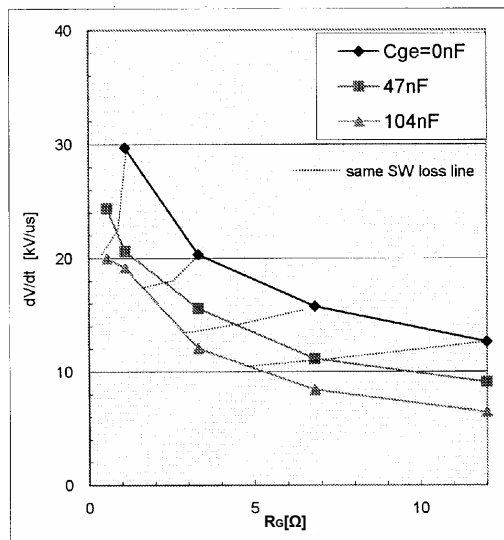


# FUJI IGBT Modules U Series

## Switching loss, dv/dt vs $C_{GE}$ , $R_G$ 6MBI450U-120

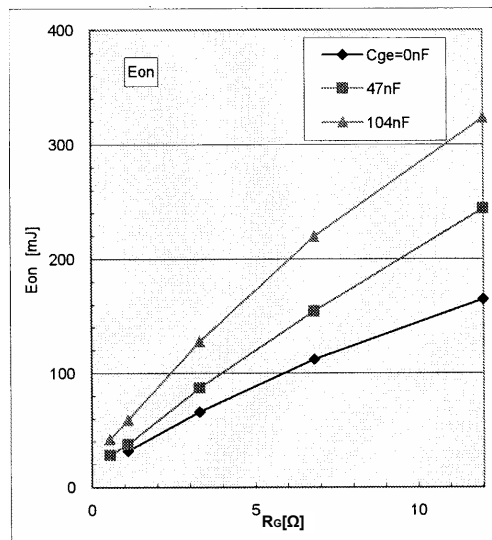
### Reverse recovery dv/dt

Sample: 6MBI450U-120 #38001-11 Y-phase drive  
 $T_j=25^\circ\text{C}$ ,  $V_{cc}=800\text{V}$ ,  $I_c=22.5\text{A}$  (5% of rating)  
 $V_{GE}=\pm 15\text{V}$ ,  $L_s=45\text{nH}$ , Snubber C=0



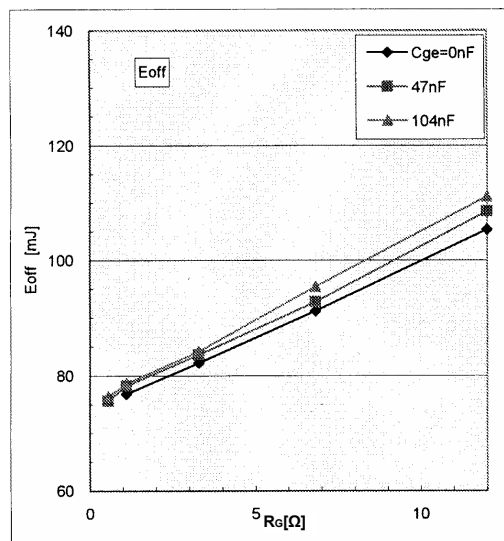
### Switching loss Eon

$T_j=125^\circ\text{C}$ ,  $V_{cc}=600\text{V}$ ,  $I_c=450\text{A}$   
 $V_{GE}=\pm 15\text{V}$ ,  $L_s=75\text{nH}$ , Snubber C=0



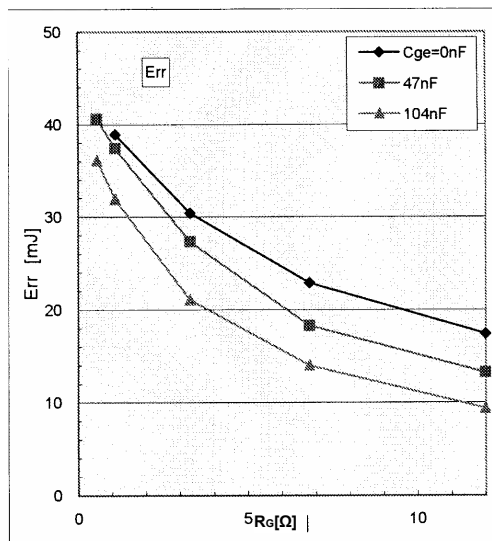
### Switching loss Eoff

$T_j=125^\circ\text{C}$ ,  $V_{cc}=600\text{V}$ ,  $I_c=450\text{A}$   
 $V_{GE}=\pm 15\text{V}$ ,  $L_s=75\text{nH}$ , Snubber C=0



### Switching loss Err

$T_j=125^\circ\text{C}$ ,  $V_{cc}=600\text{V}$ ,  $I_c=450\text{A}$   
 $V_{GE}=\pm 15\text{V}$ ,  $L_s=75\text{nH}$ , Snubber C=0



- In order to reduce dv/dt or oscillation at reverse recovery, additional  $C_{GE}$  and smaller  $R_G$  are effective.
- In order to keep same switching loss, ( $C_{GE}$  as same as  $C_{ies}$ ) +  $(0.7 \times R_G)$ , or ( $C_{GE}$  of  $2 \times C_{ies}$ ) +  $(0.5 \times R_G)$  are recommended. These are same manner also for other 1200V U-series IGBT module.

# Reverse recovery dv/dt

Sample: 6MBI450U-120 #38001-11 Y-phase drive

Tj=25°C, Vcc=800V, Ic=22.5A, VGE=±15V, Ls=45nH, Snubber C=0

Rg[Ω]	CGE=0nF	47nF	104nF
0.55			
1.1			
3.3			
6.8			
12			

# Eon (Latest sample)

Sample: 6MBI450U-120 #38001-11 Y-phase drive

Tj=125°C, Vcc=600V, Ic=450A, VGE=±15V, Ls=75nH, Snubber C=0

Rg[Ω]	Cge=0nF	47nF	104nF
0.55			
1.1			
3.3			
6.8			
12			

# Eoff (Latest sample)

Sample: 6MBI450U-120 #38001-11 Y-phase drive

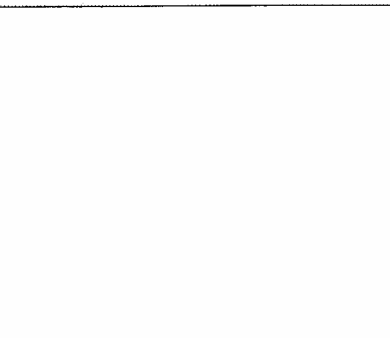
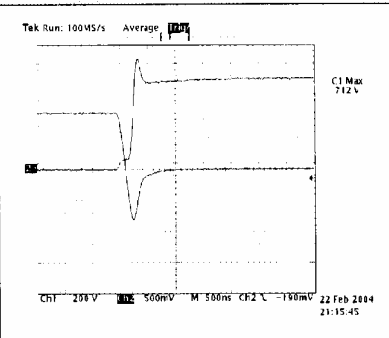
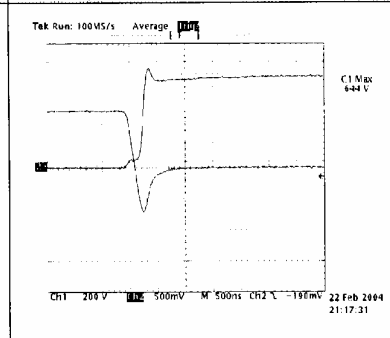
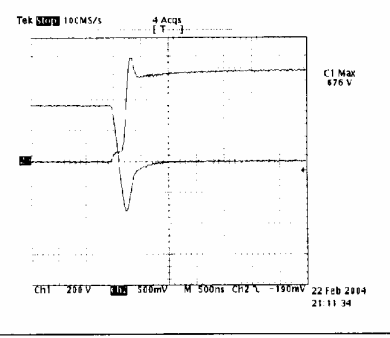
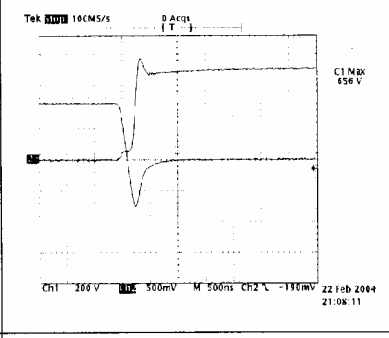
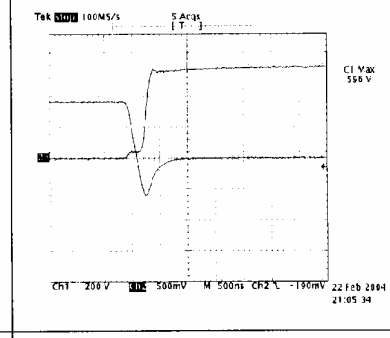
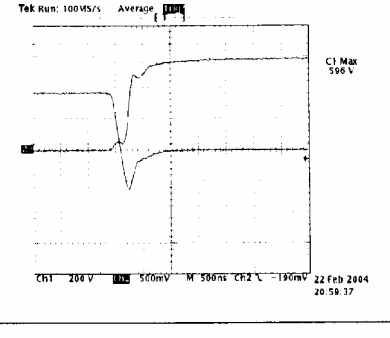
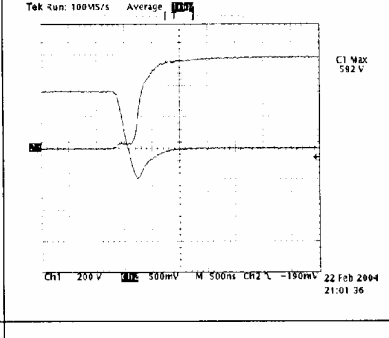
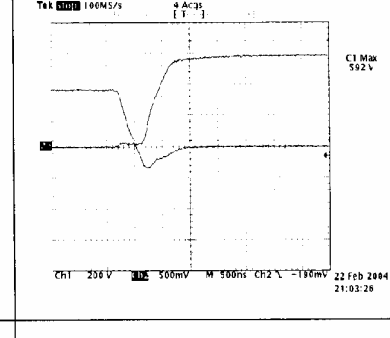
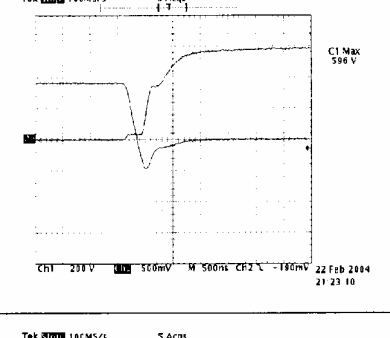
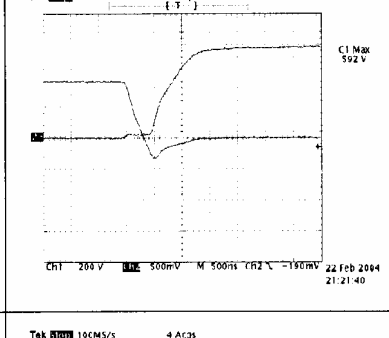
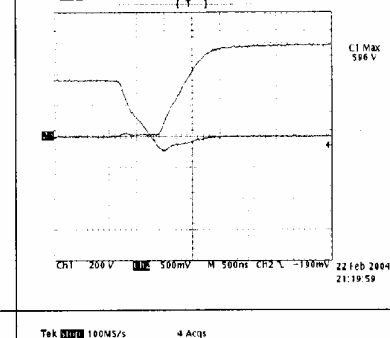
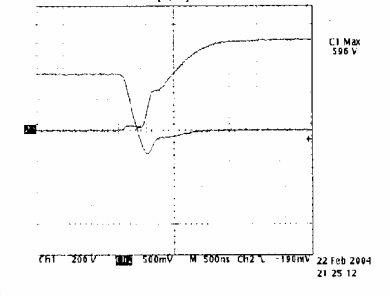
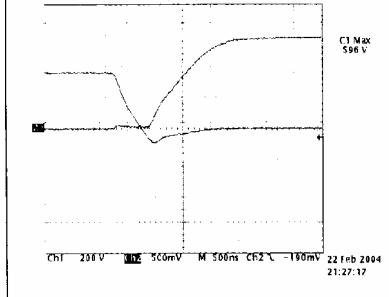
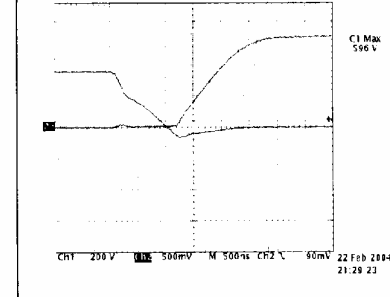
Tj=125°C, Vcc=600V, Ic=450A, VGE=±15V, Ls=75nH, Snubber C=0

Rg[Ω]	CGE=0nF	47nF	104nF
0.55		<p>Tek Run: 100MS/s Average [OFF] C1 Max 912 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:22:32</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 904 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:24:37</p>
1.1	<p>Tek Run: 100MS/s Average [OFF] C1 Max 924 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:31:13</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 888 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:29:32</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 904 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:27:31</p>
3.3	<p>Tek Run: 100MS/s Average [OFF] C1 Max 916 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:32:57</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 858 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:34:33</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 880 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:36:55</p>
6.8	<p>Tek Run: 100MS/s Average [OFF] C1 Max 856 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:42:57</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 859 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:40:40</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 852 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:38:44</p>
12	<p>Tek Run: 100MS/s Average [OFF] C1 Max 864 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:44:41</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 828 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:46:26</p>	<p>Tek Run: 100MS/s Average [OFF] C1 Max 816 V CH1 200 V CH3 20.0 V 200mV M 500ns CF2 448mV 22 Feb 2004 20:51:18</p>

### Err (Latest sample)

Sample: 6MBI450U-120 #38001-11 Y-phase drive

T<sub>j</sub>=125°C, V<sub>CC</sub>=600V, I<sub>c</sub>=450A, V<sub>GE</sub>=±15V, L<sub>s</sub>=75nH, Snubber C=0

R <sub>G</sub> [Ω]	C <sub>GE</sub> =0nF	47nF	104nF
0.55			
1.1			
3.3			
6.8			
12			

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  - Machine tools
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  - Personal equipment
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  - Safety devices
  - Medical equipment
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