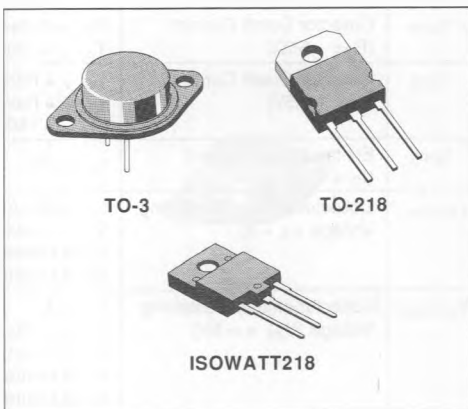
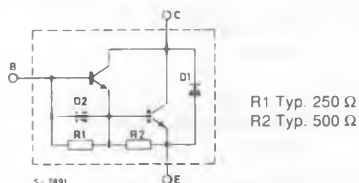


EPITAXIAL PLANAR NPN
DESCRIPTION

The MJ10004/5, MJ10004P/5P and MJ10004PFI/5PFI are silicon epitaxial planar NPN transistors in monolithic Darlington configuration with integrated speed-up diode.

They are mounted respectively in TO-3 metal case, TO-218 plastic package and ISOWATT218 fully isolated package.

They are designed for high power, fast switching applications.


INTERNAL SCHEMATIC DIAGRAM

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	MJ10004/4P/4PFI	MJ10005/5P/5PFI	Unit	
V_{CEX}	Collector-emitter Voltage ($V_{BE} = -5V$)	350	400	V	
V_{CEV}	Collector-emitter Voltage ($V_{BE} = 1.5V$)	400	450	V	
V_{CEO}	Collector-emitter Voltage ($I_C = 0$)	450	500	V	
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	8		V	
I_C	Collector Current	20		A	
I_{CM}	Collector Peak Current	30		A	
I_B	Base Current	2.5		A	
I_{BM}	Base Peak Current	5		A	
		TO-3	TO-218	ISOWATT218	
P_{101}	Total Power Dissipation at $T_c \leq 25^\circ C$	175	125	60	W
T_{stg}	Storage Temperature	- 65 to 200	- 65 to 150	- 65 to 150	$^\circ C$
T_j	Max. Operating Junction Temperature	200	150	150	$^\circ C$

THERMAL DATA

			TO-3	TO-218	ISOWATT218	
$R_{th(j-case)}$	Thermal Resistance Junction-case	Max	1	1	2.08	°C/W

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cutoff Current ($R_{BE} = 50\Omega$)	$V_{CE} = \text{Rated } V_{CEV}$ $T_{case} = 100^{\circ}C$			5	mA
I_{CEV}	Collector Cutoff Current ($V_{BE} = 1.5V$)	$V_{CEV} = \text{Rated Value}$ $V_{CEV} = \text{Rated Value}$ $T_{case} = 150^{\circ}C$			0.25 5	mA mA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 2V$			175	mA
$V_{CEO(sus)^*}$	Collector-emitter Sustaining Voltage ($I_B = 0$)	$I_C = 250mA$ $V_{clamp} = \text{Rated } V_{CEO}$ for MJ10004/4P/4PFI for MJ10005/5P/4PFI	350 400			V V
$V_{CEX(sus)^*}$	Collector-emitter Sustaining Voltage ($V_{BE} = -5V$)	$I_C = 2A$ $V_{clamp} = \text{Rated } V_{CEX}$ $T_{case} = 100^{\circ}C$ for MJ10004/4P/4PFI for MJ10005/5P/5PFI $I_C = 10A$ $T_{case} = 100^{\circ}C$ $V_{clamp} = \text{Rated } V_{CEX}$ for MJ10004/4P/4PFI for MJ10005/5P/5PFI	400 450 275 325			V V V V
$V_{CE(sat)^*}$	Collector-emitter Saturation Voltage	$I_C = 10A$ $I_B = 400mA$ $I_C = 20A$ $I_B = 2A$ $I_C = 10A$ $I_B = 400mA$ $T_{case} = 100^{\circ}C$			1.9 3 2.5	V V V
$V_{BE(sat)^*}$	Base-emitter Saturation Voltage	$I_C = 10A$ $I_B = 400mA$ $I_C = 10A$ $I_B = 400mA$ $T_{case} = 100^{\circ}C$			2.5 2.5	V V
h_{FE}^*	DC Current Gain	$I_C = 5A$ $V_{CE} = 5V$ $I_C = 10A$ $V_{CE} = 5V$	50 40		600 400	
V_F^*	Diode Forward Voltage	$I_F = 10A$		1.8	5	V
h_{fe}	Small-signal Current Gain	$I_C = 1A$ $V_{CE} = 10V$ $f = 1MHz$	10			
C_{ob}	Output Capacitance	$V_{CB} = 10V$ $I_E = 0$ $f = 100MHz$	100		325	pF
t_{on}	Turn-on Time	$V_{CC} = 250V$ $I_C = 10A$		0.5	0.8	μs
t_s	Storage Time	$I_{B1} = -I_{B2} = 400mA$ $V_{BE(off)} = 5V$		1	1.5	μs
t_f	Fall Time	$t_p = 50\mu s$ Duty Cycle – 2%		0.3	0.5	μs