

### 3.0 External Trigger Signal Requirements

External triggering will not function properly unless the external signal applied to the ICE input connector meets the specified requirements:

- The signal generator must be set up to drive the ICE 50  $\Omega$  input. Figure 29 shows a signal generator driving the external trigger input of the ICE.
- The external flashlamp input to the ICE has an impedance of 50  $\Omega$ . In order for  $V_i$  to be 5 V, the signal generator must drive 50 mA into the trigger input.
- If it is not clear that the signal generator is driving the signal properly, measure the trigger signal using the method shown in Figure 30. Connect to the trigger signal circuit using a BNC “tee”. Verify that the oscilloscope input is in high-impedance mode (greater than 1 M $\Omega$ ).
- The duration of the signal must be at least 100  $\mu$ s. If the signal from the external generator does not meet the required parameters, adjust or replace the generator until it does.
- Figure 31 shows the required characteristics of the flashlamp trigger signal.

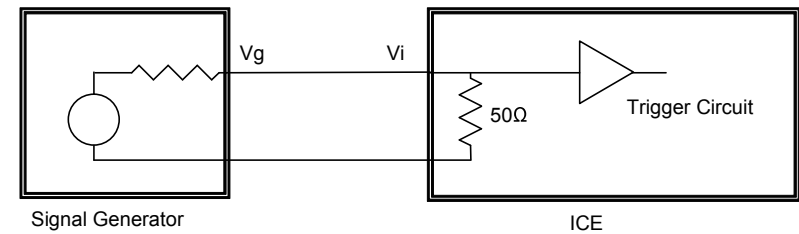
**Note:** There is a processing delay of 175 to 330  $\mu$ s between the external flashlamp trigger input and the flashlamp activation. To compensate for this interval, you must add 175 to 330  $\mu$ s to the total time between your flashlamp input and your Q-Switch input. See Figure 33 which shows an example of this delay, and the compensated Q-Switch signal.



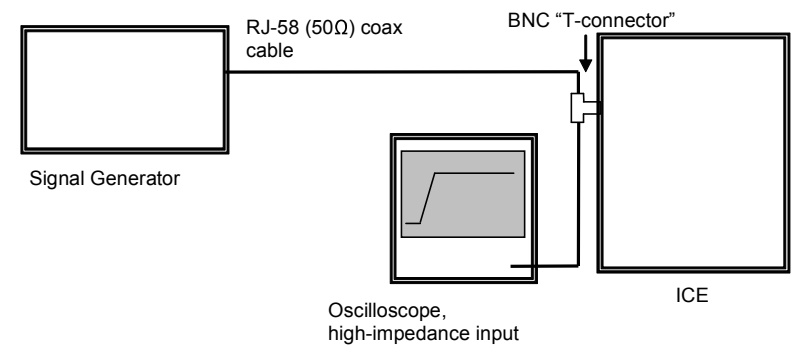
**CAUTION:** To maintain a fast rise time and therefore minimal jitter, the Q-Switch input is not optically isolated and does not have over-voltage protection circuitry. Do not apply voltages greater than 5 V to prevent damage to sensitive components.

Symbol	Parameter	Min.	Max.	Unit
$V_{IL}$	Input low voltage	0.0	0.8	V
$V_{IH}$	Input high voltage	3.0	5.0	V
$T_R$	Rise time		1	$\mu$ s
$T_W$	Pulse width	100		$\mu$ s
$V_{PK}$	Peak voltage		5.5	V

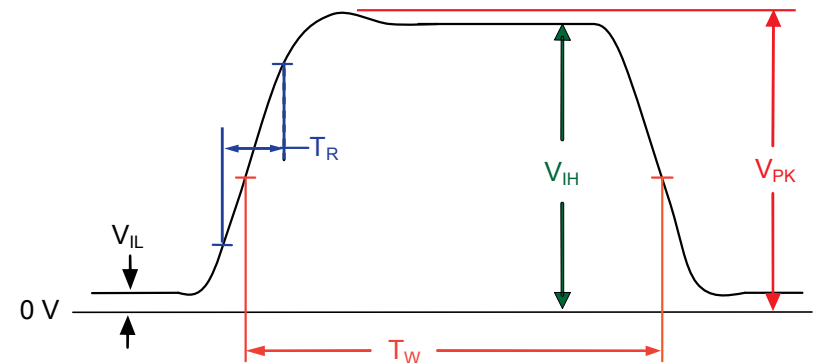
**Figure 31 Required Characteristics of Flashlamp and Q-Switch Trigger Input Signals**



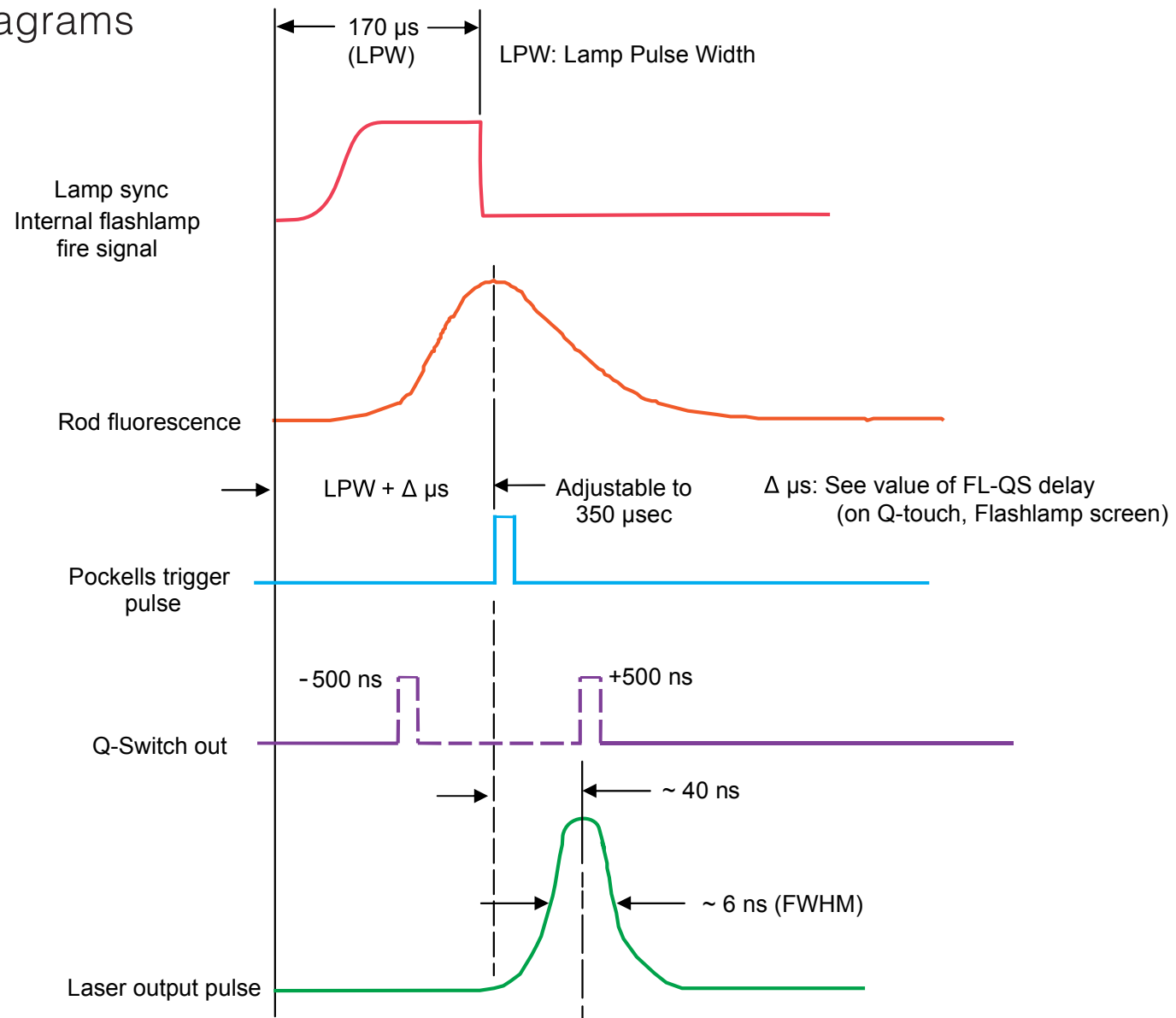
**Figure 29 Signal Generator to Trigger Circuit**



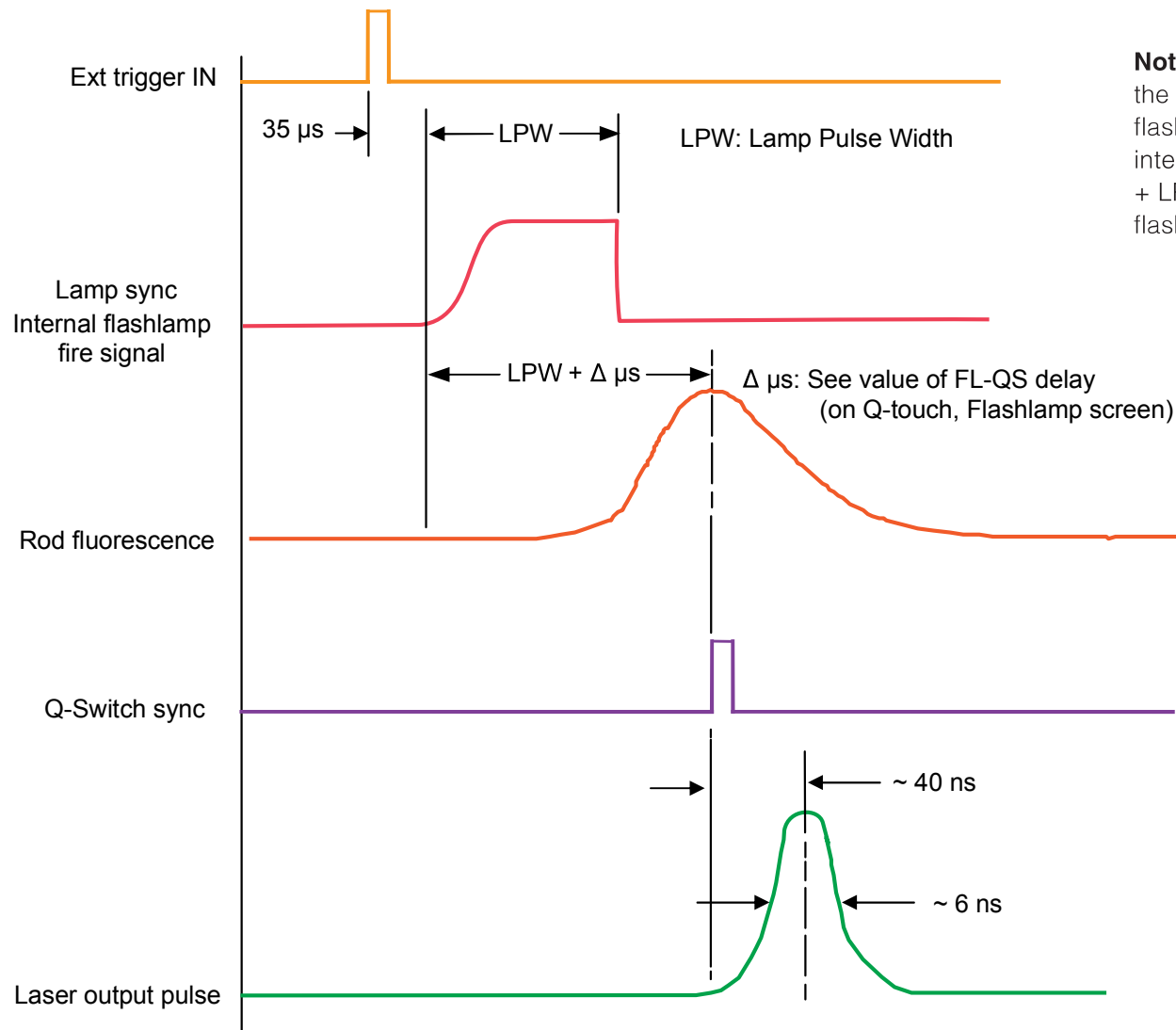
**Figure 30 Preferred Method of Measuring Trigger Signal**



## 4.0 Timing Diagrams



**Figure 32 Timing Signals in Automatic Mode  
Flashlamp Internal/Q-Switch Internal**



**Note:** There is a processing delay between the external flashlamp trigger input and the flashlamp activation. To compensate for this interval, you must add a delay equal to  $35\ \mu\text{s} + \text{LPW} + \Delta\ \mu\text{s}$  to the total time between your flashlamp input and your Q-Switch input.

**Figure 33 Typical Timing Diagram for External Mode**  
**External Flashlamp/Internal Q-Switch or External Flashlamp/External Q-Switch**