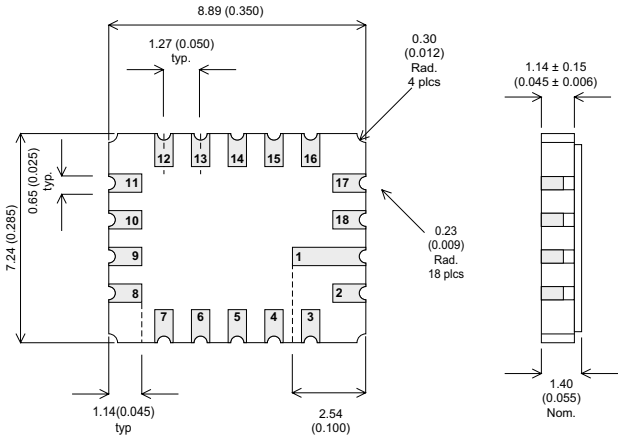
MCA104

MULTI-CHIP ARRAY
TWO NPN AND TWO PNP
HIGH SPEED, MEDIUM POWER
SWITCHING TRANSISTORS IN A
HERMETICALLY SEALED
CERAMIC SURFACE MOUNT PACKAGE

MECHANICAL DATA
Dimensions in mm (inches)



Pinout:

NPN	PNP	PNP	NPN
2 = E1	6 = C2	11 = E3	15 = C4
3 = B1	7 = B2	12 = B3	16 = B4
4 = C1	8 = E2	13 = C3	17 = E4

1,5,9,10,14,18 NO CONNECTION

DESCRIPTION

The MCA104 is a ceramic surface mount transistor array designed for high reliability applications.

It contains 2 NPN Bipolar Transistors and 2 PNP Bipolar Transistors.

FEATURES

- Ceramic Surface Mount Package.
- Screening Options Available

NPN DEVICES

- V_{CBO} = 75V
- V_{CBO} = 400V
- I_C = 600mA

PNP DEVICES

- V_{CBO} = 60V
- V_{CEO} = 60V
- I_C = 600mA

ABSOLUTE MAXIMUM RATINGS

		NPN Channel	PNP Channel
V_{CBO}	Collector - Base Voltage	75V	-60V
V_{CEO}	Collector - Emitter Voltage	40V	- 60V
V_{EBO}	Emitter - Base Voltage	6	-5
I_C	Collector Current (per device)	600mA	600mA
P_D	Power Dissipation (per device)	350mW	350mW
$\ominus$j-a	Thermal Resistance (junction to ambient)	350°C	
T_j,T_{stg}	Storage, Junction Temperature	-55 to +200°C	

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ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise stated) NPN DEVICES

	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$V_{CEO(sus)*}$	Collector – Emitter Sustaining Voltage	I_C = 10mA		40			V
$V_{(BR)CBO*}$	Collector – Base Breakdown Voltage	I_C = 10µA		75			V
$V_{(BR)EBO*}$	Emitter – Base Breakdown Voltage	I_E = 10µA	I_C = 0	6			V
I_{CEX*}	Collector Cut-off Current (I_C = 0)	I_B = 0	V_{CE} = 60V			10	nA
I_{CBO*}	Collector – Base Cut-off Current	I_E = 0	V_{CB} = 60V			10	nA
		T_C = 125°C				10	µA
I_{EBO*}	Emitter Cut-off Current (I_C = 0)	I_C = 0	V_{EB} = 3V (off)			10	nA
I_{BL*}	Base Current	V_{CE} = 60V	V_{EB} = 3V (off)			20	nA
$V_{CE(sat)*}$	Collector – Emitter Saturation Voltage	I_C = 150mA	I_B = 15mA			0.3	V
		I_C = 500mA	I_B = 50mA			1	
$V_{BE(sat)*}$	Base – Emitter Saturation Voltage	I_C = 150mA	I_B = 15mA	0.6		1.2	V
		I_C = 500mA	I_C = 50mA			2	
h_{FE*}	DC Current Gain	I_C = 0.1mA	V_{CE} = 10V	35			—
		I_C = 1mA	V_{CE} = 10V	50			
		I_C = 10mA	V_{CE} = 10V	75			
	T_A = –55°C	I_C = 10mA	V_{CE} = 10V	35			
		I_C = 150mA	V_{CE} = 10V	100		300	
		I_C = 150mA	V_{CE} = 1V	50			
		I_C = 500mA	V_{CE} = 10V	40			

* Pulse test t_p = 300µs , δ ≤ 2%

DYNAMIC CHARACTERISTICS (T_{case} = 25°C unless otherwise stated) NPN DEVICES

	Parameter	Test Conditions			Min.	Typ.	Max.	Unit
f_T	Transition Frequency	I_C = 20mA	V_{CE} = 20V	f =100MHz	300			MHz
C_{ob}	Output Capacitance	V_{CB} = 10V	I_E = 0	f = 1.0MHz			8	pF
C_{ib}	Input Capacitance	V_{BE} = 0.5V	I_C = 0	f = 1.0MHz			30	pF
h_{fe}	Small Signal Current Gain	I_C = 1mA	V_{CE} = 10V	f = 1kHz	50		300	
		I_C = 10mA	V_{CE} = 10V	f = 1kHz	75		375	

SWITCHING CHARACTERISTICS (RESISTIVE LOAD) (T_{case} = 25°C unless otherwise stated)

	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
t_d	Delay Time	V_{CC} = 30V	V_{BE} = 0.5V (off)			10	ns
t_r	Rise Time	I_{C1} = 150mA	I_{B1} = 15mA			25	ns
t_s	Storage Time	V_{CC} = 30V	I_C = 150mA			225	ns
t_f	Fall Time	I_{B1} = I_{B2} = 15mA				60	ns

f_T is defined as the frequency at which h_{FE} extrapolates to unity.

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ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise stated) PNP DEVICES

	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$V_{CEO(sus)}$*	Collector – Emitter Sustaining Voltage	I_C = 10mA		–60			V
$V_{(BR)CBO}$*	Collector – Base Breakdown Voltage	I_C = 10µA		–60			V
$V_{(BR)EBO}$*	Emitter – Base Breakdown Voltage	I_E = 10µA	I_C = 0	–5			V
I_{CEX}*	Collector Cut-off Current	V_{CE} = 30V	V_{BE} = 0.5V			50	nA
I_{CBO}*	Collector – Base Cut-off Current	I_E = 0	V_{CB} = 50V			0.01	µA
		T_C = 125°C				10	
I_{BEO}	Base Cut-off Current	V_{CE} = 30V	V_{BE} = 0.5V			50	nA
$V_{CE(sat)}$*	Collector – Emitter Saturation Voltage	I_C = 150mA	I_B = 15mA			–0.4	V
		I_C = 500mA	I_B = 50mA			–1.6	
$V_{BE(sat)}$*	Base – Emitter Saturation Voltage	I_C = 150mA	I_B = 15mA			–1.3	V
		I_C = 500mA	I_B = 50mA			–2.6	
h_{FE}*	DC Current Gain	I_C = 0.1mA	V_{CE} = 10V	75			—
		I_C = 1mA	V_{CE} = 10V	100			
		I_C = 10mA	V_{CE} = 10V	100			
		I_C = 150mA	V_{CE} = 10V	100		300	
		I_C = 500mA	V_{CE} = 10V	50			

* Pulse test t_p = 300µs , $\delta \leq 2\%$

DYNAMIC CHARACTERISTICS (T_{case} = 25°C unless otherwise stated) PNP DEVICES

	Parameter	Test Conditions			Min.	Typ.	Max.	Unit
f_T	Transition Frequency	I_C = 50mA	V_{CE} = 20V	f = 100MHz	200			MHz
C_{ob}	Output Capacitance	V_{CB} = 10V	I_E = 0	f = 1.0MHz			8	pF
C_{ib}	Input Capacitance	V_{BE} = 2V	I_C = 0	f = 1.0MHz			30	pF

ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise stated)

	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{on}	Turn-on Time	V_{CC} = 30V		26	45	ns
t_d	Delay Time	I_C = 150mA		6.0	10	
t_r	Rise Time	I_{B1} = 15mA		20	40	
t_{off}	Turn-off Time	V_{CC} = 6V		70	100	ns
t_s	Storage Time	I_C = 150mA		50	80	
t_f	Fall Time	I_{B1} = I_{B2} = 15mA		20	30	