APPLICATION NOTE
VACUUM FLUORESCENT DISPLAY

AN-E-1305

FUTABA

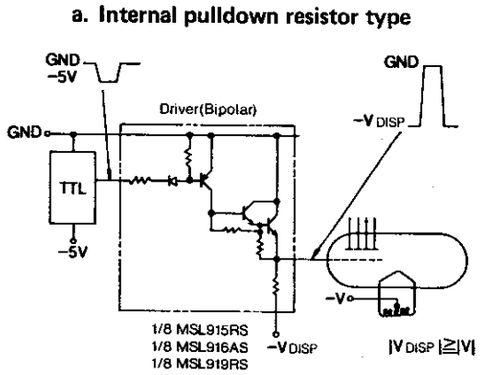
DRIVER IC FOR VACUUM FLUORESCENT DISPLAYS

Vacuum Fluorescent Displays (V.F.D.) can be driven directly by 4 ~ 8 bit C.P.U. (micro-computer), comprising p-channel open drain type MOS high breakdown voltage output stages.
However, sometimes it is necessary to use driver circuits as the interface between V.F.D. and TTL or CMOS level input signal. Such driver circuits can be composed of discrete semiconductor devices, but it is more convenient to use several bipolar or CMOS type driver Integrated Circuits which contains 6~8 circuits per package of 16~18 pin DIP.
Reference Table I for the various driver IC's available on the market.
Shown below are examples of typical drive circuits and input/output waveforms.

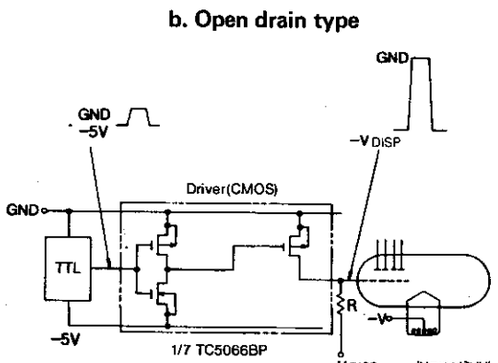
Examples of Typical Drive Circuits and Input/Output Waveforms

(1) Negative power supply use

a. Internal pulldown resistor type

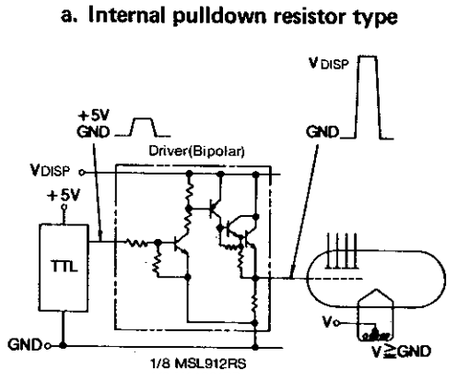


b. Open drain type



(2) Positive power supply use

a. Internal pulldown resistor type



b. Open emitter type

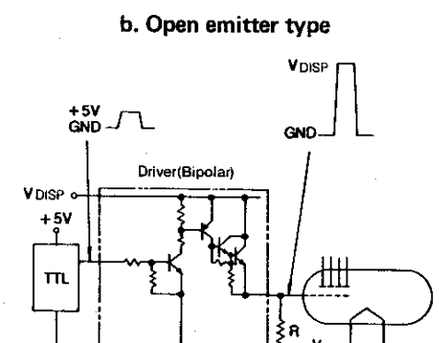


Table I

Supply Source	Type No.	Process	Input Level	Output Voltage (Abs. Max.)	Number of Circuit	Package (DIP)	Pulldown Resistor	Input/Output Waveform	Remarks*
Oki Electric	MSL912RS	Bipolar	TTL, CMOS	35V	8	18pin	150kΩ	Active High	Positive
	MSL915RS	Bipolar	TTL, CMOS	−65V	8	18pin	150kΩ	Active Low	Negative
	MSL916AS	Bipolar	TTL, CMOS	−85V	8	18pin	150kΩ	Active Low	Negative
	MSL917RS	Bipolar	TTL, CMOS	−85V	8	18pin	No	Active Low	Negative
	MSL918RS	Bipolar	TTL, CMOS	35V	8	18pin	No	Active High	Positive
	MSL919RS	Bipolar	TTL, CMOS	−65V	8	18pin	150kΩ	Active Low	Negative
Sprague**	UDN-6116A	Bipolar	TTL, CMOS	85V	6	16pin	125kΩ	Active High	Positive
	UDN-6116A-1	Bipolar	TTL, CMOS	115V	6	16pin	125kΩ	Active High	Positive
	UDN-6116A-2	Bipolar	TTL, CMOS	65V	6	16pin	125kΩ	Active High	Positive
	UDN-6118A	Bipolar	TTL, CMOS	85V	8	18pin	125kΩ	Active High	Positive
	UDN-6118A-1	Bipolar	TTL, CMOS	115V	8	18pin	125kΩ	Active High	Positive
	UDN-6118A-2	Bipolar	TTL, CMOS	65V	8	18pin	125kΩ	Active High	Positive
Tokyo Sanyo	LB1240	Bipolar	TTL, CMOS	−55V	8	18pin	150kΩ	Active Low	Negative
	LB1290	Bipolar	TTL, CMOS	55V	8	18pin	150kΩ	Active High	Positive
Hitachi	HA16617P	Bipolar	TTL, CMOS	65V	8	18pin	110kΩ	Active High	Positive
	HA16619P	Bipolar	TTL, CMOS	−65V	8	18pin	110kΩ	Active Low	Negative
Toshiba	TC5064BP***	C^2MOS	MOS	−50V	6	16pin	No	Active High	Negative
	TC5065BP***	C^2MOS	MOS	−50V	6	16pin	No	Active Low	Negative
	TC5066BP***	C^2MOS	MOS	−50V	7	16pin	No	Active High	Negative
	TC5067BP***	C^2MOS	MOS	−50V	7	16pin	No	Active Low	Negative
	TD62703P	Bipolar	TTL	−80V	6	14pin	No	Active Low	Negative
	TD62705P	Bipolar	MOS	80V	6	16pin	No	Active High	Positive
	TD62706P	Bipolar	TTL	80V	6	16pin	No	Active High	Positive
Mitsubishi	M54560P	Bipolar	MOS	−40V	7	16pin	No	Active Low	Negative
	M54561P	Bipolar	TTL, CMOS	−40V	7	16pin	No	Active Low	Negative
	M54562P	Bipolar	MOS	50V	8	18pin	No	Active High	Positive
	M54563P	Bipolar	TTL, CMOS	50V	8	18pin	No	Active High	Positive

Note: *; Positive... Positive Power Supply Use, Negative... Negative Power Supply Use.
**; UDN-6126/6128 series; Input Level... CMOS, PMOS (6~15V)
***; Output Stage... p-channel open drain (External pulldown resistors are required.)

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