

## COMPLEMENTARY SILICON HIGH-VOLTAGE HIGH-POWER TRANSISTORS

... designed for use in high power audio amplifier applications and high voltage switching regulator circuits.

### FEATURES:

\* Collector-Emitter Sustaining Voltage -

$V_{CEO(sus)}$  = 100V(Min)- MJE4340,MJE4350  
120V(Min)- MJE4341,MJE4351  
140V(Min)- MJE4342,MJE4352  
160V(Min)-MJE4343,MJE4353

\* DC Current Gain  $hFE=8.0$  (Min)@ $I_C=16A$

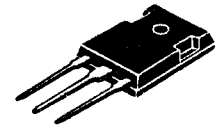
\* Current Gain-Bandwidth Product  $f_T=1.0$  MHz (Min)@ $I_C=1.0A$

NPN	PNP
MJE4340	MJE4350
MJE4341	MJE4351
MJE4342	MJE4352
MJE4343	MJE4353

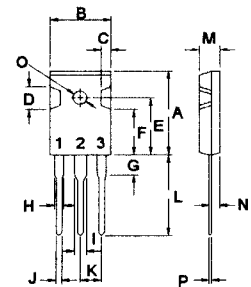
16 AMPERE  
COMPLEMENTARY SILICON  
POWER TRANSISTORS  
100 -160 VOLTS  
125 WATTS

### MAXIMUM RATINGS

Characteristic	Symbol	MJE4340	MJE4341	MJE4342	MJE4343	Unit
		MJE4350	MJE4351	MJE4352	MJE4353	
Collector-Emitter Voltage	$V_{CEO}$	100	120	140	160	V
Collector-Base Voltage	$V_{CBO}$	100	120	140	160	V
Emitter-Base Voltage	$V_{EBO}$	7.0				V
Collector Current - Continuous - Peak	$I_C$	16 20				A
Base Current	$I_B$	5.0				A
Total Power Dissipation@ $T_C=25^\circ C$ Derate above $25^\circ C$	$P_D$	125 1.0				W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +150				$^\circ C$



TO-247(3P)



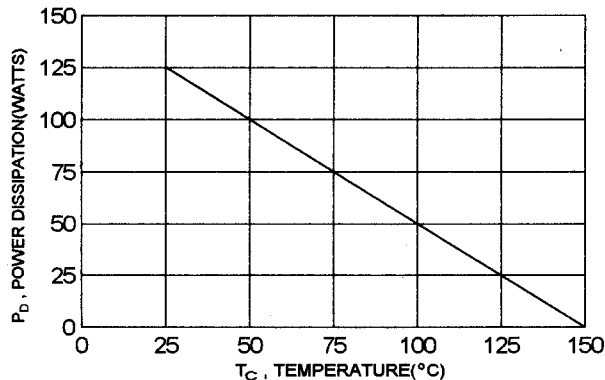
PIN 1.BASE  
2.COLLECTOR  
3.EMITTER

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.0	$^\circ C/W$

DIM	MILLIMETERS	
	MIN	MAX
A	20.63	22.38
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.81	15.22
F	11.72	12.84
G	4.20	4.50
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.50	21.50
M	4.68	5.36
N	2.40	2.80
O	3.25	3.65
P	0.55	0.70

FIGURE -1 POWER DERATING



MJE4340 Thru MJE4343 NPN / MJE4350 Thru MJE4353 PNP

ELECTRICAL CHARACTERISTICS (  $T_c = 25^\circ\text{C}$  unless otherwise noted )

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage(1) ( $I_C = 100\text{ mA}$ , $I_B = 0$ )	MJE4340,MJE4350 MJE4341,MJE4351 MJE4342,MJE4352 MJE4343,MJE4353	$V_{CEO(sus)}$	100 120 140 160	V
Collector Cutoff Current ( $V_{CE} = 50\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 60\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 70\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 80\text{ V}$ , $I_B = 0$ )	MJE4340,MJE4350 MJE4341,MJE4351 MJE4342,MJE4352 MJE4343,MJE4353	$I_{CEO}$	0.75 0.75 0.75 0.75	mA
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CBO}$ , $V_{EB(off)} = 1.5\text{ V}$ ) ( $V_{CE} = \text{Rated } V_{CBO}$ , $V_{EB(off)} = 1.5\text{ V}$ , $T_c = 150^\circ\text{C}$ )		$I_{CEX}$	1.0 5.0	mA
Collector Cutoff Current ( $V_{CB} = \text{Rated } V_{CB}$ , $I_E = 0$ )		$I_{CBO}$	0.75	mA
Emitter Cutoff Current ( $V_{EB} = 7.0\text{ V}$ , $I_C = 0$ )		$I_{EBO}$	1.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 8.0\text{ A}$ , $V_{CE} = 2.0\text{ V}$ ) ( $I_C = 16\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )		$h_{FE}$	15 8.0	
Collector-Emitter Saturation Voltage ( $I_C = 8.0\text{ A}$ , $I_B = 800\text{ mA}$ ) ( $I_C = 16\text{ A}$ , $I_B = 2.0\text{ A}$ )		$V_{CE(sat)}$	2.0 3.5	V
Base-Emitter Saturation Voltage ( $I_C = 16\text{ A}$ , $I_B = 2.0\text{ A}$ )		$V_{BE(sat)}$	3.9	V
Base-Emitter On Voltage ( $I_C = 16\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )		$V_{BE(on)}$	3.9	V

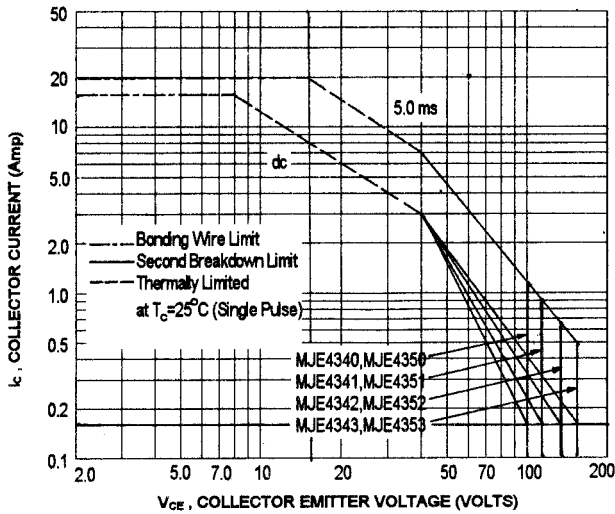
DYNAMIC CHARACTERISTICS

Current Gain - Bandwidth Product (2) ( $I_C = 1.0\text{ A}$ , $V_{CE} = 20\text{ V}$ , $f = 0.5\text{ MHz}$ )		$f_T$	1.0	MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 0.1\text{ MHz}$ )		$C_{ob}$	800	pF

(1) Pulse Test: Pulse width  $\leq 300\text{ us}$ , Duty Cycle  $\leq 2.0\%$

(2)  $f_T = |h_{fe}| \cdot f_{TEST}$

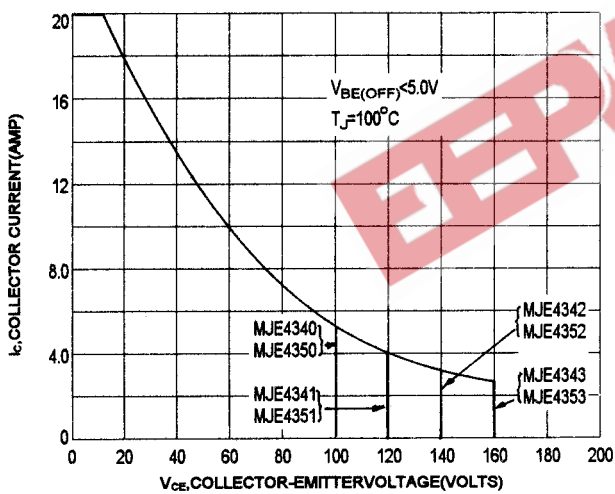
ACTIVE-REGION SAFE OPERATING AREA (SOA)



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.

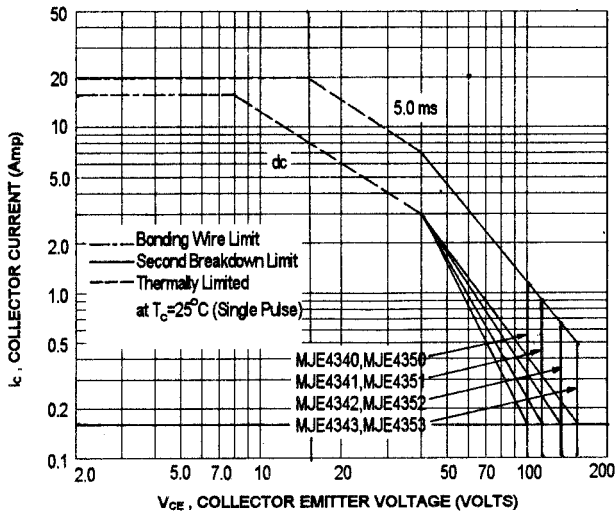
The data of SOA curve is base on  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_c$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

REVERSE BIAS SAFE OPERATING AREA



For inductive loads, high voltage and high current must be sustained simultaneously during turn-off, in most cases, with the base to emitter junction reverse biased. Under these conditions the collector voltage must be held to a safe level at or below a specific value of collector current. This can be accomplished by several means such as active clamping, RC snubbing, load line shaping, etc. the safe level for these devices is specified as Reverse Bias Safe Operating Area and represents the voltage current conditions during reverse biased turn-off. This rating is verified under clamped conditions so that the device is never subjected to an avalanche mode. Left -figure gives RBSOA characteristics.

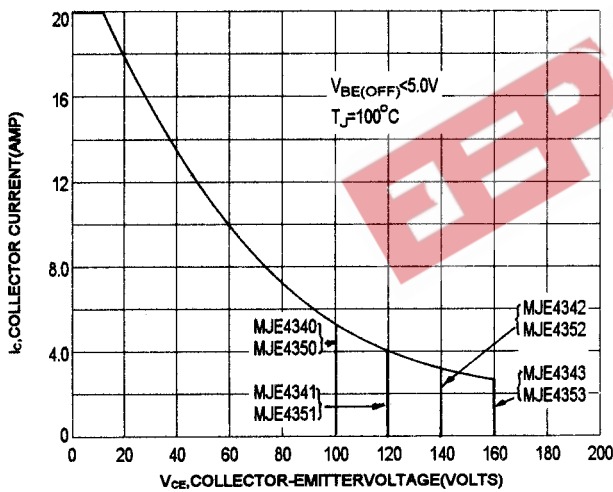
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