

600V / 30A

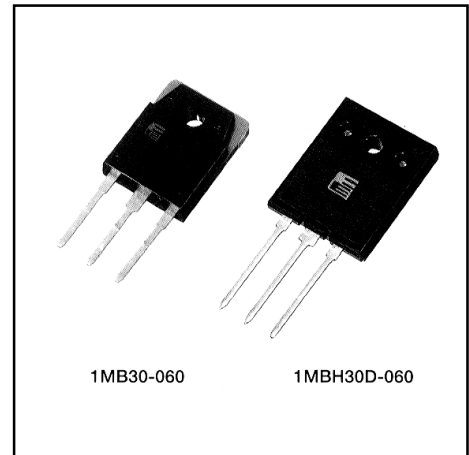
Molded Package

■ Features

- Small molded package
- Low power loss
- Soft switching with low switching surge and noise
- High reliability, high ruggedness (RBSOA, SCSOA etc.)
- Comprehensive line-up

■ Applications

- Inverter for Motor drive
- AC and DC Servo drive amplifier
- Uninterruptible power supply



■ Maximum ratings and characteristics

- Absolute maximum ratings (at Tc=25°C unless otherwise specified)

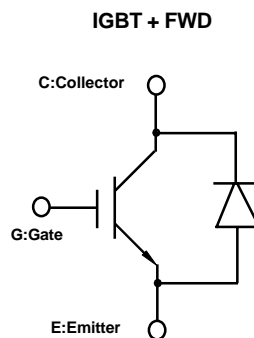
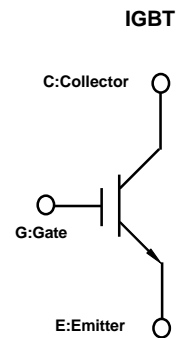
1MB30-060 / IGBT

Item	Symbol	Rating	Unit
Collector-Emitter voltage	V <sub>CES</sub>	600	V
Gate-Emitter voltage	V <sub>GES</sub>	±20	V
Collector current	DC	T <sub>c</sub> =25°C	I <sub>c25</sub> 48 A
		T <sub>c</sub> =80°C	I <sub>c80</sub> 30 A
	1ms	T <sub>c</sub> =25°C	I <sub>cp</sub> 192 A
Max. power dissipation(IGBT)	P <sub>c</sub>	180	W
Operating temperature	T <sub>j</sub>	+150	°C
Storage temperature	T <sub>stg</sub>	-40 to +150	°C
Screw torque	-	50	N·cm

1MBH30D-060 / IGBT+FWD

Item	Symbol	Rating	Unit
Collector-Emitter voltage	V <sub>CES</sub>	600	V
Gate-Emitter voltage	V <sub>GES</sub>	±20	V
Collector current	DC	T <sub>c</sub> =25°C	I <sub>c25</sub> 58 A
		T <sub>c</sub> =100°C	I <sub>c100</sub> 30 A
	1ms	T <sub>c</sub> =25°C	I <sub>cp</sub> 232 A
Max. power dissipation (IGBT)	P <sub>c</sub>	220	W
Max. power dissipation (FWD)	P <sub>c</sub>	120	W
Operating temperature	T <sub>j</sub>	+150	°C
Storage temperature	T <sub>stg</sub>	-40 to +150	°C
Screw torque	-	70	N·cm

■ Equivalent Circuit Schematic



● Electrical characteristics (at Tj=25°C unless otherwise specified)

1MB30-060 / IGBT

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	ICES	–	–	1.0	VGE=0V, VCE=600V	mA
Gate-Emitter leakage current	IGES	–	–	20	VCE=0V, VGE=±20V	µA
Gate-Emitter threshold voltage	VGE(th)	5.5	–	8.5	VCE=20V, Ic=30mA	V
Collector-Emitter saturation voltage	VCE(sat)	–	–	3.0	VGE=15V, Ic=30A	V
Input capacitance	Cies	–	1900	–	VGE=0V	pF
Output capacitance	Coes	–	400	–	VCE=10V	
Reverse transfer capacitance	Cres	–	100	–	f=1MHz	
Turn-on time	ton	–	–	1.2	VCC=300V Ic=30A	µs
	tr	–	–	0.6	VGE=±15V	
Turn-off time	toff	–	–	1.0	RG=82 ohm	
	tf	–	–	0.35	(Half Bridge)	

1MBH30D-060 / IGBT+FWD

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	ICES	–	–	1.0	VGE=0V, VCE=600V	mA
Gate-Emitter leakage current	IGES	–	–	20	VCE=0V, VGE=±20V	µA
Gate-Emitter threshold voltage	VGE(th)	5.5	–	8.5	VCE=20V, Ic=30mA	V
Collector-Emitter saturation voltage	VCE(sat)	–	–	3.0	VGE=15V, Ic=30A	V
Input capacitance	Cies	–	1900	–	VGE=0V	pF
Output capacitance	Coes	–	400	–	VCE=10V	
Reverse transfer capacitance	Cres	–	100	–	f=1MHz	
Turn-on time	ton	–	–	1.2	VCC=300V, Ic=30A	µs
	tr	–	–	0.6	VGE=±15V	
Turn-off time	toff	–	–	1.0	RG=82 ohm	
	tf	–	–	0.35	(Half Bridge)	
FWD forward on voltage	VF	–	–	3.0	IF=30A, VGE=0V	V
Reverse recovery time	trr	–	–	0.3	IF=30A, VGE=-10V, di/dt=100A/µs	µs

● Thermal resistance characteristics

1MB30-060 / IGBT

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	Rth(j-c)	–	–	0.69	IGBT	°C/W

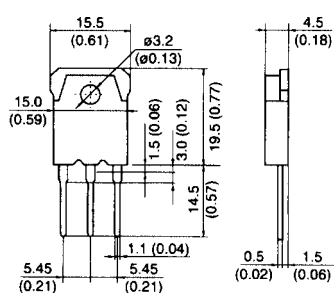
1MBH30D-060 / IGBT+FWD

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	Rth(j-c)	–	–	0.56	IGBT	°C/W
	Rth(j-c)	–	–	1.04	FWD	°C/W

■ Outline drawings, mm

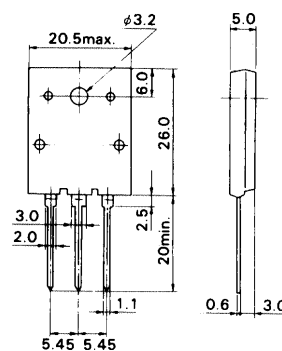
1MB30-060

TO-3P



1MBH30D-060

TO-3PL

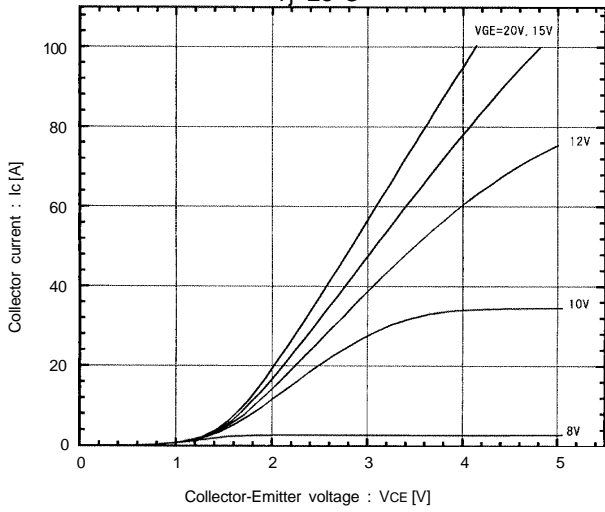


Characteristics

1MB30-060, 1MBH30D-060

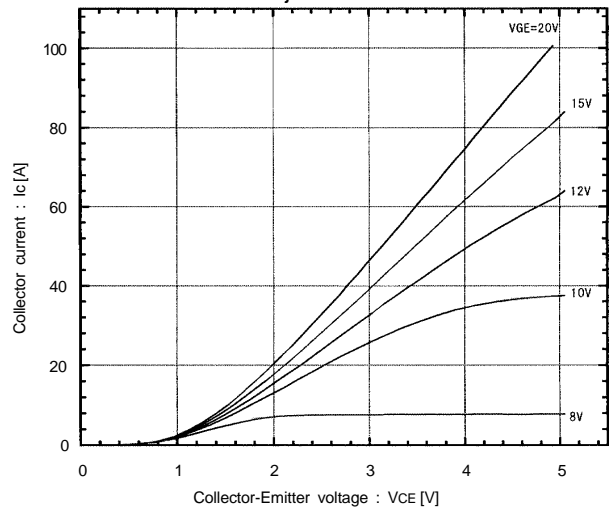
Collector current vs. Collector-Emitter voltage

$T_j=25^\circ\text{C}$



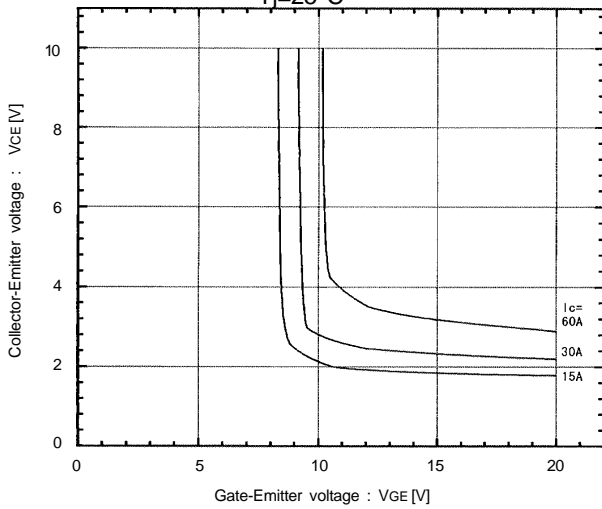
Collector current vs. Collector-Emitter voltage

$T_j=125^\circ\text{C}$



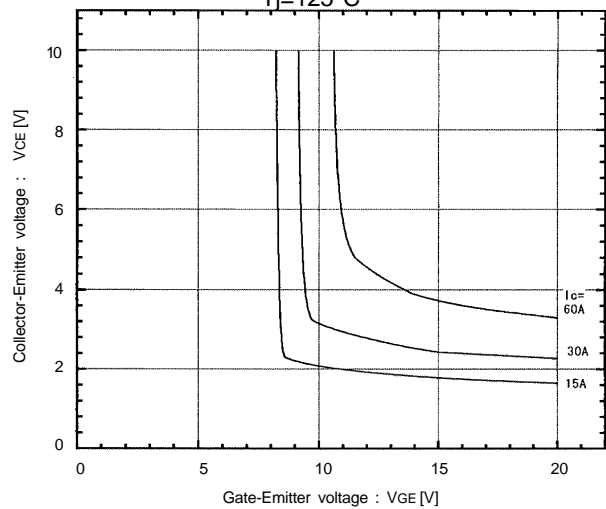
Collector-Emitter vs. Gate-Emitter voltage

$T_j=25^\circ\text{C}$



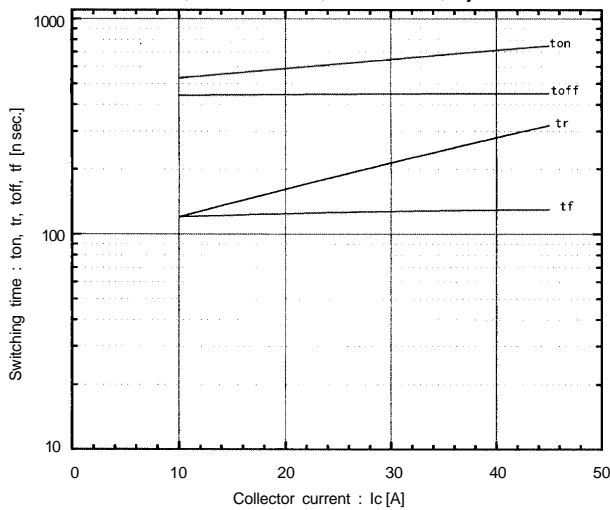
Collector-Emitter vs. Gate-Emitter voltage

$T_j=125^\circ\text{C}$



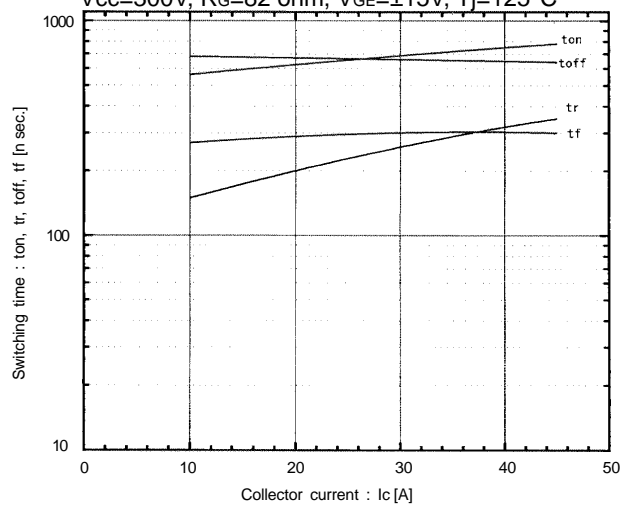
Switching time vs. Collector current

$V_{CC}=300\text{V}$ ,  $R_G=82\ \text{ohm}$ ,  $V_{GE}=\pm 15\text{V}$ ,  $T_j=25^\circ\text{C}$



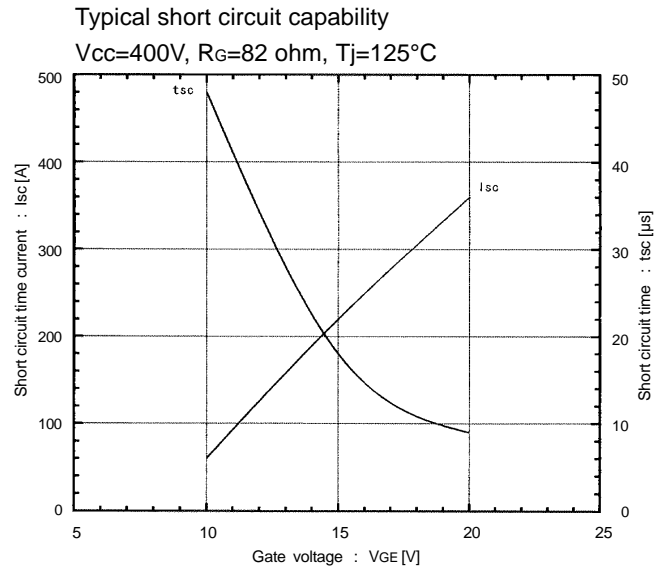
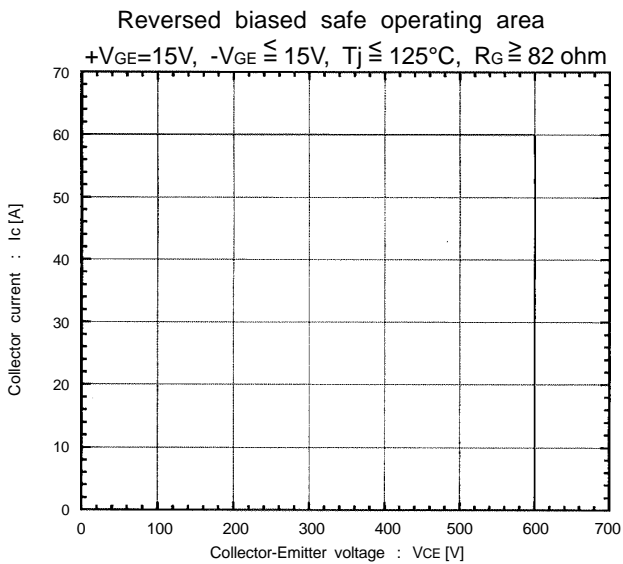
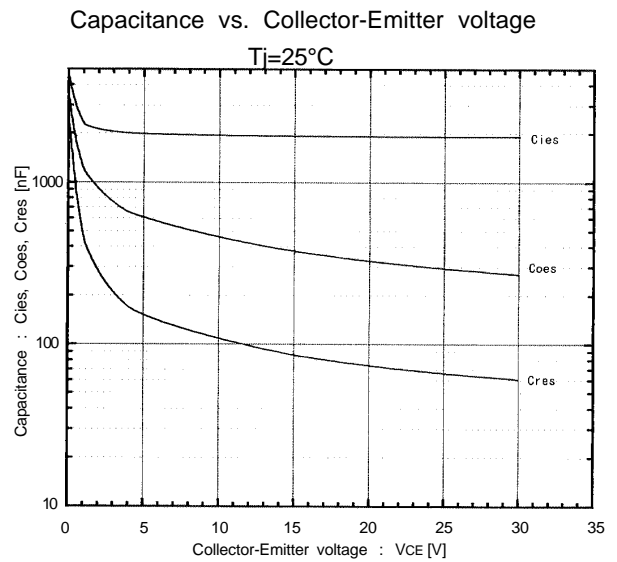
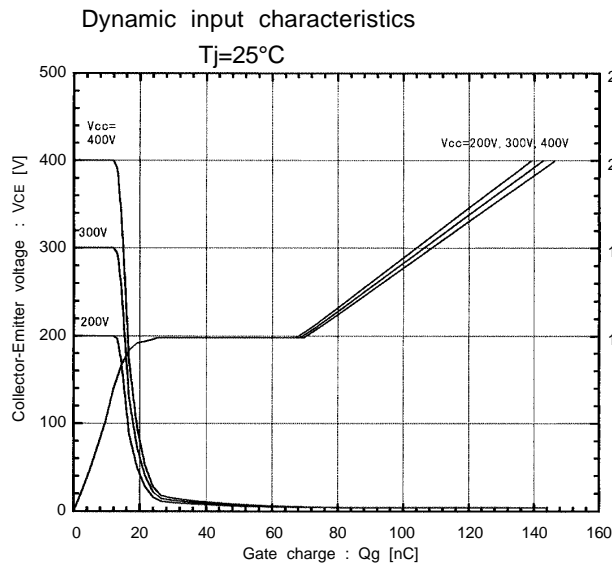
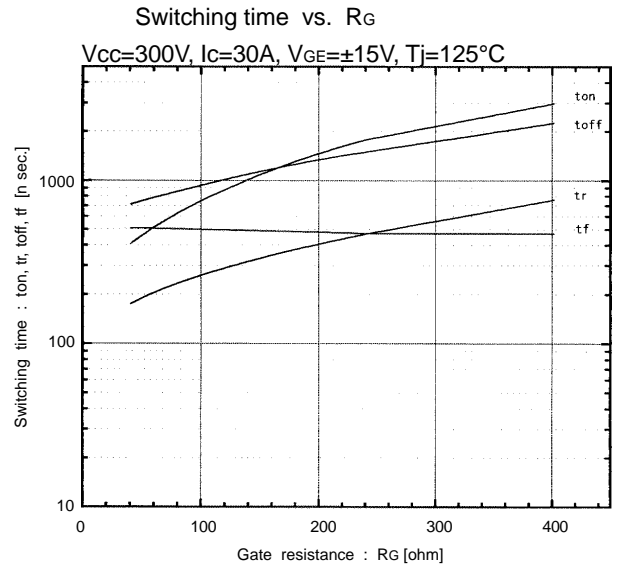
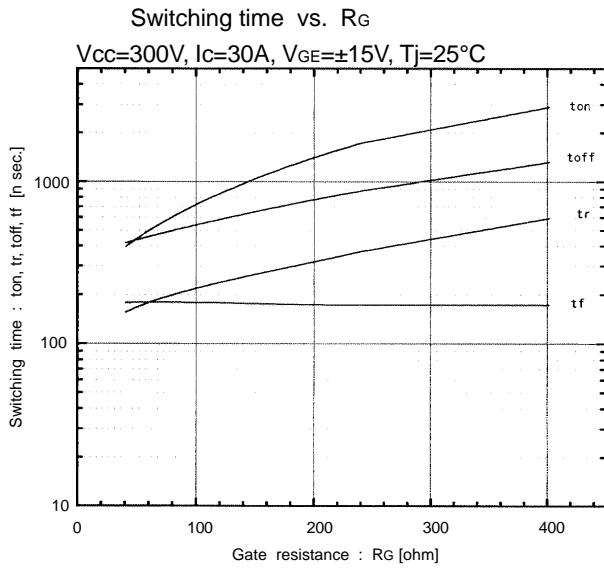
Switching time vs. Collector current

$V_{CC}=300\text{V}$ ,  $R_G=82\ \text{ohm}$ ,  $V_{GE}=\pm 15\text{V}$ ,  $T_j=125^\circ\text{C}$



Characteristics

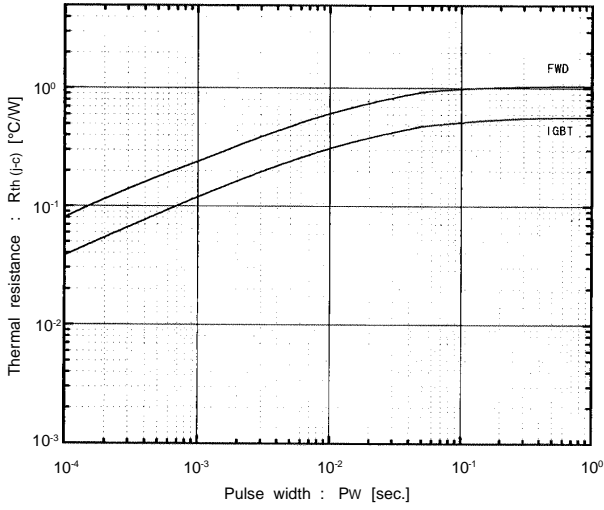
1MB30-060, 1MBH30D-060



■ Characteristics

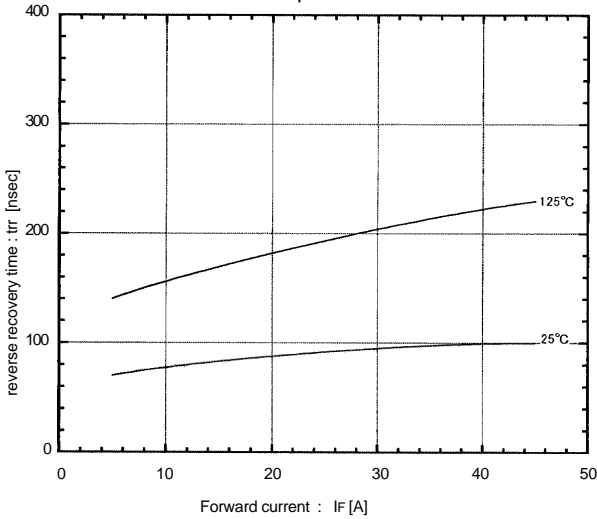
1MB30-060, 1MBH30D-060

Transient thermal resistance

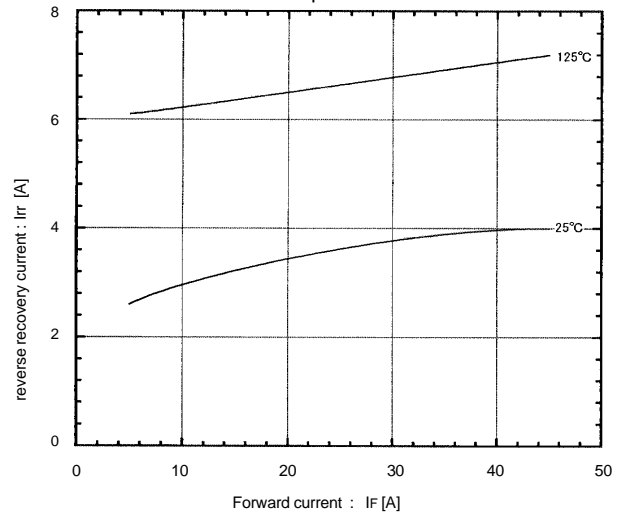


1MBH30D-060

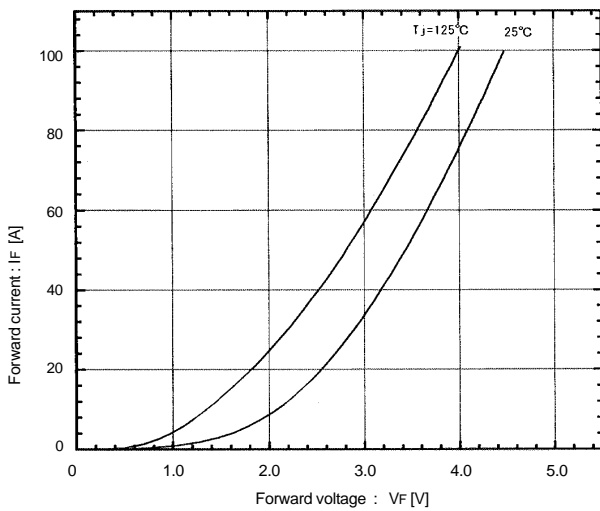
Reverse recovery time vs. Forward current  
-di/dt=90A / μsec



Reverse recovery current vs. Forward current  
-di/dt=90A / μsec



Forward current vs. Forward voltage



Reverse recovery time characteristics vs. -di/dt  
IF=30A, Tj=125°C

