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January 2015

# MMPQ6700 Quad NPN and PNP General-Purpose Amplifier

## **Description**

These complementary devices can be used in switches with collector currents of 10  $\mu$ A to 100 mA. These devices are best used when space is the primary consideration. Sourced from process 23 and 66. See 2N3904 (NPN) and 2N3906 (PNP) for characteristics.

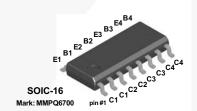


Figure 1. Device Package

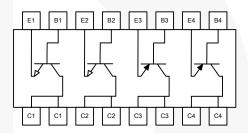


Figure 2. Internal Connection

## **Ordering Information**

Part Number	Top Mark	Package	Packing Method		
MMPQ6700	MMPQ6700	SOIC 16L	Tape and Reel		

## **Absolute Maximum Ratings**(1),(2)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^{\circ}$ C unless otherwise noted.

Symbol	Parameter	Value	Unit
V <sub>CEO</sub>	Collector-Emitter Voltage	40	V
V <sub>CBO</sub>	Collector-Base Voltage	40	V
V <sub>EBO</sub>	Emitter-Base Voltage	5.0	V
I <sub>C</sub>	Collector Current - Continuous	200	mA
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range -55 to 150		°C

## Notes:

- 1. These ratings are based on a maximum junction temperature of 150°C.
- 2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or

## Thermal Characteristics(3)

Values are at T<sub>A</sub> = 25°C unless otherwise noted.

Symbol	Parameter	Max.	Unit	
D	Total Device Dissipation	1000	mW	
P <sub>D</sub>	Derate Above 25°C	8.0	mW/°C	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	Effective 4 Dies	125	°C/W
		Each Die	240	°C/W

## Note:

3. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## **Electrical Characteristics**

Values are at  $T_A$  = 25°C unless otherwise noted.

Symbol	Parameter		Conditions		Min.	Max.	Unit
BV <sub>CEO</sub>	Collector-Emitter Breakdown Voltage <sup>(4)</sup>		I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0		40		V
BV <sub>CBO</sub>	Collector-Base Breakdown Voltage		$I_C = 10 \mu A, I_E = 0$		40		V
BV <sub>EBO</sub>	Emitter-Base Breakdown Voltage		$I_E = 10 \mu A, I_C = 0$		5.0		V
I <sub>CBO</sub>	Collector Cut-Off Current		$V_{CB} = 30 \text{ V, } I_{E} = 0$			50	nA
I <sub>EBO</sub>	Emitter Cut-Off Current		V <sub>EB</sub> = 4.0 V, I <sub>C</sub> = 0			50	nA
h <sub>FE</sub> DC Current Gain <sup>(4)</sup>			$V_{CE} = 1.0 \text{ V}, I_{C} = 0.1 \text{ mA}$		30		
	DC Current Gain <sup>(4)</sup>		$V_{CE} = 1.0 \text{ V}, I_{C} = 1.0 \text{ mA}$		50		
			$V_{CE}$ = 1.0 V, $I_{C}$ = 10 mA		70		
V <sub>CE</sub> (sat)	Collector-Emitter Saturation Voltage <sup>(4)</sup>		I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1.0 mA			0.25	V
V <sub>BE</sub> (sat)	Base-Emitter Saturation Voltage <sup>(4)</sup>		I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1.0 mA			0.9	V
C <sub>ob</sub>	Output Capacitance		V <sub>CB</sub> = 5.0 V, f = 100 kHz			4.5	pF
C <sub>ib</sub>	Input Capacitance		$V_{DE} = 0.5 \text{ V. f} = 100 \text{ kHz}$	PNP		10	nE
				NPN		8.0	- pF
f <sub>T</sub>	Current Gain Bandwidth Product		I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 20 V, f = 100 MHz		200		MHz

## Note:

4. Pulse test: pulse width  $\leq$  300  $\mu$ s, duty cycle  $\leq$  2.0%.

## **Physical Dimensions** 10.00 9.80 8.89 4.00 3.80 6.00 5.6 **PIN ONE** 0.51 **INDICATOR** 1.27 (0.30)**⊕** 0.25 **M** C B A LAND PATTERN RECOMMENDATION 1.75 MAX SEE DETAIL A 1.50 1.25 0.25 0.19 ○ 0.10 C -0.50 0.25 X 45° NOTES: UNLESS OTHERWISE SPECIFIED (R0.10) A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AC, ISSUE C. B) ALL DIMENSIONS ARE IN MILLIMETERS. C) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS D) CONFORMS TO ASME Y14.5M-1994 E) LANDPATTERN STANDARD: SOIC127P600X175-16AM F) DRAWING FILE NAME: M16AREV12. **GAGE PLANE** (R0.10) 0.36 **SEATING PLANE** 0.90 0.50 (1.04)

Figure 3. 16-LEAD, SOIC, JEDEC MS-012, 0.150 inch, NARROW BODY

DETAIL A





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Preliminary First Production		Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.		
No Identification Needed Full Production		Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.		
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.		

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