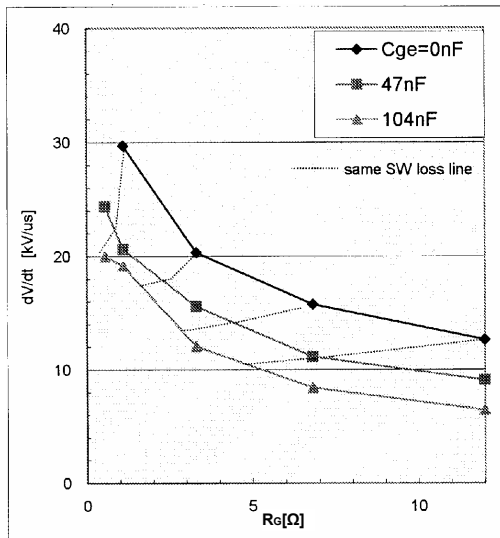


FUJI IGBT Modules U Series

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

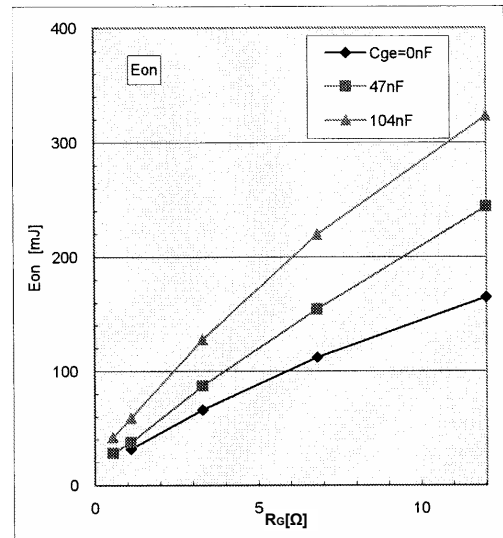
Reverse recovery dv/dt

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



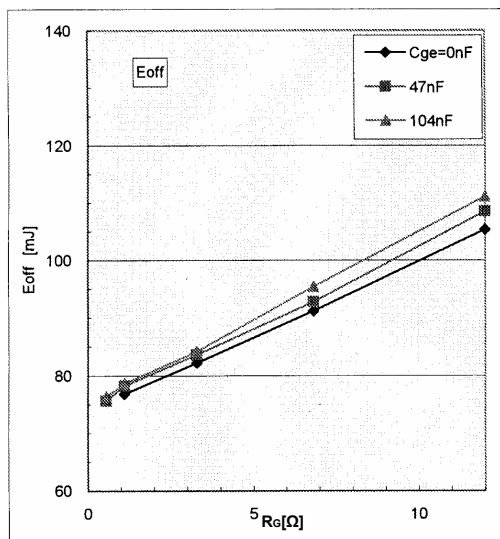
Switching loss Eon

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



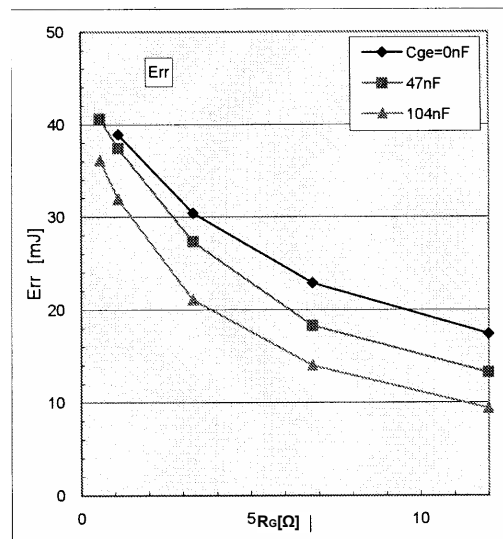
Switching loss Eoff

$T_j=125^\circ\text{C}$, $V_{cc}=600\text{V}$, $I_c=450\text{A}$
 $V_{GE}=\pm 15\text{V}$, $L_s=75\text{nH}$, 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		<p>M3 Max 1.038kV</p>	<p>M3 Max 160V</p>
1.1	<p>M3 Max 1.173kV</p>	<p>M3 Max 925V</p>	<p>M3 Max 810V</p>
3.3	<p>M3 Max 875V</p>	<p>M3 Max 780V</p>	<p>M3 Max 745V</p>
6.8	<p>M3 Max 660V</p>	<p>M3 Max 655V</p>	<p>M3 Max 585V</p>
12	<p>M3 Max 575V</p>	<p>M3 Max 540V</p>	<p>M3 Max 470V</p>

Eon (Latest sample)

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

T_j=125°C, V_{CC}=600V, I_c=450A, V_{GE}=±15V, L_s=75nH, Snubber C=0

R _g [Ω]	C _{ge} =0nF	47nF	104nF
0.55			
1.1			
3.3			
6.8			
12			

Eoff (Latest sample)

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

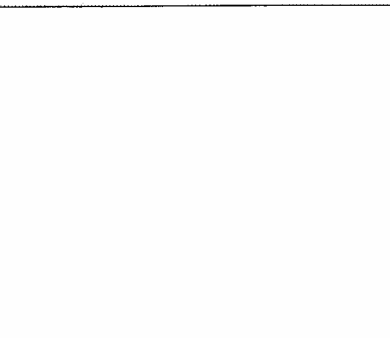
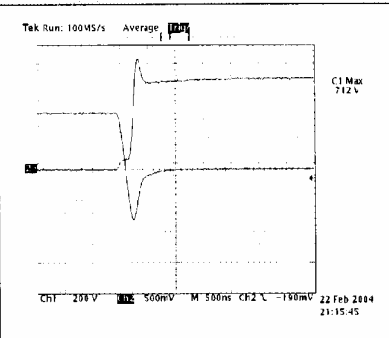
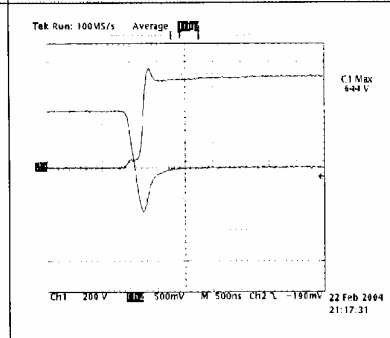
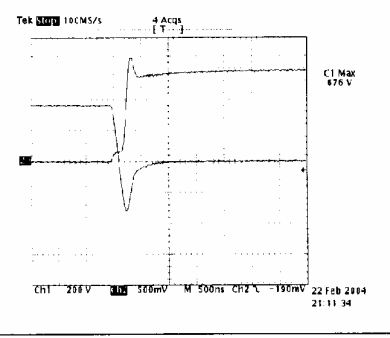
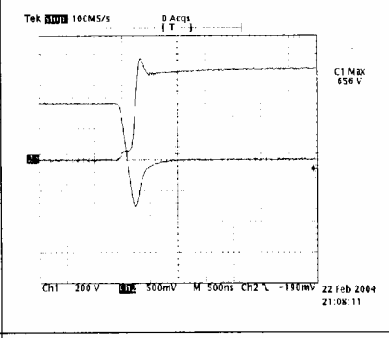
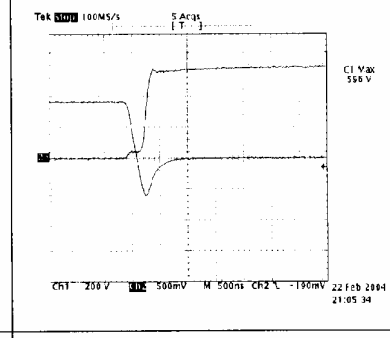
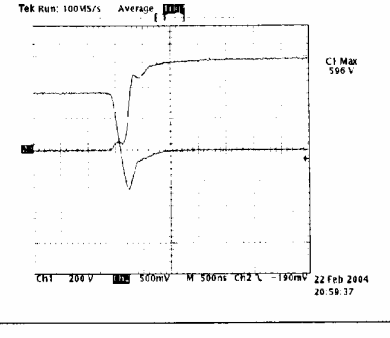
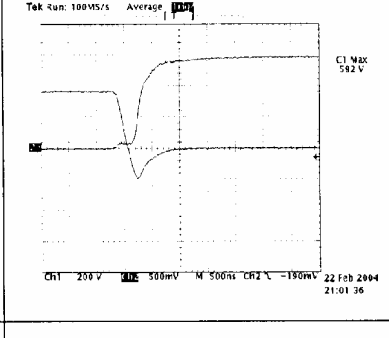
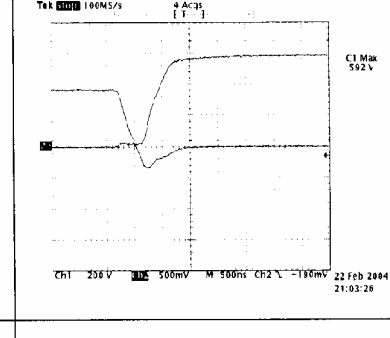
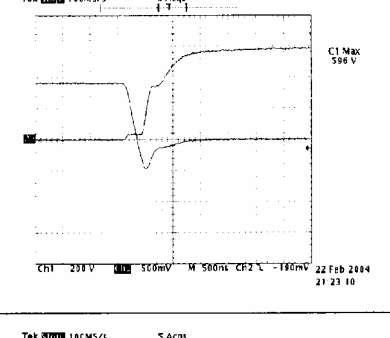
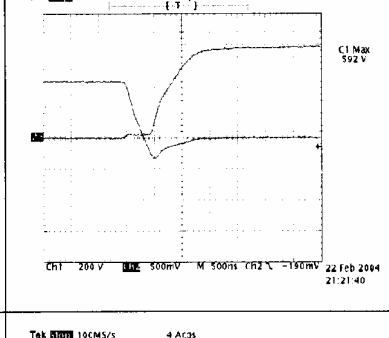
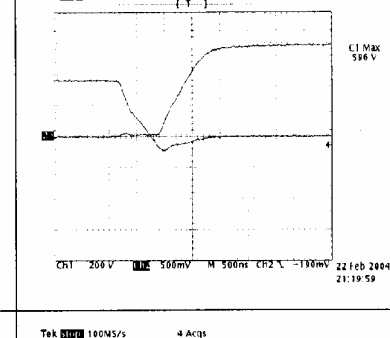
Tj=125°C, Vcc=600V, Ic=450A, VGE=±15V, Ls=75nH, Snubber C=0

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

Err (Latest sample)

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

T_j=125°C, V_{CC}=600V, I_c=450A, V_{GE}=±15V, L_s=75nH, Snubber C=0

R _G [Ω]	C _{GE} =0nF	47nF	104nF
0.55			
1.1			
3.3			
6.8			
12	