

6367254 MOTOROLA SC (XSTRS/R F)

96D 80900 D

7-33-33

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

PNP
MJ4030
MJ4031
MJ4032

NPN
MJ4033
MJ4034
MJ4035

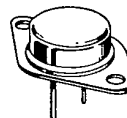
MEDIUM-POWER COMPLEMENTARY SILICON TRANSISTORS

... for use as output devices in complementary general purpose amplifier applications.

- High DC Current Gain - $h_{FE} = 3500$ (Typ) @ $I_C = 10$ A dc
- Monolithic Construction with Built-In Base-Emitter Shunt Resistor

16 AMPERE DARLINGTON POWER TRANSISTORS COMPLEMENTARY SILICON

60-100 VOLTS
150 WATTS



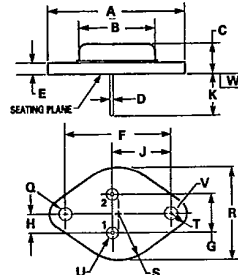
MAXIMUM RATINGS

Rating	Symbol	MJ4030 MJ4033	MJ4031 MJ4034	MJ4032 MJ4035	Unit
Collector-Emitter Voltage	V _{CEO}	60	80	100	Vdc
Collector-Base Voltage	V _{CB}	60	80	100	Vdc
Emitter-Base Voltage	V _{EB}	5.0			Vdc
Collector Current	I _C	16			A dc
Base Current	I _B	0.5			A dc
Total Device Dissipation @ T _C = 25°C Derate above 25°C	P _D	150 0.857			Watts W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-55 to +200			°C

THERMAL CHARACTERISTICS

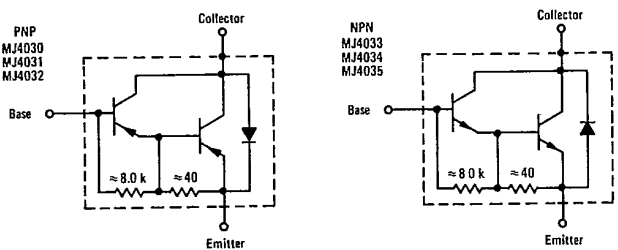
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.17	°C/W

3



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	—	39.37	—	1.550
B	—	21.08	—	0.830
C	6.35	7.62	0.250	0.300
D	0.97	1.09	0.038	0.043
E	1.40	1.78	0.055	0.070
F	30.15 BSC		1.187 BSC	
G	10.92 BSC		0.430 BSC	
H	5.46 BSC		0.215 BSC	
J	16.89 BSC		0.665 BSC	
K	11.18	12.19	0.440	0.480
Q	3.81	4.19	0.151	0.165
R	—	26.67	—	1.050
U	2.54	3.05	0.100	0.120
V	3.81	4.19	0.151	0.165

FIGURE 1 - DARLINGTON CIRCUIT SCHEMATIC



STYLE 1:
 PIN 1, BASE
 2, EMITTER
 CASE COLLECTOR

NOTES:
 1. DIAMETER V AND SURFACE W ARE DATUMS
 2. POSITIONAL TOLERANCE FOR HOLE Q:
 $\pm \phi 0.25$ (D 010) (W) (V) (Q)
 3. POSITIONAL TOLERANCE FOR LEADS:
 $\pm \phi 0.30$ (U 012) (Q) (W) (V) (Q) (Q)

CASE 1-04
 TO-204AA

6367254 MOTOROLA SC (XSTRS/R F)

96D 80901 D

PNP MJ4030, MJ4031, MJ4032
NPN MJ4033, MJ4034, MJ4035

T-33-33

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage(1) (I _C = 100 mA, I _B = 0)	V _{(BR)CEO}	60 80 100	-	Vdc
Collector Emitter Leakage Current (V _{CB} = 60 Vdc, R _{BE} = 1.0 k ohm) (V _{CB} = 80 Vdc, R _{BE} = 1.0 k ohm) (V _{CB} = 100 Vdc, R _{BE} = 1.0 k ohm) (V _{CB} = 60 Vdc, R _{BE} = 1.0 k ohm, T _C = 150°C) (V _{CB} = 80 Vdc, R _{BE} = 1.0 k ohm, T _C = 150°C) (V _{CB} = 100 Vdc, R _{BE} = 1.0 k ohm, T _C = 150°C)	I _{CER}	- - - - - -	10 1.0 10 50 50 50	mA
Emitter Cutoff Current (V _{BE} = 5.0 Vdc, I _C = 0)	I _{EBO}	-	50	mA
Collector-Emitter Leakage Current (V _{CE} = 30 Vdc, I _B = 0) (V _{CE} = 40 Vdc, I _B = 0) (V _{CE} = 50 Vdc, I _B = 0)	I _{CEO}	- - -	30 30 30	mA
ON CHARACTERISTICS(1)				
DC Current Gain (I _C = 10 A, V _{CE} = 3.0 Vdc)	h _{FE}	1000	-	-
Collector-Emitter Saturation Voltage (I _C = 10 A, I _B = 40 mA) (I _C = 16 A, I _B = 80 mA)	V _{CE(sat)}	-	2.5 4.0	Vdc
Base-Emitter Voltage (I _C = 10 A, V _{CE} = 3.0 Vdc)	V _{BE}	-	3.0	Vdc

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

FIGURE 2 - DC CURRENT GAIN

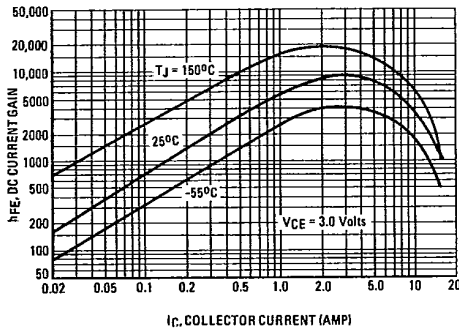


FIGURE 4 - "ON" VOLTAGES

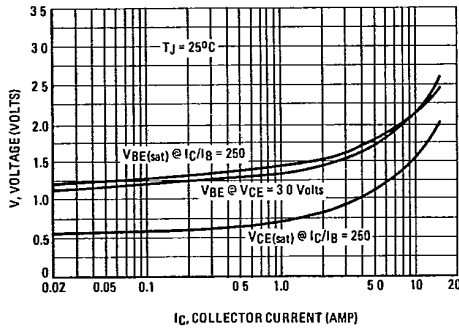


FIGURE 3 - SMALL-SIGNAL CURRENT GAIN

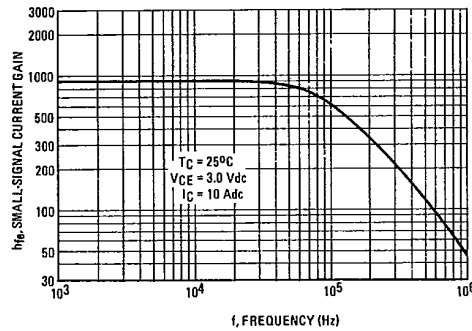
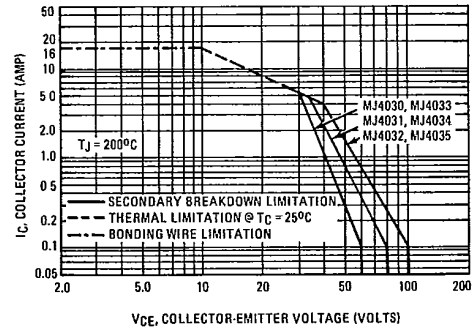


FIGURE 5 - DC SAFE OPERATING AREA



There are two limitations on the power handling ability of a transistor: average junction temperature and secondary breakdown. Safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation; e.g., the transistor

must not be subjected to greater dissipation than the curves indicate. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.