

MC1413, MC1413B, NCV1413B

High Voltage, High Current Darlington Transistors

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.

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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 MC1413 MC1413B NCV1413B	T_A	-20 to +85 -40 to +85 -40 to +125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient Case 648, P Suffix Case 751B, D Suffix	$R_{\theta JA}$	67 100	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case Case 648, P Suffix Case 751B, D Suffix	$R_{\theta JC}$	22 20	$^\circ\text{C/W}$
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.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Output Leakage Current ($V_O = 50\text{ V}$, $T_A = +85^\circ\text{C}$) ($V_O = 50\text{ V}$, $T_A = +25^\circ\text{C}$)	All Types All Types	I_{CEX}	– –	– –	100 50	μA
Collector–Emitter Saturation Voltage ($I_C = 350\text{ mA}$, $I_B = 500\text{ }\mu\text{A}$) ($I_C = 200\text{ mA}$, $I_B = 350\text{ }\mu\text{A}$) ($I_C = 100\text{ mA}$, $I_B = 250\text{ }\mu\text{A}$)	All Types All Types All Types	$V_{CE(sat)}$	– – –	1.1 0.95 0.85	1.6 1.3 1.1	V
Input Current – On Condition ($V_I = 3.85\text{ V}$)	MC1413, B	$I_{I(on)}$	–	0.93	1.35	mA
Input Voltage – On Condition ($V_{CE} = 2.0\text{ V}$, $I_C = 200\text{ mA}$) ($V_{CE} = 2.0\text{ V}$, $I_C = 250\text{ mA}$) ($V_{CE} = 2.0\text{ V}$, $I_C = 300\text{ mA}$)	MC1413, B MC1413, B MC1413, B	$V_{I(on)}$	– – –	– – –	2.4 2.7 3.0	V
Input Current – Off Condition ($I_C = 500\text{ }\mu\text{A}$, $T_A = 85^\circ\text{C}$)	All Types	$I_{I(off)}$	50	100	–	μA
DC Current Gain ($V_{CE} = 2.0\text{ V}$, $I_C = 350\text{ mA}$)		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 ($V_R = 50\text{ V}$)	$T_A = +25^\circ\text{C}$ $T_A = +85^\circ\text{C}$	I_R	– –	– –	50 100	μA
Clamp Diode Forward Voltage ($I_F = 350\text{ mA}$)		V_F	–	1.5	2.0	V

NOTE: NCV1413B $T_{low} = -40^\circ\text{C}$, $T_{high} = +125^\circ\text{C}$. Guaranteed by design. NCV prefix is for automotive and other applications requiring site and change control.

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TYPICAL PERFORMANCE CURVES - $T_A = 25^\circ\text{C}$

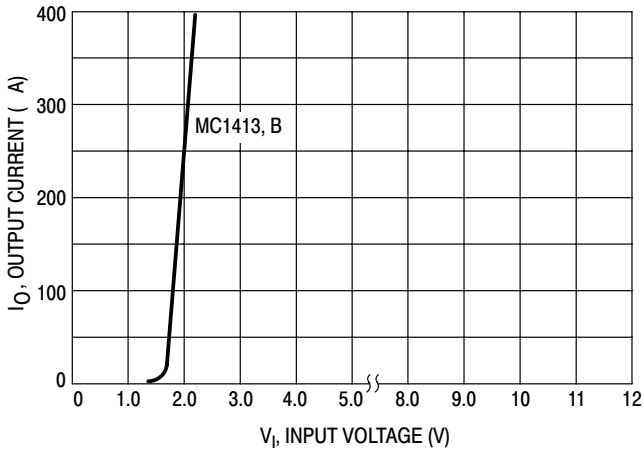


Figure 3. Output Current versus Input Voltage

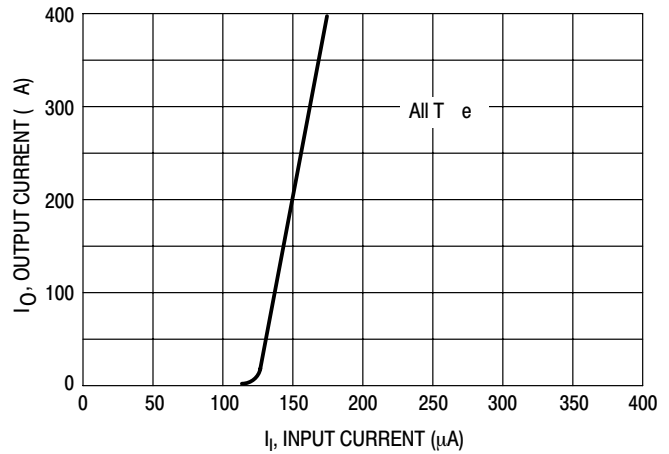


Figure 4. Output Current versus Input Current

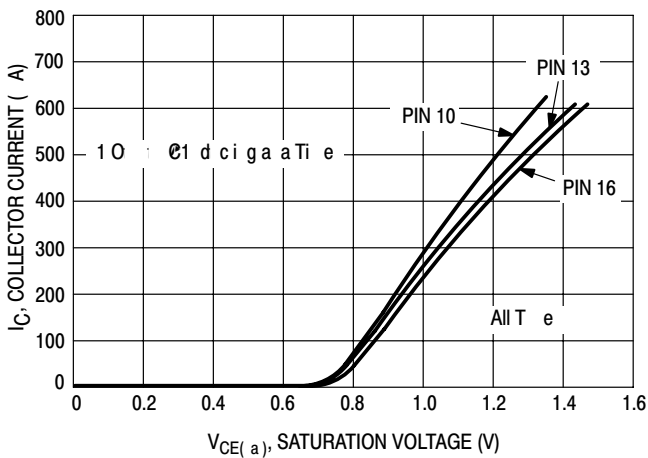


Figure 5. Typical Output Characteristics

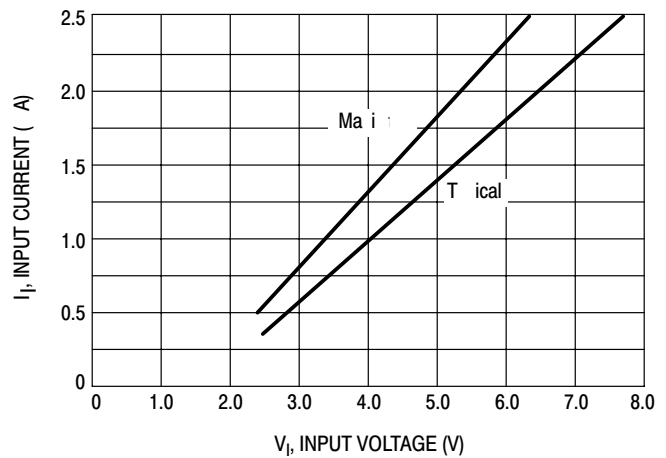


Figure 6. Input Characteristics - MC1413, B

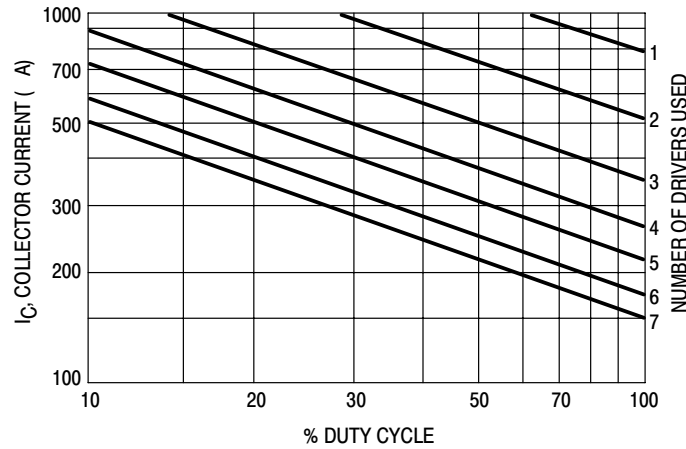
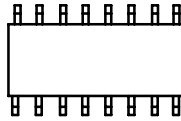
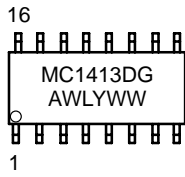
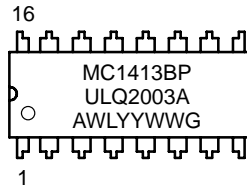
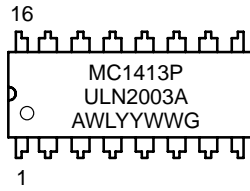


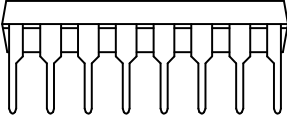
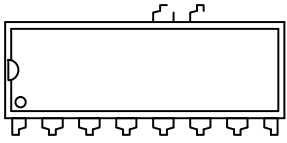
Figure 7. Maximum Collector Current versus Duty Cycle (and Number of Drivers in Use)

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MARKING DIAGRAMS

PDIP-16
P SUFFIX
CASE 648





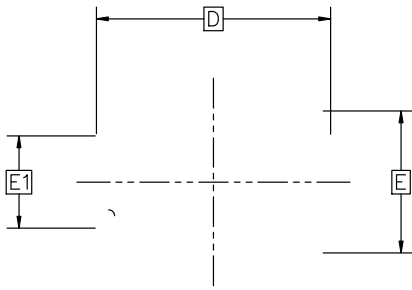


SOIC-16 9.90x3.90x1.37 1.27P
CASE 751B
ISSUE M

DATE 18 OCT 2024

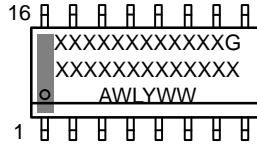
- 3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD PROTRUSION.
- 4. MAXIMUM MOLD PROTRUSION 0.17

b DIMENSION AT MAXIMUM MATE nm TOTAL IN EXCESS OF THE



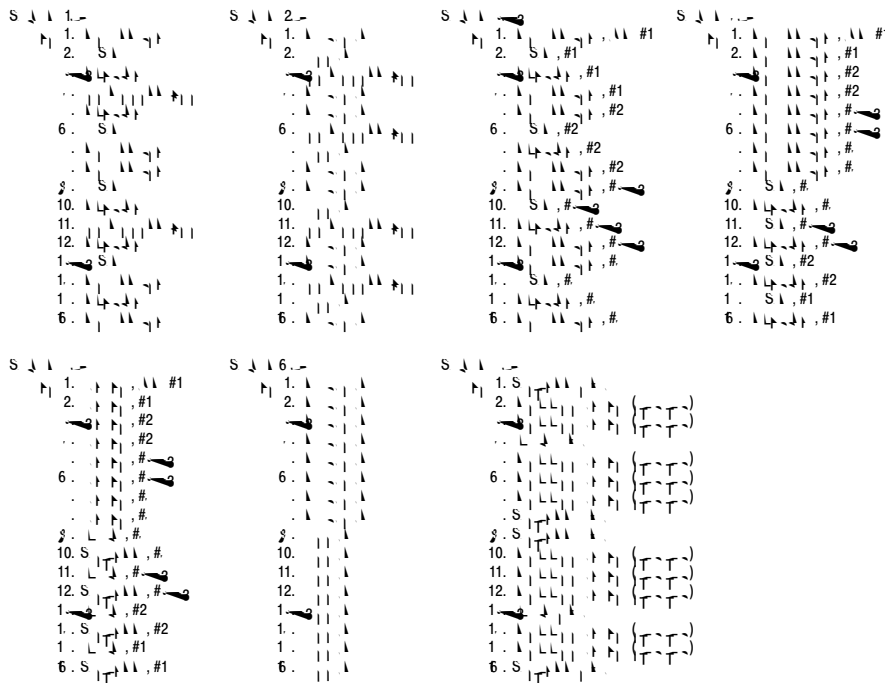
TOP VIEW

**GENERIC
MARKING DIAGRAM***



XXXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
WW = Work Week
G = Pb Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.



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