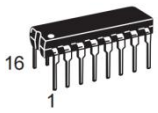
High Voltage, High Current Darlington Transistor Arrays

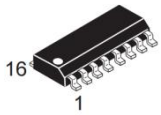
General Description

The seven NPN Darlington connected transistors in these arrays 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 500 mApermit them to drive incandescent lamps.

The MC1413, B with a 2.7 kΩ series input resistor is well suited for systems utilizing a 5.0 V TTL or CMOS Logic.



DIP16

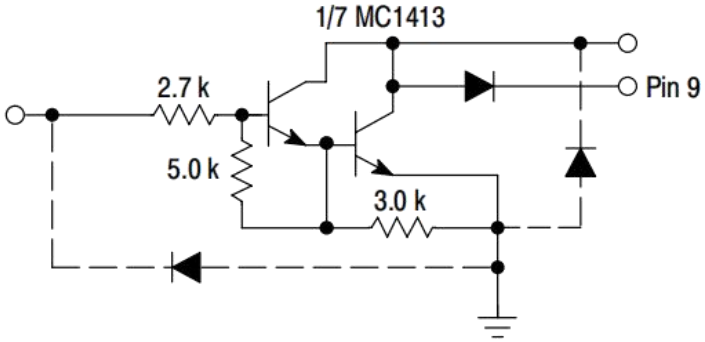


SOP16

Ordering Information

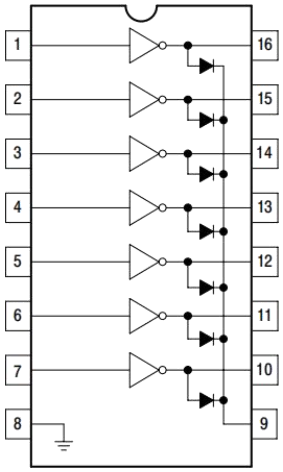
DEVICE	Package Type	MARKING	Packing	Packing Qty
MC1413PG	DIP16	MC1413	TUBE	1000pcs/Box
MC1413DRG	SOP16	MC1413	REEL	2500pcs/Reel
MC1413BPG	DIP16	MC1413B	TUBE	1000pcs/Box
MC1413BDRG	SOP16	MC1413B	REEL	2500pcs/Reel

Representative Schematic Diagram



Pin Connections

SOP16/DIP16



Maximum Ratings (TA = 25℃, 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 MC1413 MC1413B	T_A	 −20 to +85 −40 to +85	℃
Storage Temperature Range	T_{stg}	−55 to +150	℃
Junction Temperature	T_J	150	℃
Thermal Resistance, Junction−to−Ambient: N Suffix M Suffix	$R_{\theta JA}$	67 100	℃/W
Thermal Resistance, Junction−to−Case: N Suffix M Suffix	$R_{\theta JC}$	22 20	℃/W
Electrostatic Discharge Sensitivity (ESD)Human Body Model (HBM) Machine Model (MM) Charged Device Model (CDM)	ESD	2000 400 1500	V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Electrical Characteristics (TA = 25℃, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Output Leakage Current (V_O = 50 V, T_A = +85℃) (V_O = 50 V, T_A = +25℃)	I_{CEX}	 − −	 − −	 100 50	μA
Collector−Emitter Saturation Voltage (I_C = 350 mA, I_B = 500 μA) (I_C = 200 mA, I_B = 350 μA) (I_C = 100 mA, I_B = 250 μA)	$V_{CE(sat)}$	 − − −	 1.1 0.95 0.85	 1.6 1.3 1.1	V
Input Current − On Condition(V_I = 3.85 V)	$I_{I(on)}$	−	0.93	1.35	mA
Input Voltage − On Condition (V_{CE} = 2.0 V, I_C = 200 mA) (V_{CE} = 2.0 V, I_C = 250 mA) (V_{CE} = 2.0 V, I_C = 300 mA)	$V_{I(on)}$	 − − −	 − − −	 2.4 2.7 3.0	V
Input Current − Off Condition(I_C = 500 μA, T_A = 85℃)	$I_{I(off)}$	50	100	−	μA
DC Current Gain (V_{CE} = 2.0 V, I_C = 350 mA)	h_{FE}	1000	−	−	−
Input Capacitance	C_I	−	15	30	pF
Turn−On Delay Time (50% E_I to 50% E_O)	t_{on}	−	0.25	1.0	μs
Turn−Off Delay Time (50% E_I to 50% E_O)	t_{off}	−	0.25	1.0	μs
Clamp Diode Leakage Current T_A = +25℃ (V_R = 50 V) T_A = +85℃	I_R	− −	− −	50 100	μA
Clamp Diode Forward Voltage(I_F = 350 mA)	V_F	−	1.5	2.0	V

Typical Performance Curves TA = 25°C

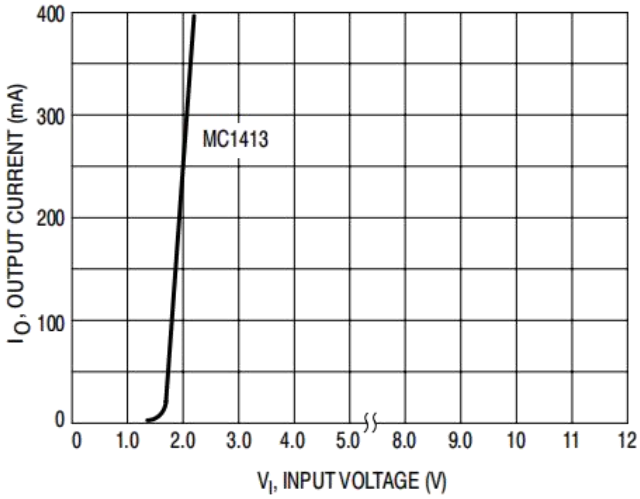


Figure 3. Output Current versus Input Voltage

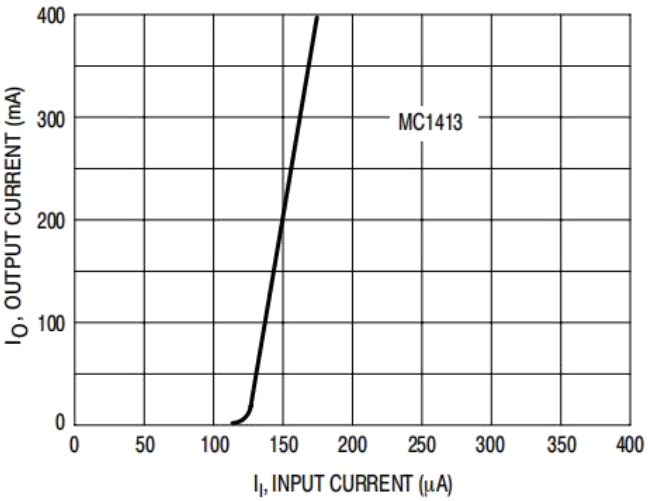


Figure 4. Output Current versus Input Current

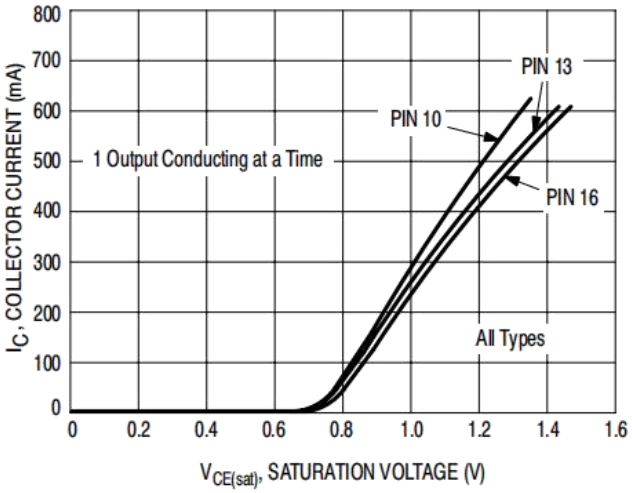


Figure 5. Typical Output Characteristics

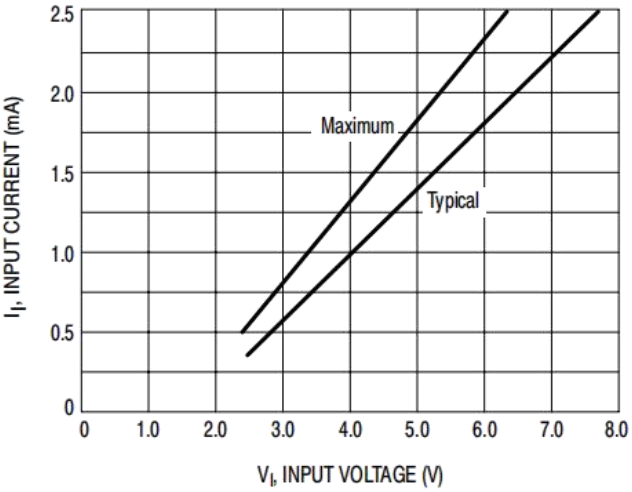


Figure 6. Input Characteristics

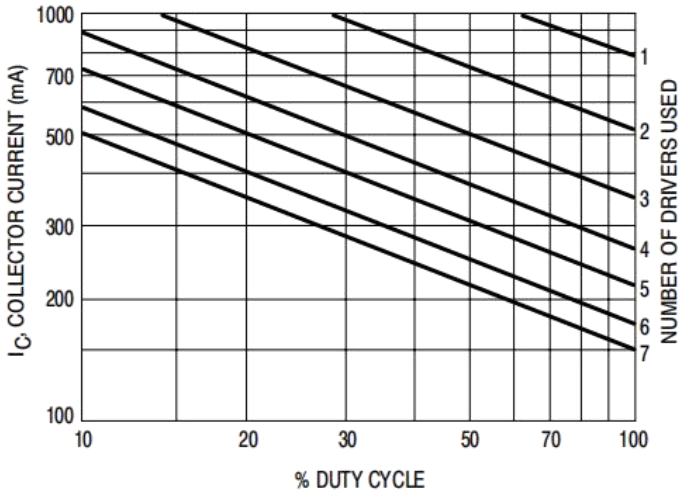
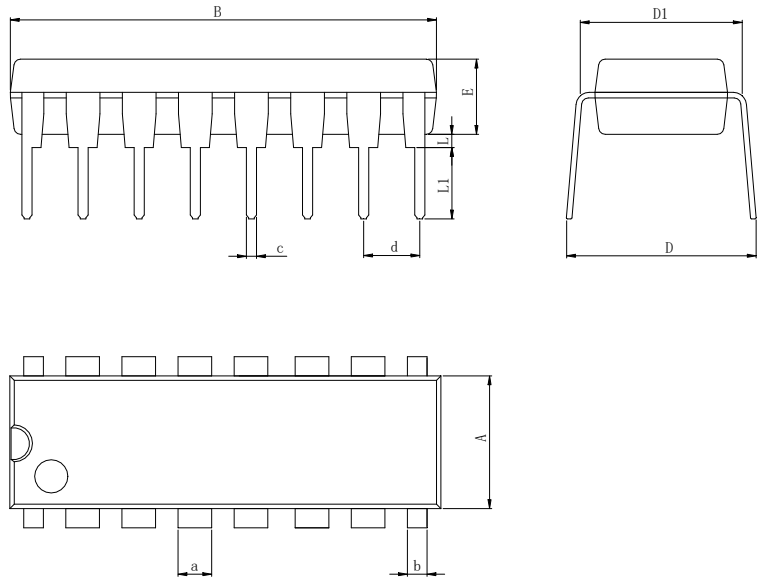


Figure 7. Maximum Collector Current versus Duty Cycle
(and Number of Drivers in Use)

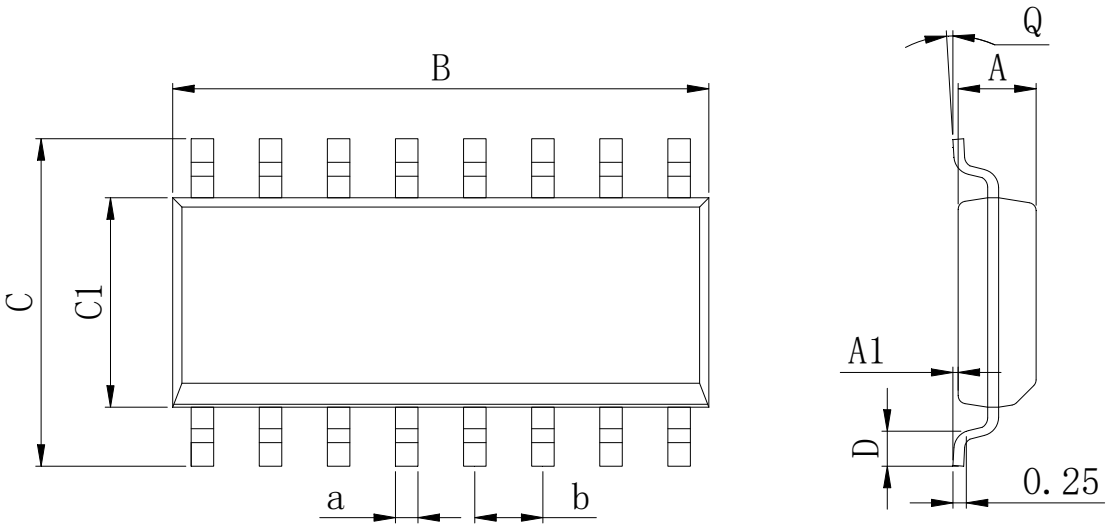
Physical Dimensions

DIP16



Dimensions In Millimeters(DIP16)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	18.94	8.40	7.42	3.10	0.50	300	1.50	0.85	0.40	2.54 BSC
Max:	6.68	19.56	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

SOP16



Dimensions In Millimeters(SOP16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	9.80	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	10.0	6.20	4.00	0.80	8°	0.45	

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