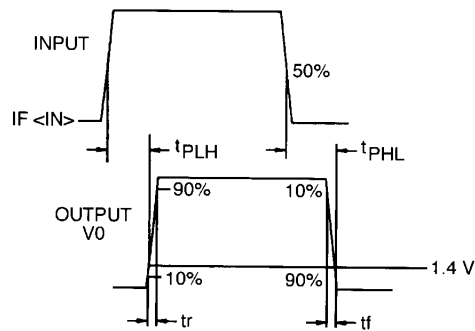


ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless Otherwise Specified)	
Supply Voltage, V_{CC}	18 volts
Storage Temperature	$-40^\circ\text{C} + 100^\circ\text{C}$
Operating Temperature	-40°C to $+85^\circ\text{C}$
Soldering:	
Lead Temperature (Iron)	240°C for 5 sec. ^(2,3,4,5)
Lead Temperature (Flow)	260°C for 10 sec. ^(2,3,5)
Power Dissipation	100 mW ⁽¹⁾
Duration of Output short to V_{CC}	1.00 sec.
Voltage at Output	35 volts
Sinking Current	50 mA
Sourcing Current (QSE156, QSE157)	10 mA
Irradiance	3.0 mW/cm^2

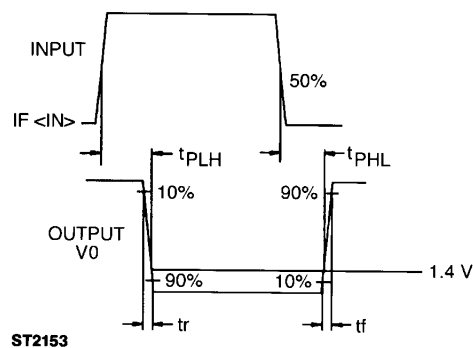
ELECTRICAL CHARACTERISTICS ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$) ($V_{CC} = 4.5$ to 16 volts)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Operating Supply Voltage	V_{CC}	4.5		16.0	V	
Positive Going Threshold Irradiance ⁽⁶⁾	Ee (+)	0.025		0.250	mW/cm^2	$T_A = 25^\circ\text{C}$
Hysteresis Ratio	Ee(+)/Ee(-)	1.10		2.00		
Supply Current	I_{CC}	—		12.0	mA	Ee = 0 or $.3 \text{ mW/cm}^2$ ⁽⁶⁾
Peak to peak ripple which will cause false triggering		—		2.00	V	f = DC to 50 MHz
QSE156 (BUFFER TOTEM POLE)						
High Level Output Voltage	V_{OH}	$V_{CC} - 2.1$		—	V	Ee = $.3 \text{ mW/cm}^2$, $I_{OH} = -1.0 \text{ mA}$ ⁽⁶⁾
Low Level Output Voltage	V_{OL}	—		0.40	V	Ee = 0, $I_{OL} = 16 \text{ mA}$
QSE157 (INVERTER TOTEM POLE)						
High Level Output Voltage	V_{OH}	$V_{CC} - 2.1$		—	V	Ee = 0, $I_{OH} = -1.0 \text{ mA}$
Low Level Output Voltage	V_{OL}	—		0.40	V	Ee = $.3 \text{ mW/cm}^2$, $I_{OL} = 16 \text{ mA}$ ⁽⁶⁾
QSE158 (BUFFER OPEN COLLECTOR)						
High Level Output Current	I_{OH}	—		100	μA	Ee = $.3 \text{ mW/cm}^2$, $V_{OH} = 30 \text{ V}$ ⁽⁶⁾
Low Level Output Voltage	V_{OL}	—		0.40	V	Ee = 0, $I_{OL} = 16 \text{ mA}$
QSE159 (INVERTER OPEN COLLECTOR)						
High Level Output Current	I_{OH}	—		100	μA	Ee = 0, $V_{OH} = 30 \text{ V}$
Low Level Output Voltage	V_{OL}	—		0.40	V	Ee = $.3 \text{ mW/cm}^2$, $I_{OL} = 16 \text{ mA}$ ⁽⁶⁾

ELECTRICAL CHARACTERISTICS ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$) ($V_{CC} = 4.5$ to 16 volts)						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
QSE156, QSE157						
Output rise, fall times	t_r, t_f	—		70	nS	$E_e = 0$ or $.3 \text{ mW/cm}^2$, $f = 10\text{K Hz}$
Propagation delay	t_{phl}, t_{plh}		6.0		μS	$\text{DC} = 50\%$, $R_L = 10 \text{ TTL loads}^{(6)}$
QSE158, QSE159						
Output rise, fall times	t_r, t_f	—		100	nS	$E_e = 0$ or $.3 \text{ mW/cm}^2$, $f = 10\text{K Hz}$
Propagation delay	t_{phl}, t_{plh}		6.0		μS	$\text{DC} = 50\%$, $R_L = 300\Omega^{(6)}$

Switching Test Curve for Buffers



Switching Test Curve for Inverters

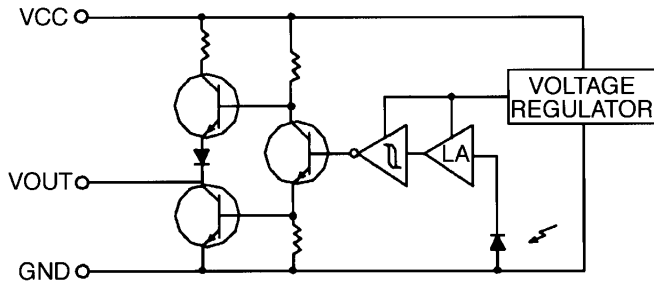


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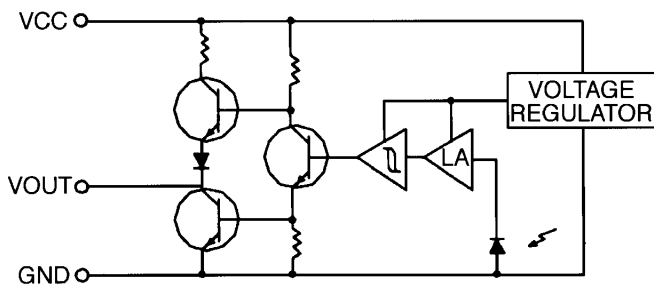
NOTES

1. Derate power dissipation linearly $4.00 \text{ mW}/^\circ\text{C}$ above 25°C .
2. RMA flux is recommended.
3. Methanol or Isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron tip $1/16"$ (1.6 mm) minimum from housing.
5. As long as leads are not under any stress or spring tension.
6. Irradiance measurements are made with an AlGaAs LED emitting light at a peak wavelength of 880 nm.

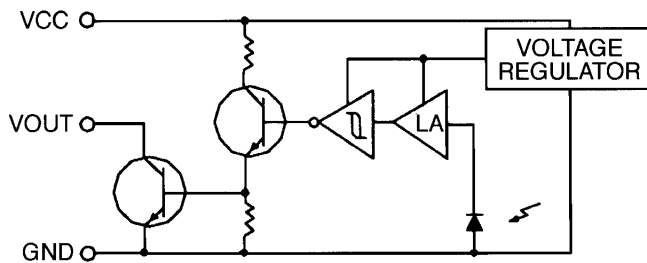
CIRCUIT SCHEMATICS



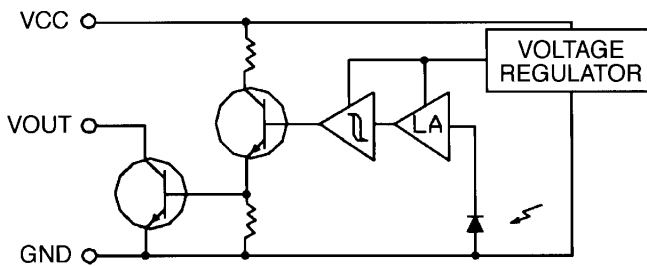
QSE156
Totem-Pole Output Buffer



QSE157
Totem-Pole Output Inverter



QSE158
Open-Collector Output Buffer



QSE159
Open-Collector Output Inverter

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