



ON Semiconductor[®]
Xenon Flash Light
IGBT Application Note

Hyper Device Division

March. 2014

Agenda

- 1. Operating Precautions**
- 2. Recommended Circuit Example**



Agenda

1. Operating Precautions

2. Recommended Circuit Example

Operating Precautions

Please note the followings when you use the devices because flash IGBTs handle high current.

Please evaluate the following points when designing.

- a. ICP precautions
- b. dv/dt precautions
- c. dv/dt adjustments
- d. Wiring precautions

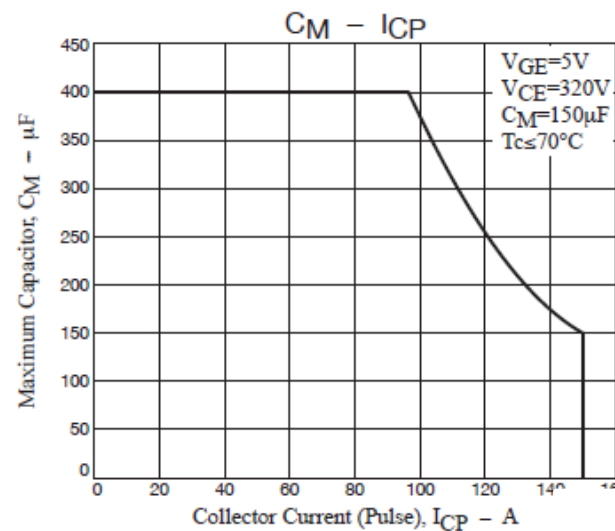
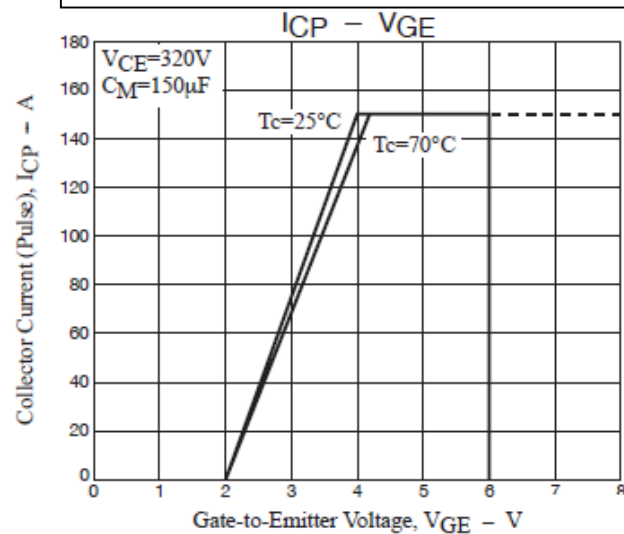
a. ICP precautions

The ICP, collector current peak is restricted by VGE, gate-emitter voltage.

Please use the device within the ICP-VGE safe operation area described in each product's specification.

Please note that the ICP is also restricted by the main condenser capacity.

Example: TIG058E8's ASO



※Left chart shows the ASO for single-shot pulse. Considering heat generation, please use the device with channel temperature $T_{ch} \leq 150^\circ C$ in continuous operating

Operating waveform

Collector Current Peak ICP

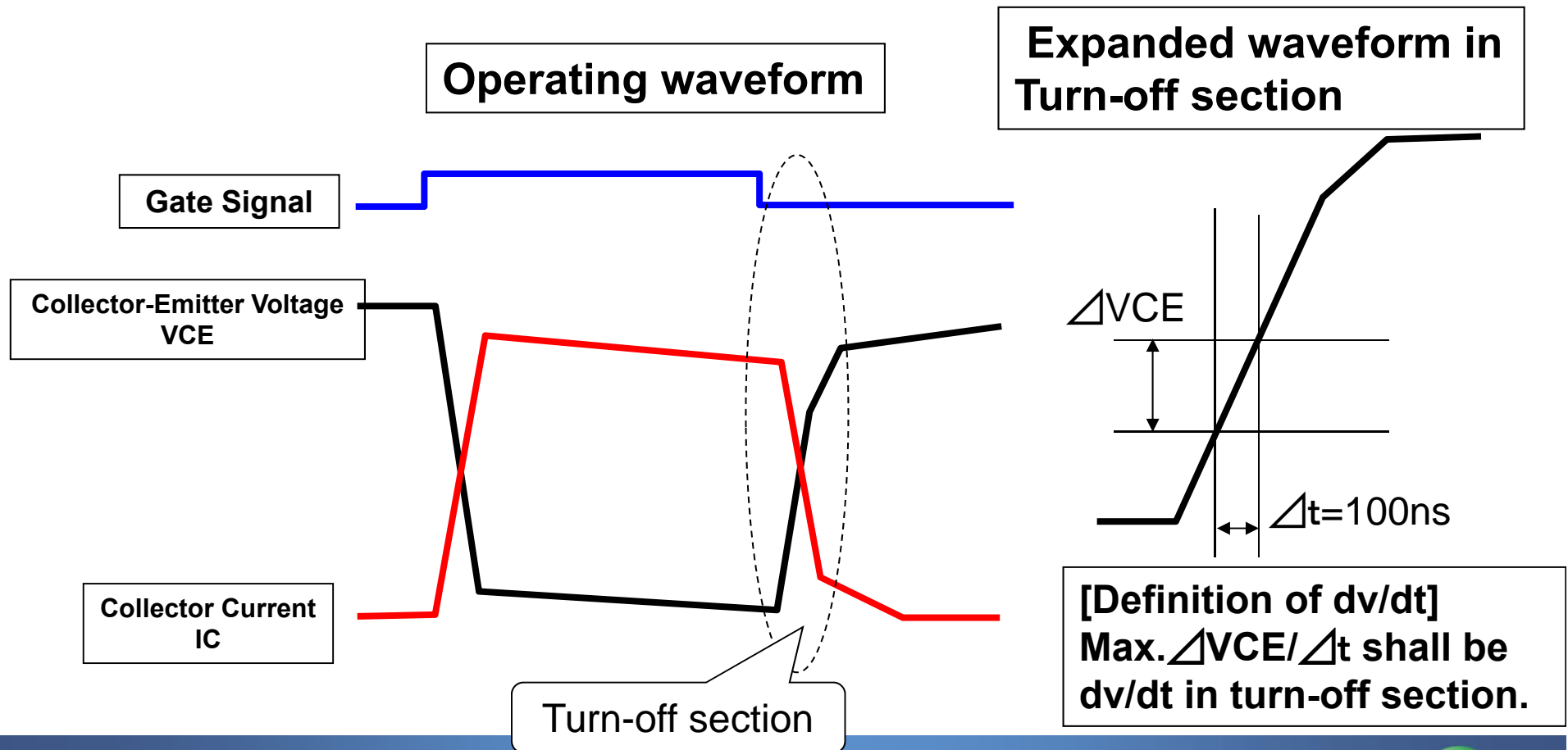
Gate Signal

Collector-Emitter Voltage VCE

Collector Current IC

b. dv/dt precautions

Please use the device with **400V/ μ s or less** of dv/dt , inclination of collector-emitter voltage in turn-off section. Using with dv/dt > 400V/ μ s is not guaranteed.

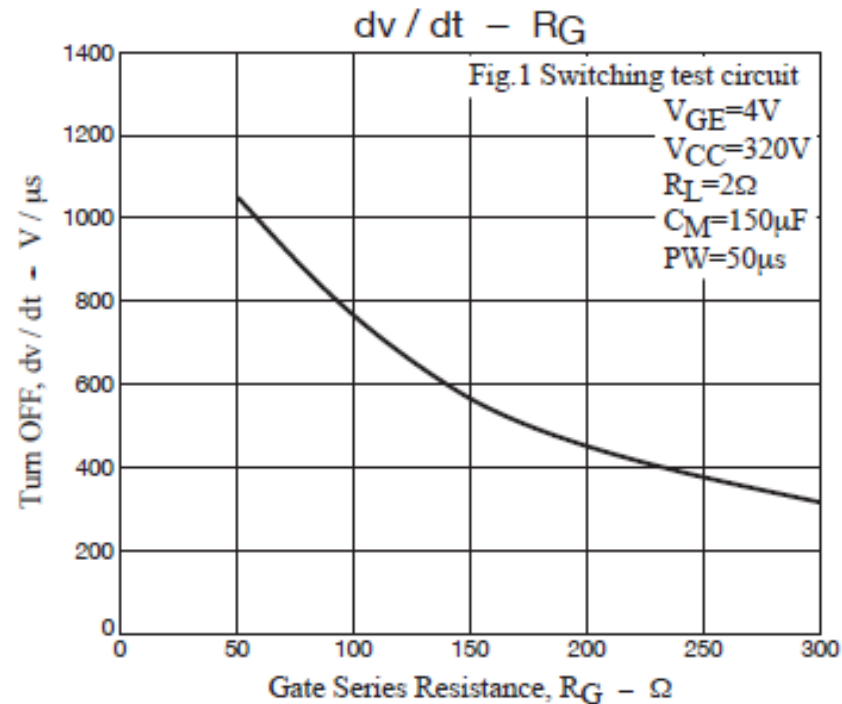


c. dv/dt adjustments

Please adjust the gate series resistance R_G to keep dv/dt to 400V/ μ s or less. There is no restriction for R_g .

Though the dv/dt- R_g dependency differs according to the mount conditions, for your reference, we provide the dv/dt- R_g dependency graphs in each product's specification.

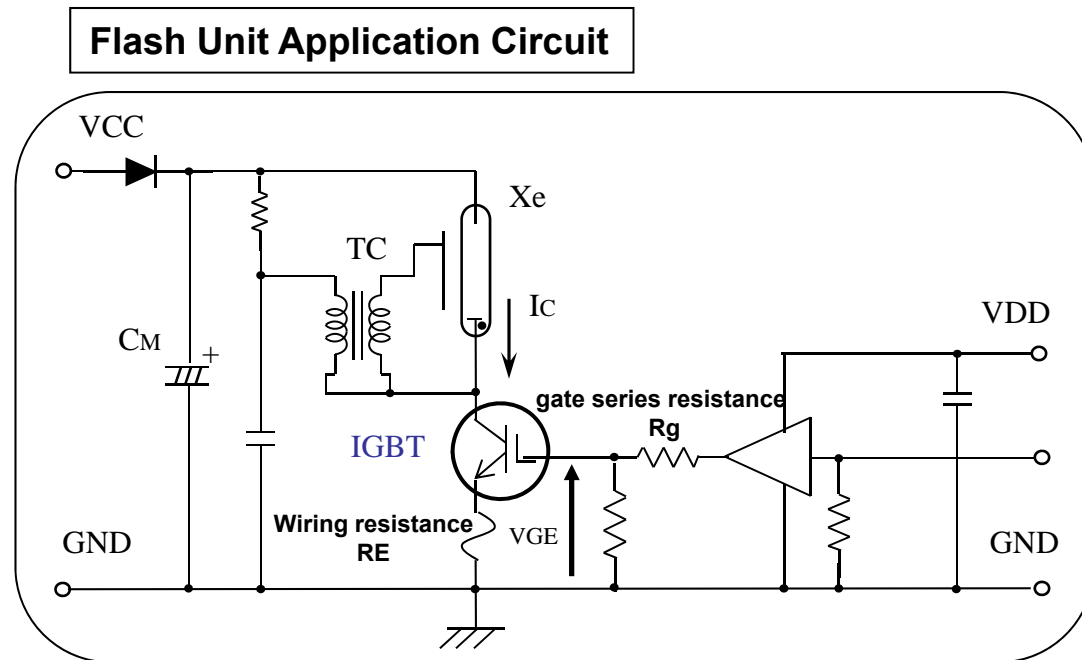
Example: TIG058E8's dv/dt- R_g dependency graph



d. Wiring precautions

If the wiring resistance between IGBT's emitter terminal and GND is high, there will be rise in emitter terminal potential and lack in actual gate voltage during high current operation.

This may cause the breakdown of IGBT.



Gate Voltage during high current operation will be:
 $V_{GE} - I_C \times R_E$

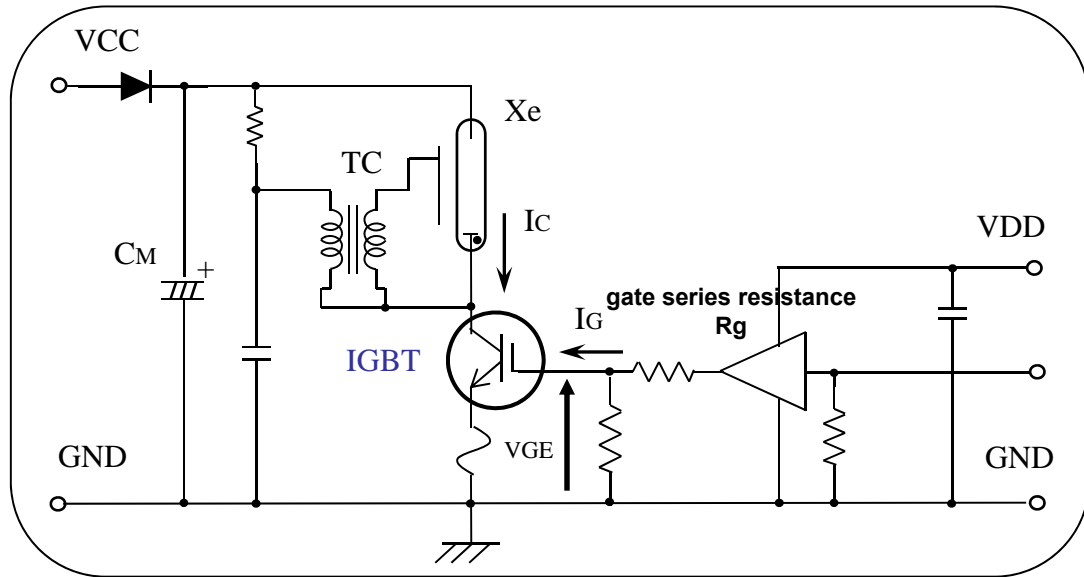
Agenda

1. Operating Precautions

2. Recommended Circuit Example



Recommended Circuit Example



① High current path should be thick and short

② Keep low impedance between IGBT-GND (3mΩ or less is recommended)

③ Place IGBT & driver near by

