementary Darlington Silicon Power Transistors

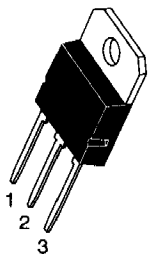
15 AMPERE DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS 150–250 VOLTS, 150 WATTS

These devices are designed for use as general purpose amplifiers, low frequency switching and motor control applications.

Features

- High DC Current Gain @ 10 Adc — h_{FE} = 400 Min (All Types)
- Collector–Emitter Sustaining Voltage
  $V_{CEO(sus)}$ = 150 Vdc (Min) — MJH11018, 17
  = 200 Vdc (Min) — MJH11020, 19
  = 250 Vdc (Min) — MJH11022, 21
- Low Collector–Emitter Saturation Voltage
  $V_{CE(sat)}$ = 1.2 V (Typ) @ I_C = 5.0 A
  = 1.8 V (Typ) @ I_C = 10 A
- Monolithic Construction
- Pb–Free Packages are Available*





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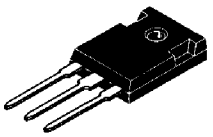

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MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Collector–Emitter Voltage MJH11018, MJH11017 MJH11020, MJH11019 MJH11022, MJH11021	V_{CEO}	 150 200 250	Vdc
Collector–Base Voltage MJH11018, MJH11017 MJH11020, MJH11019 MJH11022, MJH11021	V_{CB}	 150 200 250	Vdc
Emitter–Base Voltage	V_{EB}	5.0	Vdc
Collector Current – Continuous – Peak (Note 1)	I_C	15 30	Adc
Base Current	I_B	0.5	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	150 1.2	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	$R_{\theta JC}$	0.83	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle ≤ 10%.

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (Note 2) (I_C = 0.1 Adc, I_B = 0)	MJH11017, MJH11018 MJH11019, MJH11020 MJH11021, MJH11022	$V_{CEO(sus)}$	 150 200 250	 – – –	Vdc
Collector Cutoff Current (V_{CE} = 75 Vdc, I_B = 0) (V_{CE} = 100 Vdc, I_B = 0) (V_{CE} = 125 Vdc, I_B = 0)	 MJH11017, MJH11018 MJH11019, MJH11020 MJH11021, MJH11022	I_{CEO}	 – – –	 1.0 1.0 1.0	mAdc
Collector Cutoff Current (V_{CE} = Rated V_{CB}, $V_{BE(off)}$ = 1.5 Vdc) (V_{CE} = Rated V_{CB}, $V_{BE(off)}$ = 1.5 Vdc, T_J = 150°C)		I_{CEV}	 – –	 0.5 5.0	mAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc I_C = 0)		I_{EBO}	–	2.0	mAdc
ON CHARACTERISTICS (Note 2)					
DC Current Gain (I_C = 10 Adc, V_{CE} = 5.0 Vdc) (I_C = 15 Adc, V_{CE} = 5.0 Vdc)		h_{FE}	 400 100	 15,000 –	–
Collector–Emitter Saturation Voltage (I_C = 10 Adc, I_B = 100 mA) (I_C = 15 Adc, I_B = 150 mA)		$V_{CE(sat)}$	 – –	 2.5 4.0	Vdc
Base–Emitter On Voltage (I_C = 10 A, V_{CE} = 5.0 Vdc)		$V_{BE(on)}$	–	2.8	Vdc
Base–Emitter Saturation Voltage (I_C = 15 Adc, I_B = 150 mA)		$V_{BE(sat)}$	–	3.8	Vdc
DYNAMIC CHARACTERISTICS					
Current–Gain Bandwidth Product (I_C = 10 Adc, V_{CE} = 3.0 Vdc, f = 1.0 MHz)		f_T	3.0	–	–
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 0.1 MHz)	MJH11018, MJH11020, MJH11022 MJH11017, MJH11019, MJH11021	C_{ob}	– –	400 600	pF
Small–Signal Current Gain (I_C = 10 Adc, V_{CE} = 3.0 Vdc, f = 1.0 kHz)		h_{fe}	75	–	–

SWITCHING CHARACTERISTICS

Characteristic		Symbol	Typical NPN	Typical PNP	Unit
Delay Time	(V_{CC} = 100 V, I_C = 10 A, I_B = 100 mA $V_{BE(off)}$ = 5.0 V) (See Figure 2)	t_d	150	75	ns
Rise Time		t_r	1.2	0.5	μs
Storage Time		t_s	4.4	2.7	μs
Fall Time		t_f	2.5	2.5	μs