

PERIPHERAL **DRIVER ARRAY** 

SEMICONDUCTOR

**TECHNICAL DATA** 

# **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.

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.

		3	]
one device in the pack-			
Value	Unit	5	
50	V		7
30	V		
500	mA	7	7
25	mA		_
– 20 to + 85 – 40 to + 85	°C		
– 55 to +150	°C		

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ORDERING INFORMATION

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

MAXIMUM RATINGS (T<sub>A</sub> = 25°C and rating apply to any one device age unless otherwise noted.)

Symbol

٧o

٧I

IC

 $I_B$ 

ΤA

T<sub>stg</sub>

ТJ

θJA

150

67

°C

°C/W

Rating

**Operating Ambient Temperature Range** 

Thermal Resistance - Junction-to-Ambient

Collector Current - Continuous

Base Current - Continuous

Storage Temperature Range

Junction Temperature

**Output Voltage** 

Input Voltage

MCT1413

MCT1413B

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** 

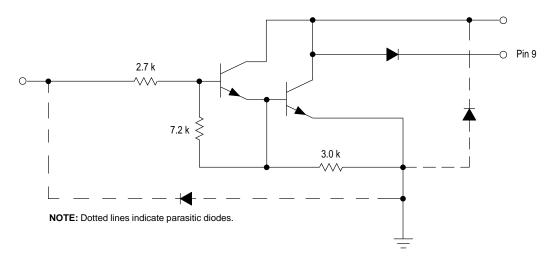
16

P SUFFIX PLASTIC PACKAGE CASE 648D

## **ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = $25^{\circ}$ C, unless otherwise noted.)

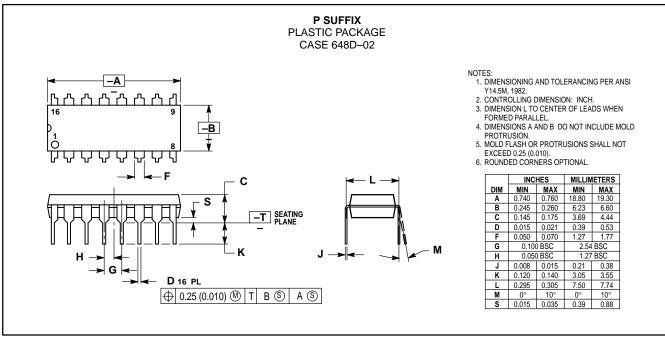
Characteristic	Symbol	Min	Тур	Max	Unit	
Output Leakage Current $(V_O = 50 V)$ $(V_O = 50 V, T_A = + 85^{\circ}C)$ $(V_O = 50 V, T_A = -40^{\circ}C)$	MCT1413, B MCT1413, B MCT1413B	ICEX	_ _ _	_ _ _	50 100 100	μΑ
Collector-Emitter Saturation Voltage ( $I_C = 350 \text{ mA}, I_B = 500 \mu\text{A}$ ) ( $I_C = 200 \text{ mA}, I_B = 350 \mu\text{A}$ ) ( $I_C = 100 \text{ mA}, I_B = 250 \mu\text{A}$ ) ( $I_C = 350 \text{ mA}, I_B = 500 \mu\text{A}, T_A = +85^\circ\text{C}, -40^\circ\text{C}$ ) ( $I_C = 200 \text{ mA}, I_B = 350 \mu\text{A}, T_A = +85^\circ\text{C}, -40^\circ\text{C}$ ) ( $I_C = 100 \text{ mA}, I_B = 250 \mu\text{A}, T_A = +85^\circ\text{C}, -40^\circ\text{C}$ )	MCT1413, B MCT1413, B MCT1413, B MCT1413B MCT1413B MCT1413B MCT1413B	VCE(sat)	- - - - -	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)	MCT1413, B	lin	_	0.93	1.35	mA
Output Voltage – ON Condition ( $V_{in} = 2.4 \text{ V}, \text{ IC} = 200 \text{ mA}$ ) ( $V_{in} = 2.7 \text{ V}, \text{ IC} = 250 \text{ mA}$ ) ( $V_{in} = 3.0 \text{ V}, \text{ IC} = 300 \text{ mA}$ ) ( $V_{in} = 2.7 \text{ V}, \text{ IC} = 250 \text{ mA}, \text{ TA} = +85^{\circ}\text{C}, -40^{\circ}\text{C}$ ) ( $V_{in} = 3.0 \text{ V}, \text{ IC} = 300 \text{ mA}, \text{ TA} = +85^{\circ}\text{C}, -40^{\circ}\text{C}$ )	MCT1413, B MCT1413, B MCT1413, B MCT1413B MCT1413B	V <sub>out</sub>	- - - -	- - - -	2.0 2.0 2.0 2.0 2.0	V
Output Current – OFF Condition ( $I_{in} = 50 \ \mu$ A, V <sub>out</sub> = 5.0 V) ( $I_{in} = 50 \ \mu$ A, V <sub>out</sub> = 5.0 V, T <sub>A</sub> = + 85°C) ( $I_{in} = 50 \ \mu$ A, V <sub>out</sub> = 5.0 V, T <sub>A</sub> = - 40°C)	MCT1413, B MCT1413, B MCT1413B	lout	_ _ _		100 500 500	μΑ
Clamp Diode Leakage Current $(V_R = 50 V)$ $(V_R = 50 V, T_A = + 85^{\circ}C)$ $(V_R = 50 V, T_A = -40^{\circ}C)$	MCT1413, B MCT1413, B MCT1413B	IR	_ _ _	_ _ _	50 100 100	μΑ
Clamp Diode Forward Voltage (I <sub>F</sub> = 350 mA) (I <sub>F</sub> = 350 mA, T <sub>A</sub> = + 85°C, $-40^{\circ}$ C)	MCT1413, B MCT1413B	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.

#### **OUTLINE DIMENSIONS**



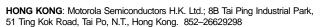
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 $\Diamond$ 





MCT1413B/D