SOLID STATE INC.
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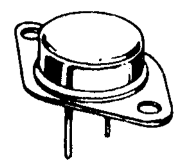
COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

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

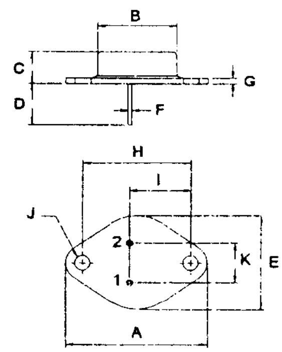
PNP	NPN
MJ11011	MJ11012
MJ11013	MJ11014
MJ11015	MJ11016

30 AMPERE
COMPLEMENTARY
SILICON POWER
DARLINGTON TRANSISTOR
60-120 VOLTS
200 WATTS

FEATURES:
* High Gain Darlington Performance
* High DC Current Gain hFE = 1000(Min) @ I_C = 20 A
* Monolithic Construction with Built-in Base-Emitter Shunt Resistor



TO-3



PIN 1.BASE
2.EMITTER
COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

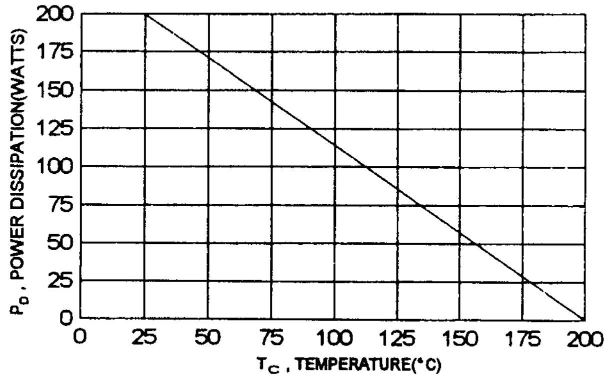
MAXIMUM RATINGS

Characteristic	Symbol	MJ11011 MJ11012	MJ11013 MJ11014	MJ11015 MJ11016	Unit
Collector-Emitter Voltage	V_{CEO}	60	90	120	V
COllector-Base Voltage	V_{CBO}	60	90	120	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	30 50			A
Base Current	I_B	1.0			A
Total Power Dissipation @T_C= 25°C Derate above 25°C	P_D	200 1.15			W W/°C
Operating and Storage Junction Temperature Range	T_J,T_{STG}	- 65 to +200			°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	Rθjc	0.87	°C/W

FIGURE -1 POWER DERATING



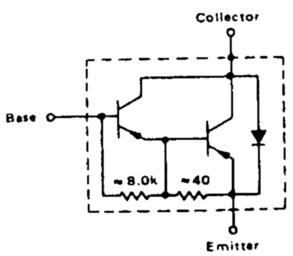
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Sustaining Voltage (1)		$V_{CEO(sus)}$			V
(I_C = 100 mA, I_B = 0)	MJ11011,MJ11012		60		
	MJ11013,MJ11014		90		
	MJ11015,MJ11016		120		
Collector Cutoff Current (V_{CE} = 50 V, I_B = 0.0)		I_{CEO}		1.0	mA
Collector-Emitter Leakage Current		I_{CER}			mA
(V_{CE} = 60 V, R_{BE} = 1.0k ohm)	MJ11011,MJ11012			1.0	
(V_{CE} = 90 V, R_{BE} = 1.0k ohm)	MJ11013,MJ11014			1.0	
(V_{CE} = 120 V, R_{BE} = 1.0k ohm)	MJ11015,MJ11016			1.0	
(V_{CE} = 60 V, R_{BE} = 1.0k ohm, T_C = 125°C)	MJ11011,MJ11012			5.0	
(V_{CE} = 90 V, R_{BE} = 1.0k ohm, T_C =125°C)	MJ11013,MJ11014			5.0	
(V_{CE} = 120 V, R_{BE} = 1.0k ohm, T_C =125°C)	MJ11015,MJ11016			5.0	
Emitter Cutoff Current (V_{EB} = 5.0 V, I_C = 0)		I_{EBO}		5.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain		hFE			
(I_C = 20 A, V_{CE} = 5.0 V)			1000		
(I_C = 30 A, V_{CE} = 5.0 V)			200		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			V
(I_C = 20 A, I_B = 200 mA)				3.0	
(I_C = 30 A, I_B = 300 mA)				4.0	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			V
(I_C = 20 A, I_B = 200 mA)				3.5	
(I_C = 30 A, I_B = 300 mA))				5.0	
DYNAMIC CHARACTERISTICS					
Small-Signal Current Gain (I_C = 10 A, V_{CE} = 3.0 V, f = 1.0 MHz)		$\|h_{fe}\|$	4.0		

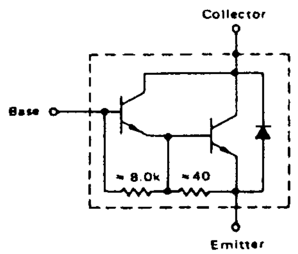
(1) Pulse Test: Pulse width = 300 us , Duty Cycle ≦ 2.0%
(2) $f_T = |h_{fe}| \cdot f_{test}$

INTERNAL SCHEMATIC DIAGRAM

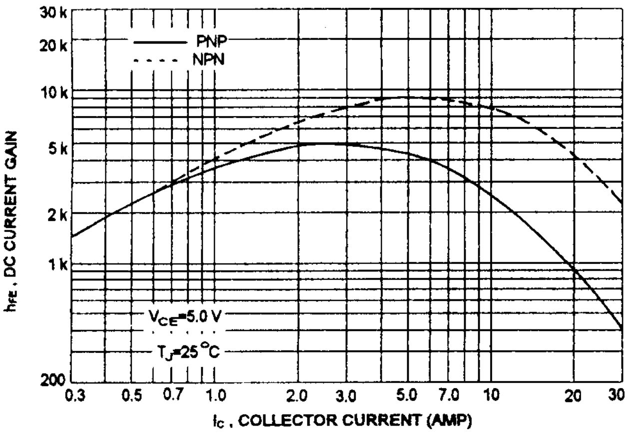
NPN
MJ11011
MJ11013
MJ11015



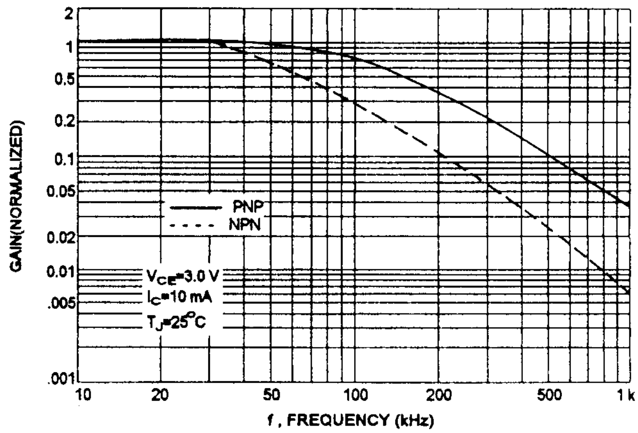
PNP
MJ11012
MJ11014
MJ11016



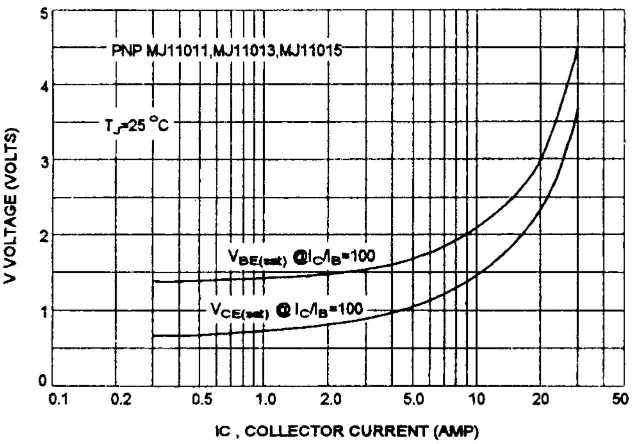
DC CURRENT GAIN



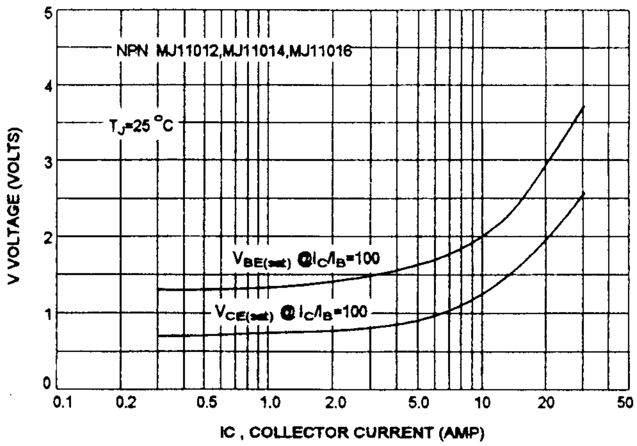
SMALL-SIGNAL CURRENT GAIN



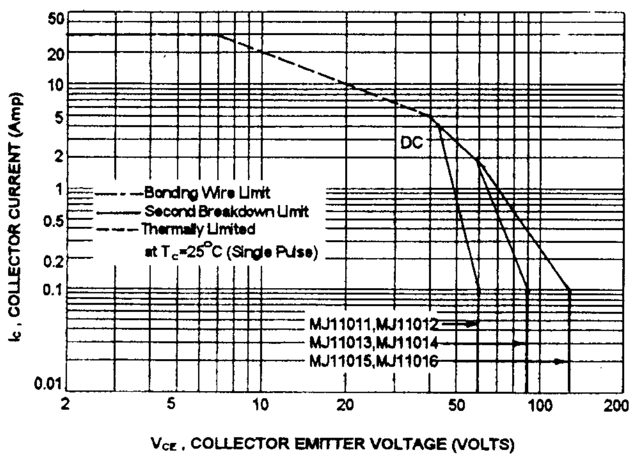
"ON" VOLTAGES



"ON" VOLTAGES



ACTIVE-REGION SAFE OPERATING AREA (SOA)



There are two limitation 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 curves indicate.

The data of SOA curve is base on $T_{J(PK)}$=200 °C;T_C is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 200$°C,At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.