

# MCT1413, B

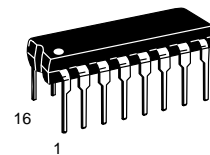
## High Voltage, High Current Darlington Transistor Array

The seven NPN Darlington connected transistors in this array are well suited for driving lamps, relays, or printer hammers in a variety of industrial and consumer applications. Their high breakdown voltage and internal suppression diodes insure freedom from problems associated with inductive loads. Peak inrush currents to 600 mA permit them to drive incandescent lamps.

The MCT1413, B with a 2.7 k $\Omega$  series input resistor is well suited for systems utilizing a 5.0 V TTL or CMOS Logic.

### PERIPHERAL DRIVER ARRAY

### SEMICONDUCTOR TECHNICAL DATA



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648D

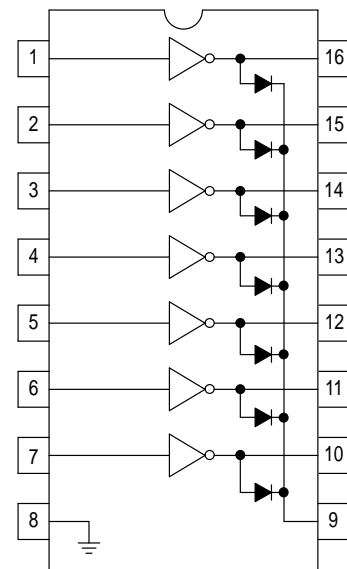
This MCT–prefixed device is intended to be a possible replacement for the similar device with the MC–prefix. Because the MCT device originates from different source material, there may be subtle differences in typical parameter values or characteristic curves. Due to the diversity of potential applications, Motorola can not assure identical performance in all circuits. Motorola recommends that the customer qualify the MCT–prefixed device in each potential application.

**MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  and rating apply to any one device in the package unless otherwise noted.)

Rating	Symbol	Value	Unit
Output Voltage	$V_O$	50	V
Input Voltage	$V_I$	30	V
Collector Current – Continuous	$I_C$	500	mA
Base Current – Continuous	$I_B$	25	mA
Operating Ambient Temperature Range MCT1413 MCT1413B	$T_A$	– 20 to + 85 – 40 to + 85	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	– 55 to +150	$^\circ\text{C}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Thermal Resistance – Junction–to–Ambient	$\theta_{JA}$	67	$^\circ\text{C}/\text{W}$

**CAUTION:** These devices do not have internal ESD protection circuitry and are rated as CLASS 1 devices per the ESD test method in Mil–Std–833D. They should be handled using standard ESD prevention methods to avoid damage to the device.

### PIN CONNECTIONS



### ORDERING INFORMATION

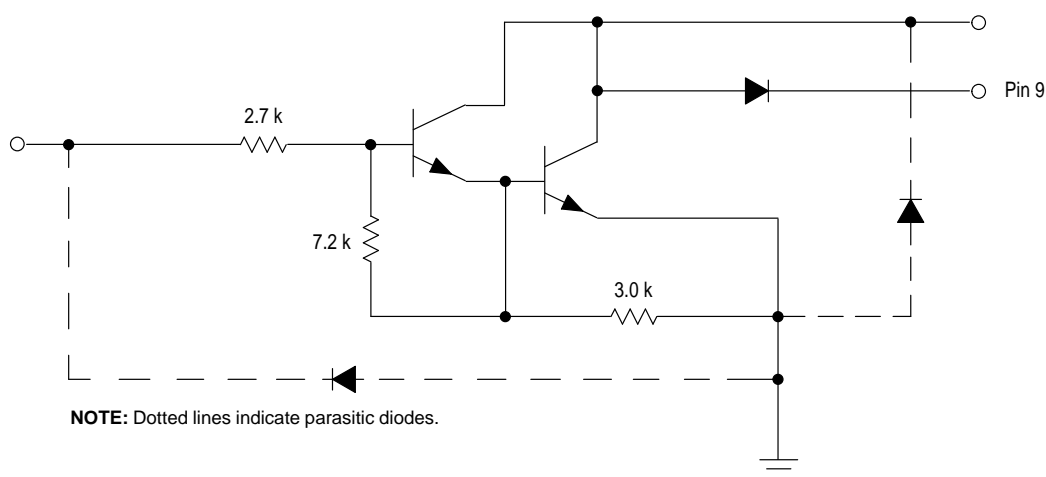
Device	Operating Temperature Range	Package
MCT1413P (ULN2003A)	$T_A = -20^\circ$ to $+85^\circ\text{C}$	Plastic
MCT1413BP	$T_A = -40^\circ$ to $+85^\circ\text{C}$	

# MCT1413, B

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Output Leakage Current (V <sub>O</sub> = 50 V) (V <sub>O</sub> = 50 V, T <sub>A</sub> = + 85°C) (V <sub>O</sub> = 50 V, T <sub>A</sub> = - 40°C)	I <sub>CEX</sub>	-	-	50 100 100	μA
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 350 mA, I <sub>B</sub> = 500 μA) (I <sub>C</sub> = 200 mA, I <sub>B</sub> = 350 μA) (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 250 μA) (I <sub>C</sub> = 350 mA, I <sub>B</sub> = 500 μA, T <sub>A</sub> = + 85°C, - 40°C) (I <sub>C</sub> = 200 mA, I <sub>B</sub> = 350 μA, T <sub>A</sub> = + 85°C, - 40°C) (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 250 μA, T <sub>A</sub> = + 85°C, - 40°C)	V <sub>CE(sat)</sub>	-	1.1 0.95 0.85	1.6 1.3 1.1 1.75 1.5 1.3	V
Input Current – ON Condition (V <sub>in</sub> = 3.85 V)	I <sub>in</sub>	-	0.93	1.35	mA
Output Voltage – ON Condition (V <sub>in</sub> = 2.4 V, I <sub>C</sub> = 200 mA) (V <sub>in</sub> = 2.7 V, I <sub>C</sub> = 250 mA) (V <sub>in</sub> = 3.0 V, I <sub>C</sub> = 300 mA) (V <sub>in</sub> = 2.7 V, I <sub>C</sub> = 250 mA, T <sub>A</sub> = + 85°C, - 40°C) (V <sub>in</sub> = 3.0 V, I <sub>C</sub> = 300 mA, T <sub>A</sub> = + 85°C, - 40°C)	V <sub>out</sub>	-	-	2.0 2.0 2.0 2.0 2.0	V
Output Current – OFF Condition (I <sub>in</sub> = 50 μA, V <sub>out</sub> = 5.0 V) (I <sub>in</sub> = 50 μA, V <sub>out</sub> = 5.0 V, T <sub>A</sub> = + 85°C) (I <sub>in</sub> = 50 μA, V <sub>out</sub> = 5.0 V, T <sub>A</sub> = - 40°C)	I <sub>out</sub>	-	-	100 500 500	μA
Clamp Diode Leakage Current (V <sub>R</sub> = 50 V) (V <sub>R</sub> = 50 V, T <sub>A</sub> = + 85°C) (V <sub>R</sub> = 50 V, T <sub>A</sub> = - 40°C)	I <sub>R</sub>	-	-	50 100 100	μA
Clamp Diode Forward Voltage (I <sub>F</sub> = 350 mA) (I <sub>F</sub> = 350 mA, T <sub>A</sub> = + 85°C, - 40°C)	V <sub>F</sub>	-	1.5	2.0 2.0	V

Figure 1. Representative Schematic Diagram  
(1/7 MCT1413, B)

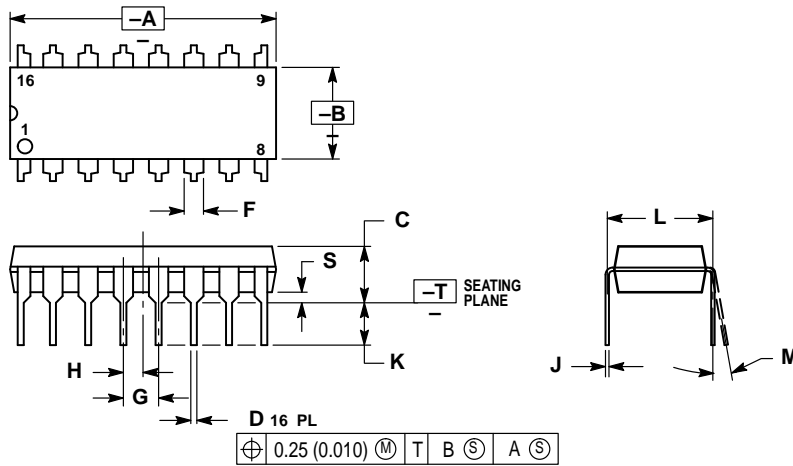


This device contains 14 active transistors.

# MCT1413, B

## OUTLINE DIMENSIONS

P SUFFIX  
PLASTIC PACKAGE  
CASE 648D-02




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
5. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.25 (0.010).
6. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.740	0.760	18.80	19.30
B	0.245	0.260	6.23	6.60
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.050	0.070	1.27	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.120	0.140	3.05	3.55
L	0.295	0.305	7.50	7.74
M	0°	10°	0°	10°
S	0.015	0.035	0.39	0.88

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MCT1413B/D

