

## 1200V / 15A

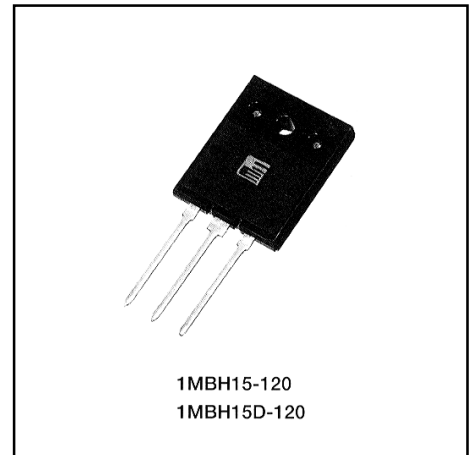
## Molded Package

### ■ 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  $T_c=25^{\circ}\text{C}$  unless otherwise specified)

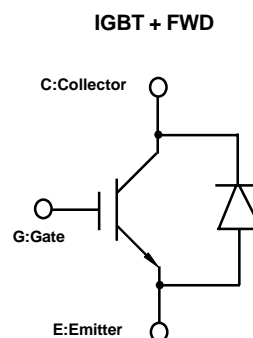
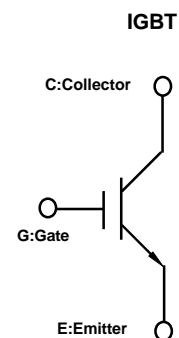
#### 1MBH15-120 / IGBT

Item	Symbol	Rating	Unit		
Collector-Emitter voltage	$V_{CES}$	1200	V		
Gate-Emitter voltage	$V_{GES}$	$\pm 20$	V		
Collector current	DC	$T_c=25^{\circ}\text{C}$	$I_{c25}$	26	A
		$T_c=100^{\circ}\text{C}$	$I_{c100}$	15	A
	1ms	$T_c=25^{\circ}\text{C}$	$I_{cp}$	78	A
Max. power dissipation(IGBT)	$P_c$	245	W		
Operating temperature	$T_j$	+150	$^{\circ}\text{C}$		
Storage temperature	$T_{stg}$	-40 to +150	$^{\circ}\text{C}$		
Screw torque	-	70	N·m		

#### 1MBH15D-120 / IGBT+FWD

Item	Symbol	Rating	Unit		
Collector-Emitter voltage	$V_{CES}$	1200	V		
Gate-Emitter voltage	$V_{GES}$	$\pm 20$	V		
Collector current	DC	$T_c=25^{\circ}\text{C}$	$I_{c25}$	26	A
		$T_c=100^{\circ}\text{C}$	$I_{c100}$	15	A
	1ms	$T_c=25^{\circ}\text{C}$	$I_{cp}$	78	A
Max. power dissipation (IGBT)	$P_c$	245	W		
Max. power dissipation (FWD)	$P_c$	120	W		
Operating temperature	$T_j$	+150	$^{\circ}\text{C}$		
Storage temperature	$T_{stg}$	-40 to +150	$^{\circ}\text{C}$		
Screw torque	-	70	N·m		

### ■ Equivalent Circuit Schematic



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

1MBH15-120 / IGBT

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	ICES	–	–	1.0	VGE=0V, VCE=1200V	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=15mA	V
Collector-Emitter saturation voltage	VCE(sat)	–	–	3.5	VGE=15V, IC=15A	V
Input capacitance	Cies	–	1700	–	VGE=0V	pF
Output capacitance	Coes	–	300	–	VCE=10V	
Reverse transfer capacitance	Cres	–	120	–	f=1MHz	
Turn-on time	ton	–	–	1.2	VCC=600V IC=15A	µs
	tr	–	–	0.6	VGE=±15V	
Turn-off time	toff	–	–	1.5	RG=120 ohm	
	tf	–	–	0.5	(Half Bridge)	

1MBH15D-120 / IGBT+FWD

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	ICES	–	–	1.0	VGE=0V, VCE=1200V	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=15mA	V
Collector-Emitter saturation voltage	VCE(sat)	–	–	3.5	VGE=15V, IC=15A	V
Input capacitance	Cies	–	1700	–	VGE=0V	pF
Output capacitance	Coes	–	300	–	VCE=10V	
Reverse transfer capacitance	Cres	–	120	–	f=1MHz	
Turn-on time	ton	–	–	1.2	VCC=600V, IC=15A	µs
	tr	–	–	0.6	VGE=±15V	
Turn-off time	toff	–	–	1.5	RG=120 ohm	
	tf	–	–	0.5	(Half Bridge)	
FWD forward on voltage	VF	–	–	3.0	IF=15A, VGE=0V	V
Reverse recovery time	trr	–	–	0.35	IF=15A, VGE=-10V, di/dt=100A/µs	µs

● Thermal resistance characteristics

1MBH15-120 / IGBT

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	Rth(j-c)	–	–	0.51	IGBT	°C/W

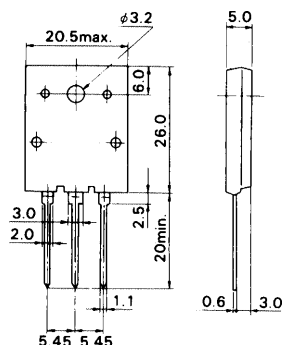
1MBH15D-120 / IGBT+FWD

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	Rth(j-c)	–	–	0.51	IGBT	°C/W
	Rth(j-c)	–	–	1.04	FWD	°C/W

■ Outline drawings, mm

1MBH15-120, 1MBH15D-120

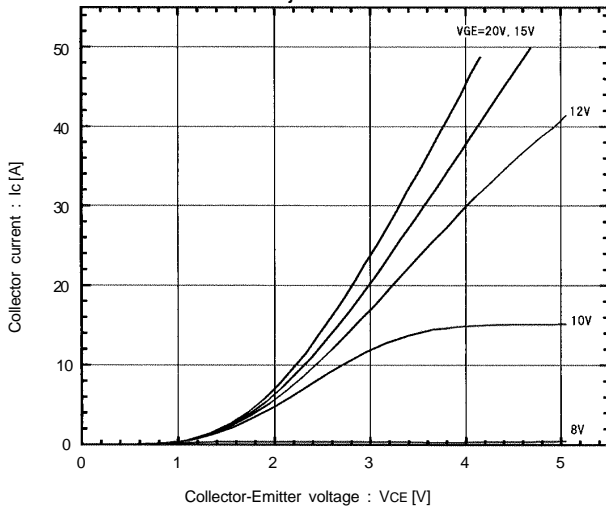
TO-3PL



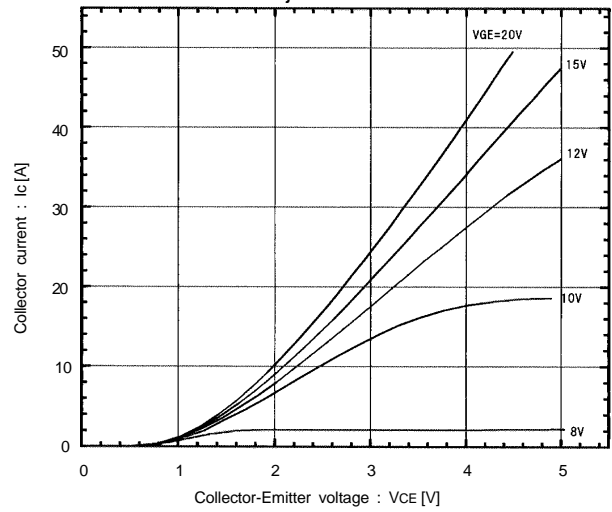
Characteristics

1MBH15-120,1MBH15D-120

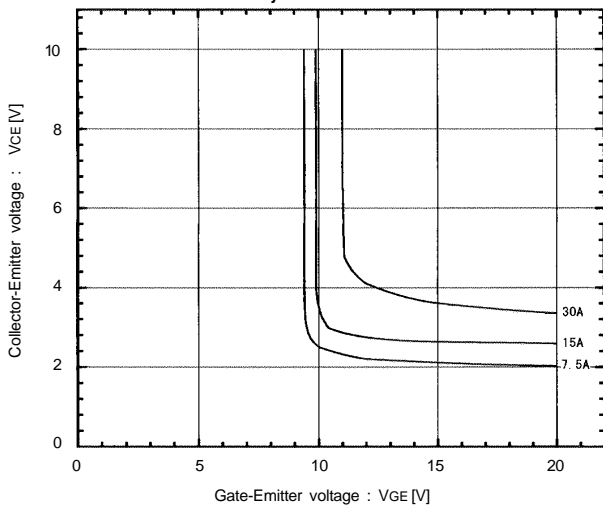
Collector current vs. Collector-Emitter voltage  
T<sub>j</sub>=25°C



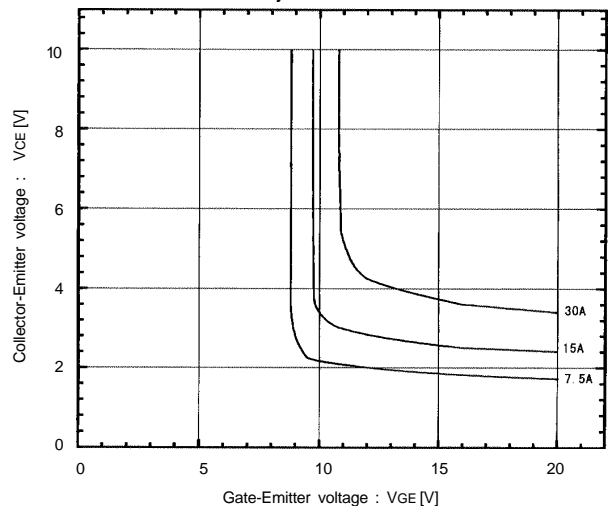
Collector current vs. Collector-Emitter voltage  
T<sub>j</sub>=125°C



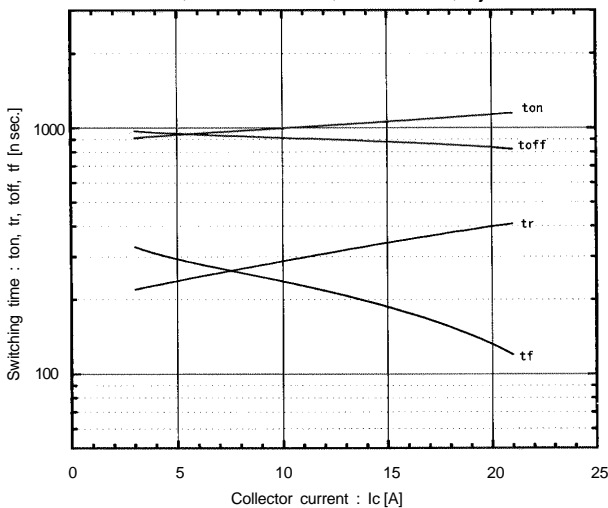
Collector-Emitter vs. Gate-Emitter voltage  
T<sub>j</sub>=25°C



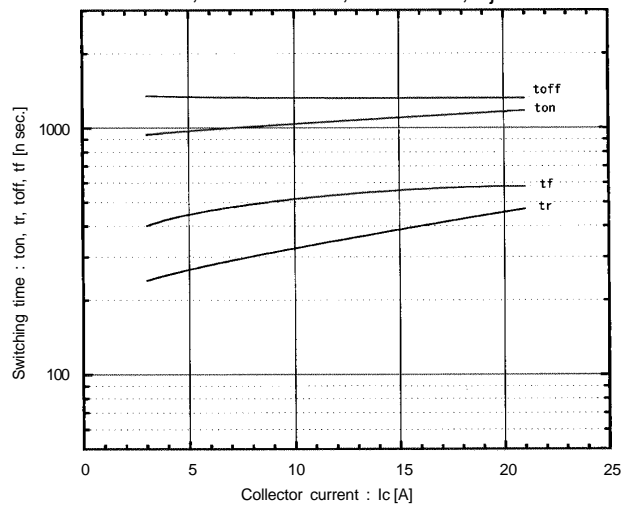
Collector-Emitter vs. Gate-Emitter voltage  
T<sub>j</sub>=125°C



Switching time vs. Collector current  
V<sub>CC</sub>=600V, R<sub>G</sub>=120 ohm, V<sub>GE</sub>=±15V, T<sub>j</sub>=25°C

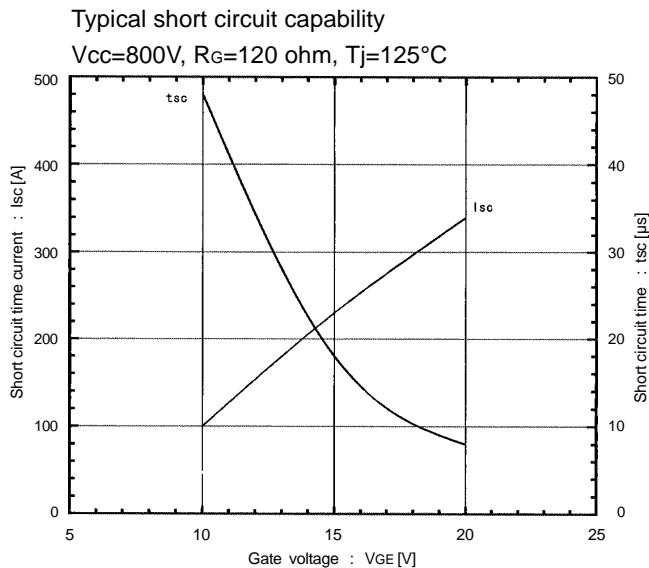
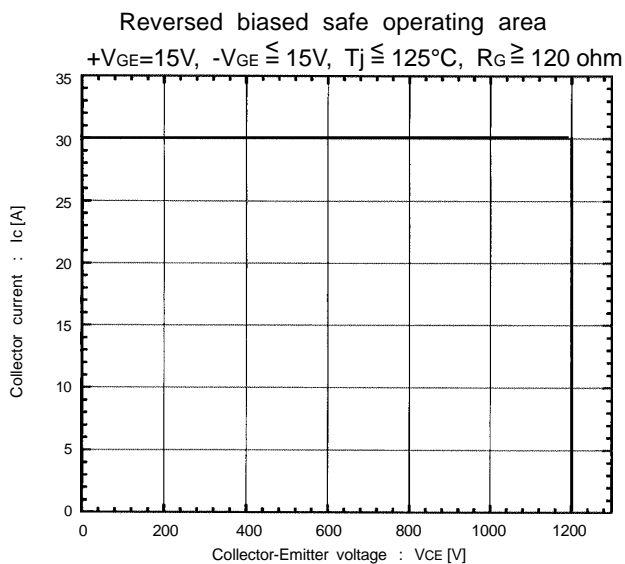
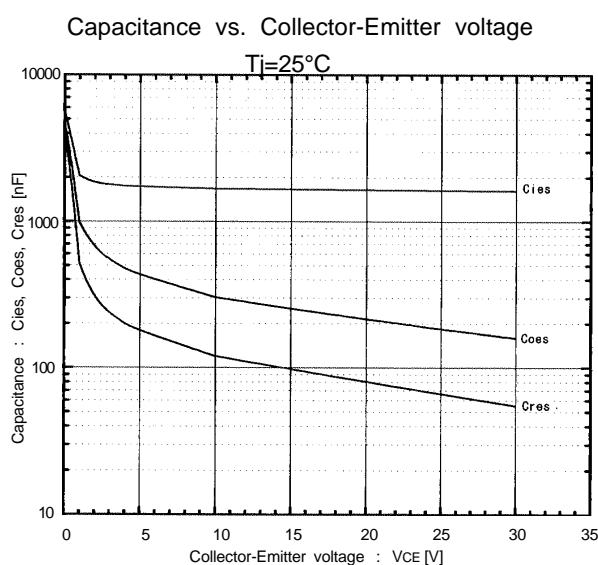
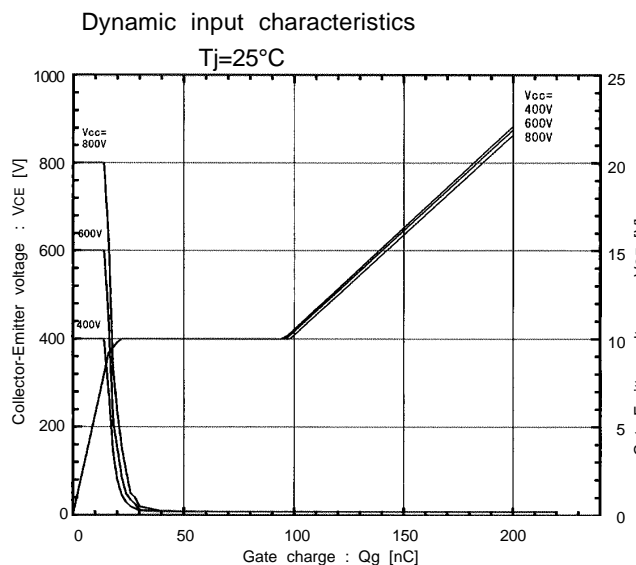
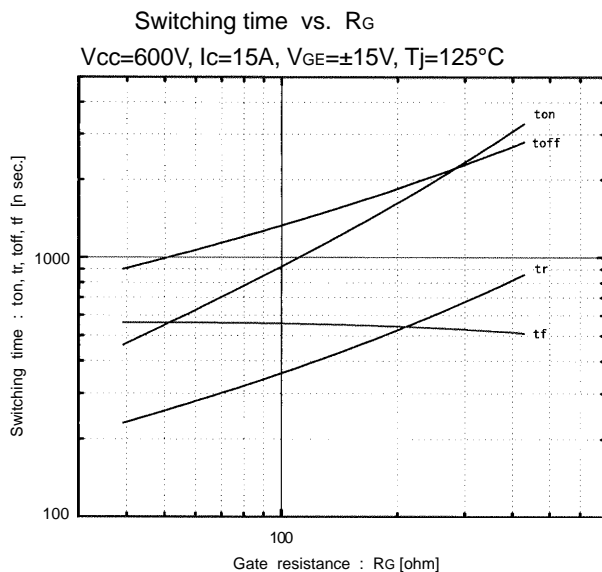
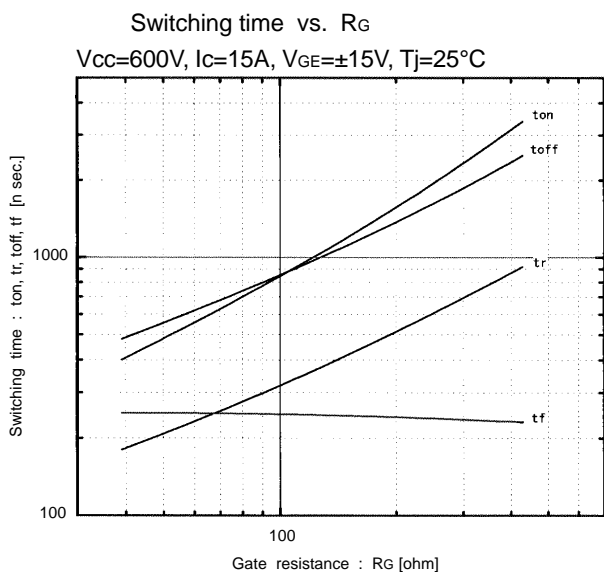


Switching time vs. Collector current  
V<sub>CC</sub>=600V, R<sub>G</sub>=120 ohm, V<sub>GE</sub>=±15V, T<sub>j</sub>=125°C



Characteristics

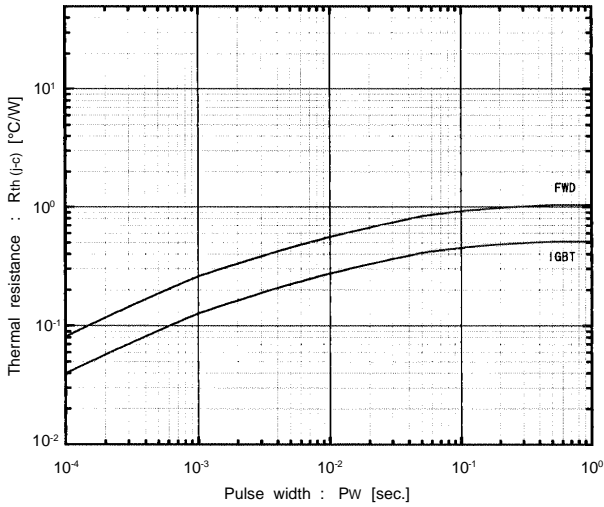
1MBH15-120, 1MBH15D-120



■ Characteristics

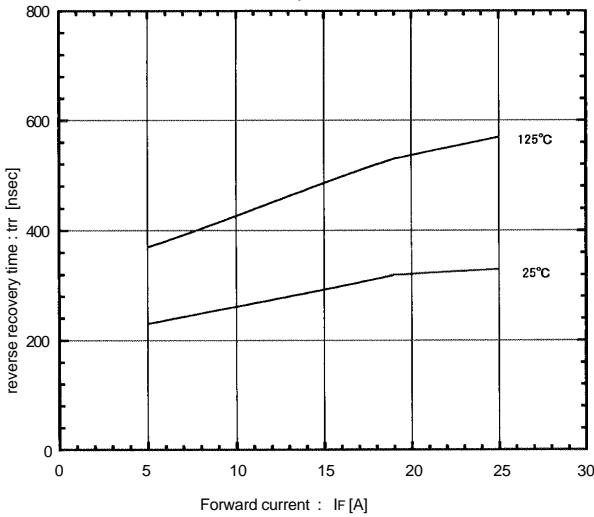
1MBH15-120, 1MBH15D-120

Transient thermal resistance

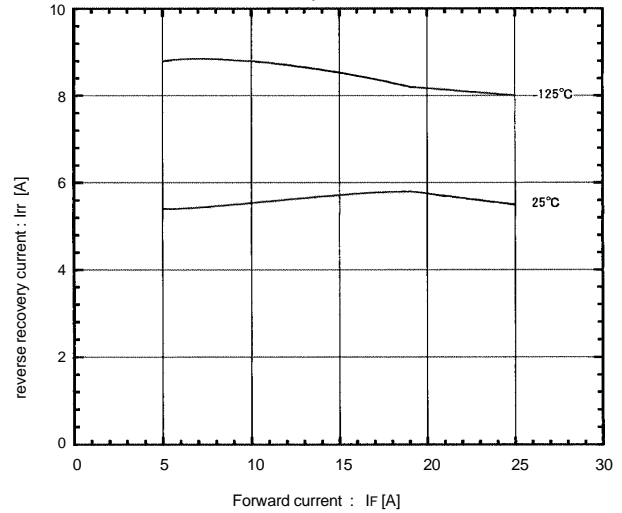


1MBH15D-120

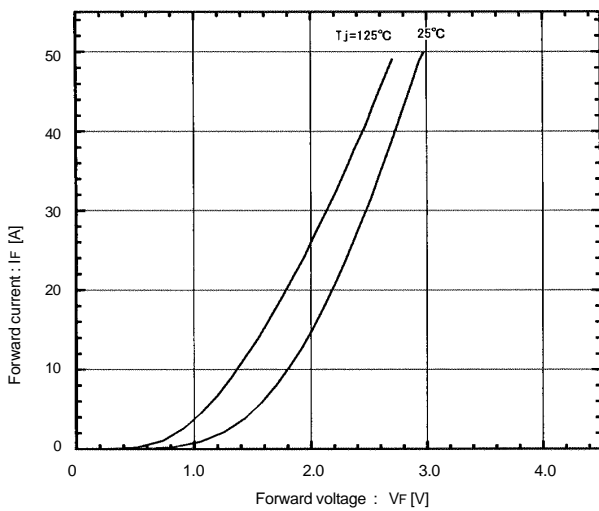
Reverse recovery time vs. Forward current  
-di/dt=45A / μsec



Reverse recovery current vs. Forward current  
-di/dt=45A / μsec



Forward current vs. Forward voltage



Reverse recovery time characteristics vs. -di/dt  
IF=15A, Tj=125°C

