

**SANYO**

No.1042F

**LB1211 Series****General-Purpose Transistor Array**

The LB1211 series are general-purpose transistor arrays containing 7 channels (5 channels : LB1217 only). They are especially suited for driving LEDs, lamps, small-sized relays, etc. The transistors can be standardized.

**Features**

- Common-emitter 7 channels. LB1211,1212,1213,1214
- Common-collector 7 channels. LB1215,1216
- Independent 5 channels LB1217
- Built-in base current limiting resistors. LB1212,1213,1214,1216
- Built-in Zener diodes for level shift. LB1212
- Capable of being direct driven with TTL, CMOS, PMOS, etc.
- Wide operating voltage and temperature ranges

**Absolute Maximum Ratings at Ta = 25°C**

				unit
Output Supply Voltage	V <sub>OUT</sub>	LB1212/13/14 only	-0.5 to +50	V
Collector to Emitter Voltage	V <sub>CEO</sub>	LB1211/15/16/17 only	35	V
Collector to Base Voltage	V <sub>CBO</sub>	LB1211/15/16/17 only	50	V
Output Current	I <sub>OUT</sub>		200	mA
Input Voltage	V <sub>IN1</sub>	LB1212/13/14 only	-0.5 to +30	V
	V <sub>IN2</sub>	LB1216 only	-0.5 to +45	V
Input Current	I <sub>IN</sub>	LB1211/15/17 only	25	mA
GND Pin Current	I <sub>GND</sub>		500	mA
Allowable Power Dissipation	P <sub>d max</sub>		960	mW
Operating Temperature	T <sub>opr</sub>		-20 to +75	°C
Storage Temperature	T <sub>stg</sub>		-40 to +150	°C

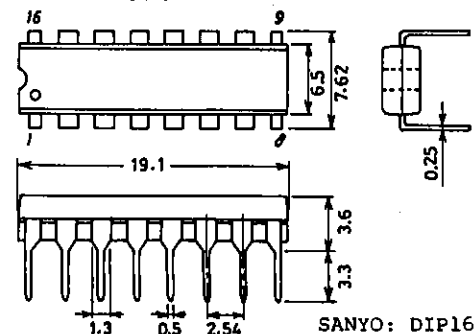
**Electrical Characteristics at Ta = 25°C**

			min	typ	max	unit
Output Voltage	V <sub>OUT1</sub>	I <sub>IN</sub> = 1mA, I <sub>OUT</sub> = 10mA			0.2	V
	V <sub>OUT2</sub>	I <sub>IN</sub> = 2mA, I <sub>OUT</sub> = 100mA			0.8	V
	V <sub>OUT3</sub>	I <sub>IN</sub> = 3mA, I <sub>OUT</sub> = 100mA			0.8	V
Output Leakage Current	I <sub>OFF</sub>	V <sub>IN</sub> = 0V, V <sub>OUT</sub> = 25V			10	μA
	V <sub>OUT(sus)</sub>	I <sub>OUT</sub> = 100mA	35			V
DC Current Gain	h <sub>FE1</sub>	V <sub>OUT</sub> = 10V, I <sub>OUT</sub> = 10mA	50		500	
	h <sub>FE2</sub>	V <sub>OUT</sub> = 10V, I <sub>OUT</sub> = 10mA	70		500	

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**Package Dimensions 3064**

(unit : mm)

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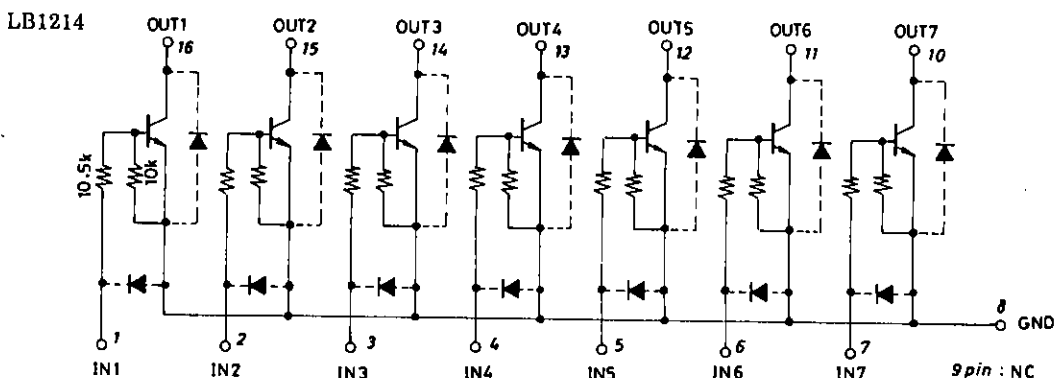
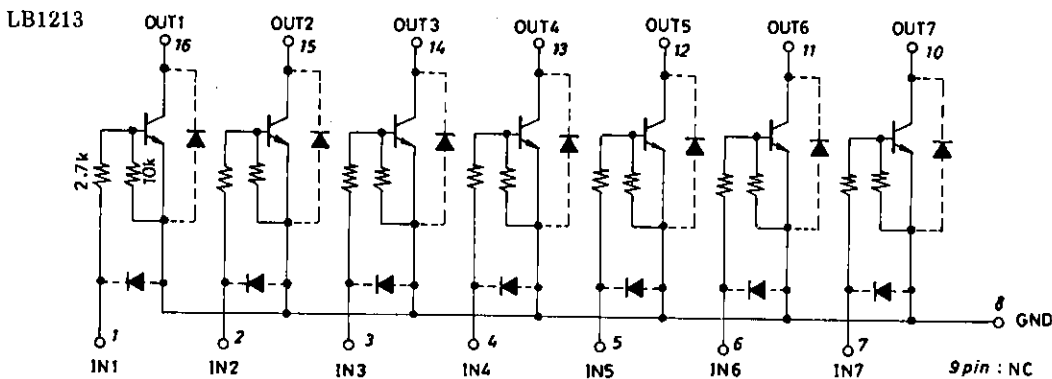
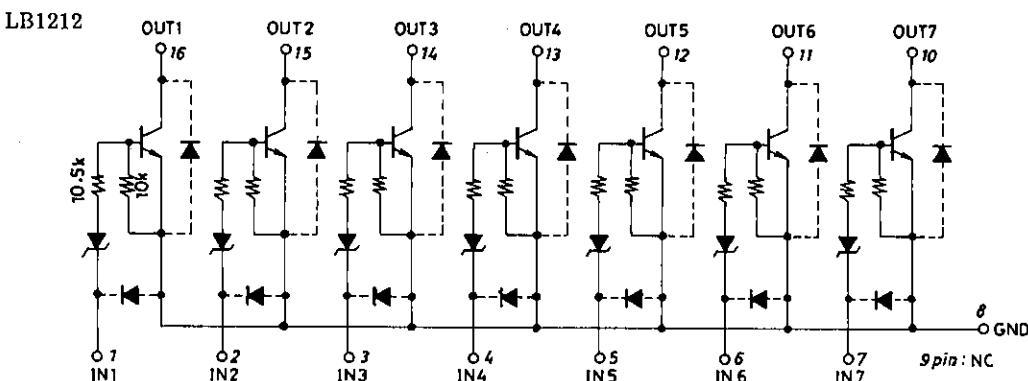
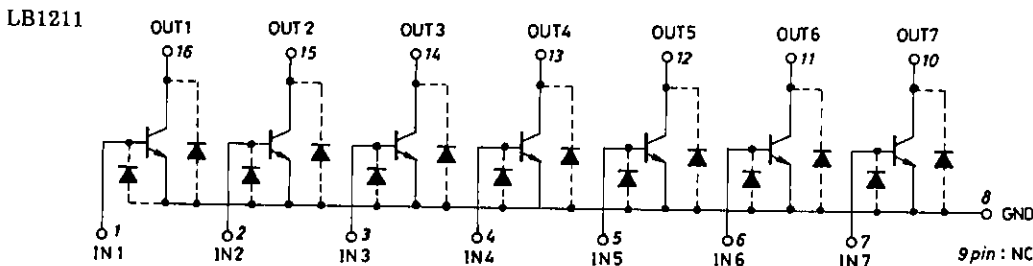
N010TS / 4050YT / 4078TA / 7067KI / 3295KI / 7072KI, TS No.1042-1/4

LB1211,1212,1213,1214,1215;1216,1217

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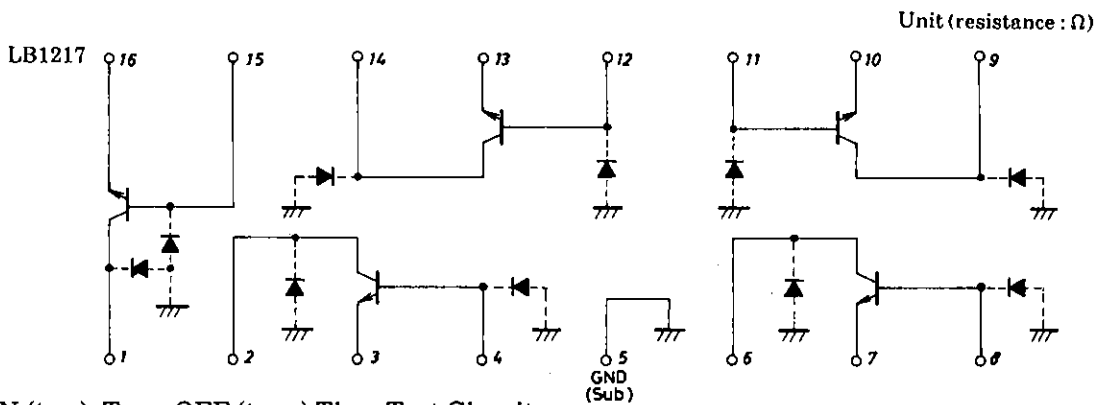
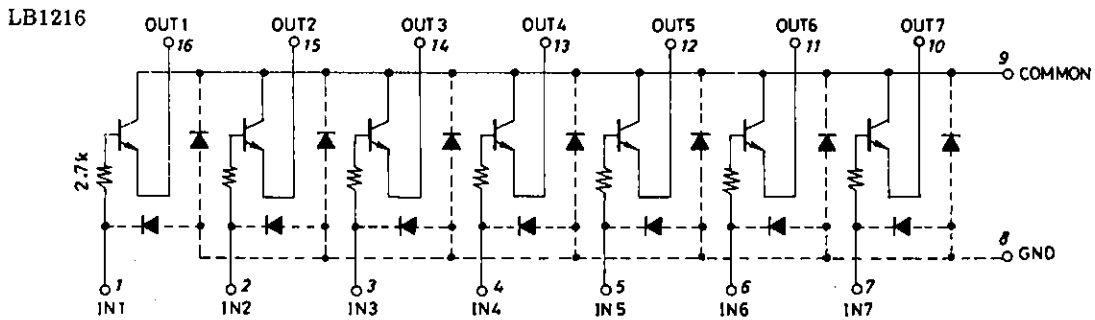
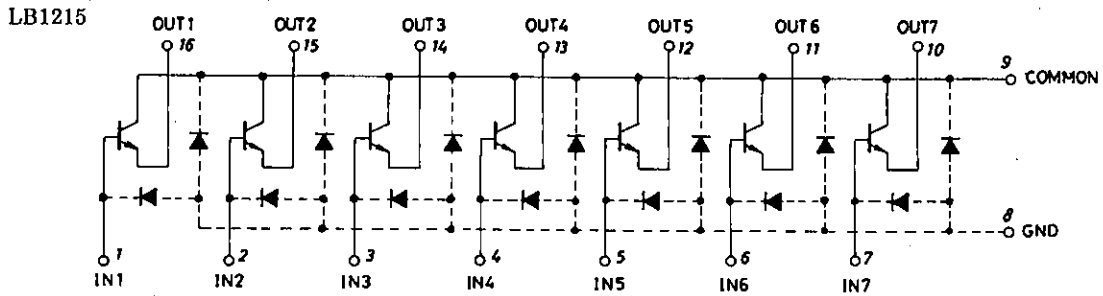
		$I_{IN}=1mA, I_{OUT}=10mA$ LB1211/15/16/17 only	min	typ	max	unit
Input Voltage	$V_{IN(on)}$		0.4			V
Turn-ON Time	$t_{ON}$	Refer to Test Circuit.		50		ns
Turn-OFF Time	$t_{OFF}$	Refer to Test Circuit.		200		ns

Equivalent Circuit

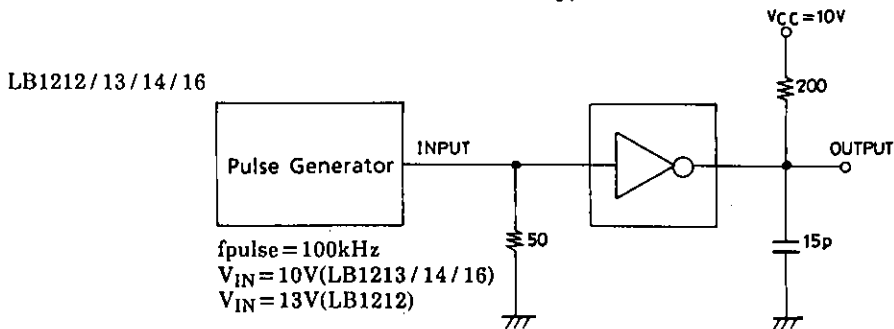
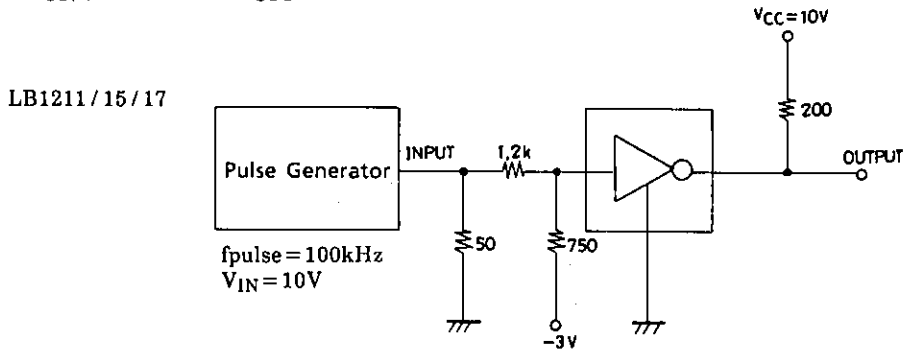


Unit (resistance :  $\Omega$ )

# LB1211,1212,1213,1214,1215,1216,1217

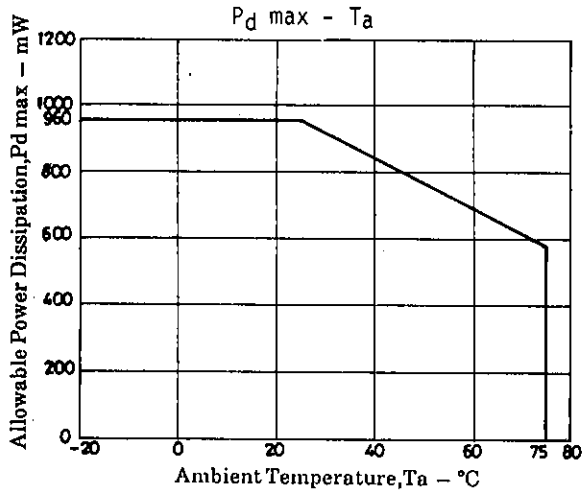
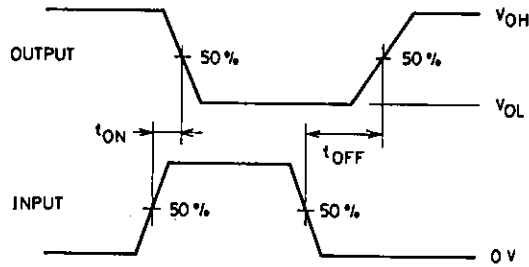


Turn-ON ( $t_{ON}$ ), Turn-OFF ( $t_{OFF}$ ) Time Test Circuits



Unit (resistance:  $\Omega$ , capacitance: F)

Input/Output Waveforms



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**SANYO**

NO.1188D

**LB1231 Series****High-Voltage, Large Current  
Darlington Transistor Array**

The circuit configuration of this IC is of 7-channel Darlington transistor array consisting of NPN transistors. It is especially suited for use in hammer drivers and lamp, relay drivers. It contains spark killer diodes against L load.

Features High-voltage ( $V_{CE0} \geq 50V$ ), large-current ( $I_{Cmax} = 500mA$ ) drive

LB1231 . Drivable by TTL, MOS output

LB1232 . Contains base current limiting resistors, Zener diodes for level shift.

. Direct drivable by 24V P MOS.

LB1233 . Contains base current limiting resistors.

. Direct drivable by TTL, C MOS output.

LB1234 . Contains base current limiting resistors.

. Direct drivable by C MOS, P MOS output.

**Absolute Maximum Ratings at  $T_a = 25^\circ C$** 

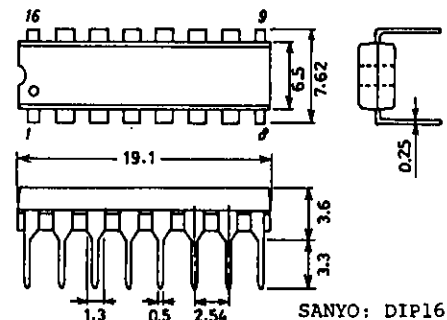
				unit
Output Supply Voltage	$V_{OUT}$		50	V
Output Current	$I_{OUT}$	Per unit	500	mA
Input Supply Voltage	$V_{IN}$	LB1232/33/34	30	V
Input Current	$I_{IN}$	LB1231 only	25	mA
GND Pin Current	$I_{GND}$	7ch simultaneously on, $f=10Hz, duty, =23\%$	2.8	A
Allowable Power Dissipation	$P_{dmax}$		1.5	W
Operating Temperature	$T_{opr}$		-20 to +75	$^\circ C$
Storage Temperature	$T_{stg}$		-40 to +150	$^\circ C$

**Allowable Operating Conditions at  $T_a = 25^\circ C$** 

				unit
Output Supply Voltage	$V_{OUT}$		50	V
Input "H" Level Voltage	$V_{IH}$	LB1232 $I_{OUT}=350mA$	11 to 30	V
		LB1233 $I_{OUT}=350mA$	3 to 30	V
		LB1234 $I_{OUT}=350mA$	5 to 30	V
Input "L" Level Voltage	$V_{IL}$	LB1231/33 $I_{OUT} \leq 100\mu A$	-0.3 to +0.3	V
		LB1232 $I_{OUT} \leq 100\mu A$	-0.3 to +6.0	V
		LB1234 $I_{OUT} \leq 100\mu A$	-0.3 to +0.7	V

**Package Dimensions 3064-D16TR**

(unit : mm)

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O1995YK/7067KI/4055KI/0152KI, TS No.1188-1/4

LB1231,1232,1233,1234

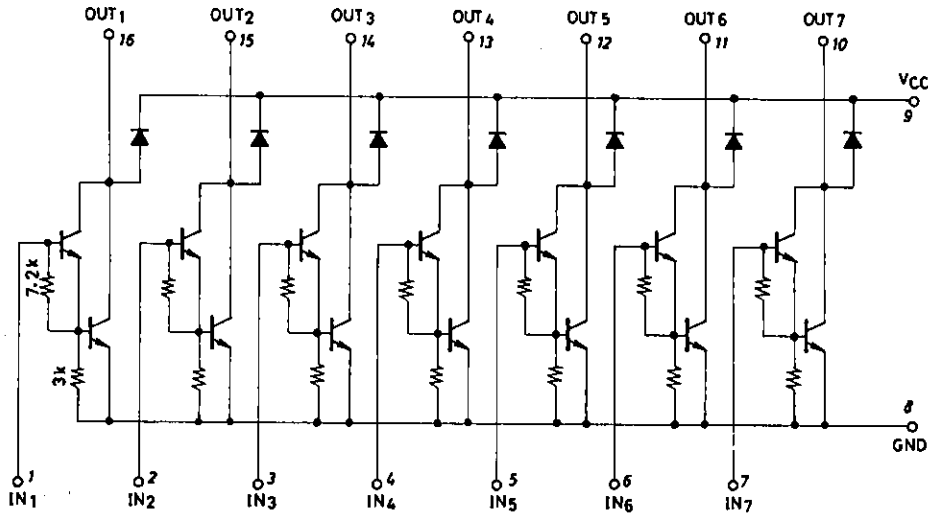
Electrical Characteristics at  $T_a=25^\circ\text{C}$

			min	typ	max	unit
Output Leak Current	$I_{OFF}$	$V_{OUT}=50V$			100	$\mu\text{A}$
Output Voltage	$V_{OH1}$	$I_{IN}=0.25\text{mA}, I_{OUT}=100\text{mA}$	0.9	1.1		V
	$V_{OH2}$	$I_{IN}=0.35\text{mA}, I_{OUT}=200\text{mA}$	1.1	1.3		V
	$V_{OH3}$	$I_{IN}=0.5\text{mA}, I_{OUT}=350\text{mA}$	1.3	1.6		V
	$V_{OH4}$	$I_{IN}=1\text{mA}, I_{OUT}=400\text{mA}$		2.4		V
Input Voltage	$V_{IN}$	LB1231 $I_{IN}=1\text{mA}$	1.35	1.7		V
Input Current	$V_{IN}$	LB1232 $V_{IN}=17V$	0.82	1.25		mA
		LB1233 $V_{IN}=3.85V$	0.93	1.35		mA
		LB1234 $V_{IN}=5V$	0.35	0.5		mA
		LB1234 $V_{IN}=12V$	1.00	1.45		mA
Spark Killer Diode Leak Current	$I_{R(S)}$	$V_{R(S)}=50V$			100	$\mu\text{A}$
Spark Killer Diode Forward Voltage	$V_{F(S)1}$	$I_{F(S)}=350\text{mA}$		2.0		V
Forward Voltage	$V_{F(S)2}$	$I_{F(S)}=400\text{mA}$		2.4		V

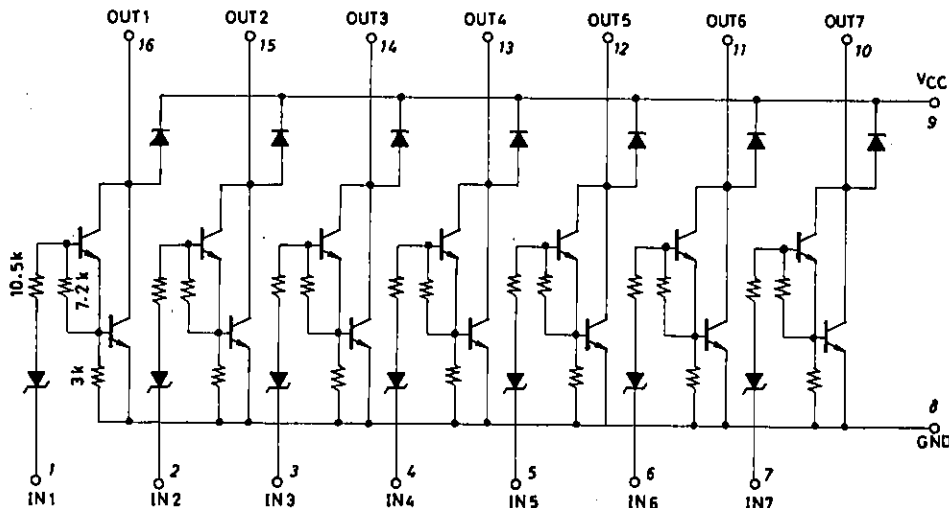
Equivalent Circuits

Unit (resistance:  $\Omega$ )

LB1231



LB1232



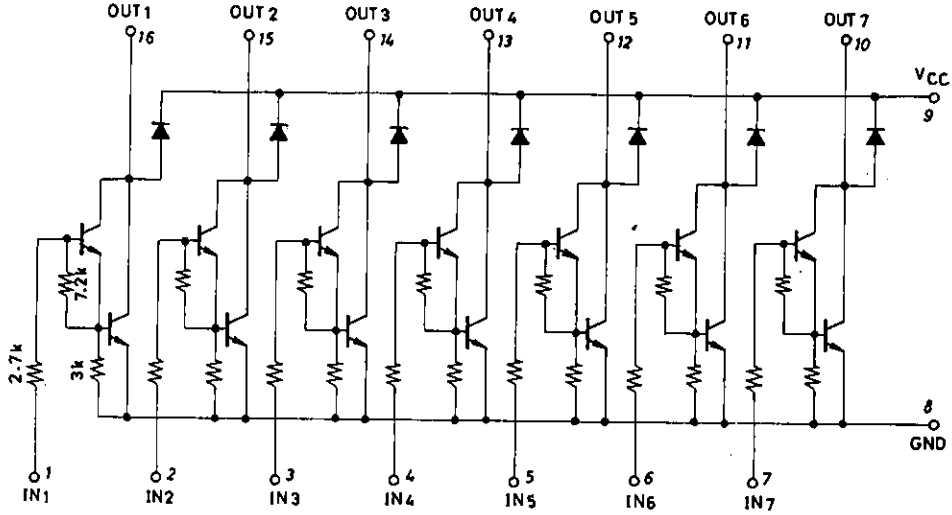
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LB1231,1232,1233,1234

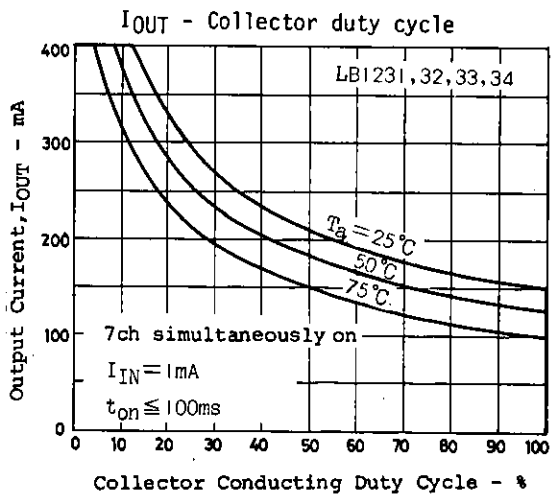
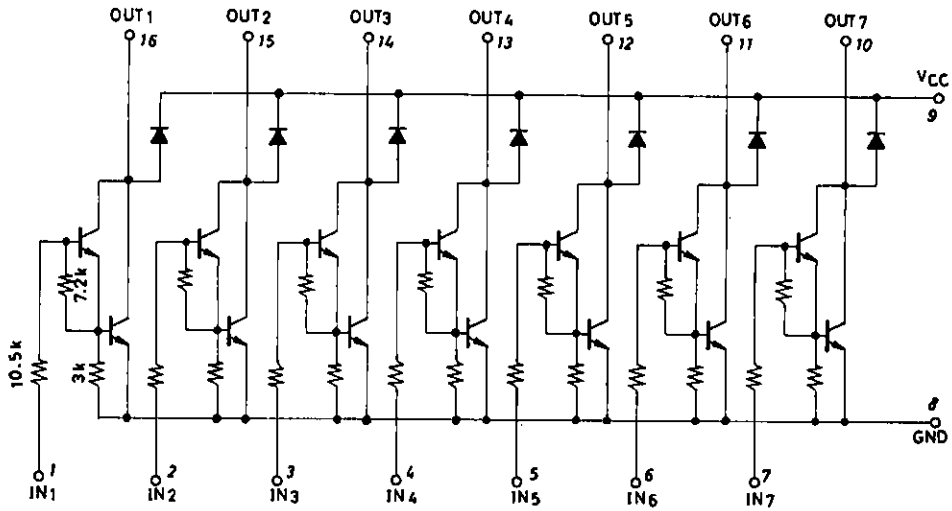
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Unit (resistance:  $\Omega$ )

LB1233



LB1234



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