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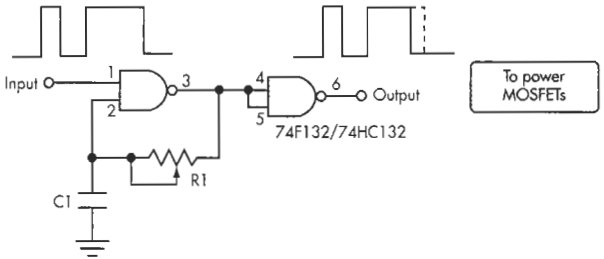
SHYAM SUNDER TIWARI
SENSORS TECHNOLOGY PRIVATE LTD., GWALIOR, INDIA
sst@sensorstechnology.com

Power Control Circuit Limits On Time To Prevent MOSFET Burnout

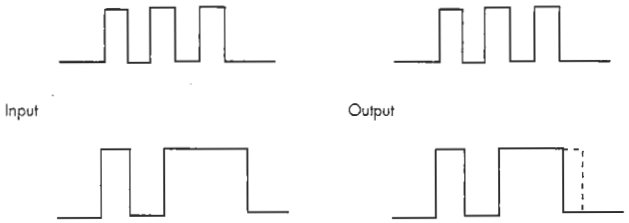
A power control device that protects against MOSFET burnout was designed using a well-known gated-oscillator circuit. The circuit prevents excessive On time for the MOSFETs beyond a permitted limit. The R1-C1 time constant forms a timing circuit that limits the On-time pulse period and automatically generates its own maximum permitted On/Off duty cycle *(Fig. 1)*. Without this timing circuit, if the input remained high for any reason it would then generate a continuous On condition for the power-driver MOSFETs.

R1 is a variable resistor that sets the desired oscillator frequency by keeping the input always On or in one state. Once the limit frequency or On/Off period is set, the circuit is ready for operation with any input signal. A longer zero level (or Off) at the input keeps the zero level intact at the output. However, a longer one level (or On) is prevented automatically *(Fig. 2)*. C1 can be from 100 pF to 10 μF, and R1 can vary from 1 kΩ to 1 MΩ.

SHYAM SUNDER TIWARI, managing director, holds an MSc in physics from the University of Agra, India, and a PhD in physics from the University of Bombay, India.



1. A gated-oscillator circuit is used to prevent burnout of the MOSFETs it controls by limiting the On time controlled by the input pulse.



2. The control circuit works by using the R1-C1 time constant to limit the width of the On pulse at the output, regardless of the width at the input.