

600V / 50A

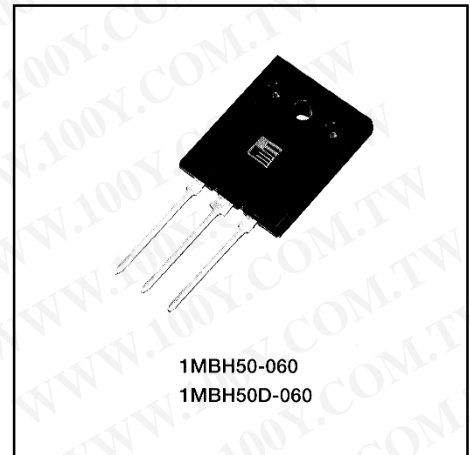
Molded Package

■ 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



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■ Maximum ratings and characteristics

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

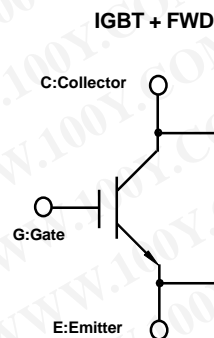
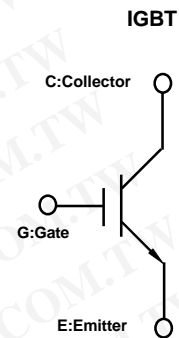
1MBH50-060 / IGBT

Item	Symbol	Rating	Unit		
Collector-Emitter voltage	V _{CES}	600	V		
Gate-Emitter voltage	V _{GES}	±20	V		
Collector current	DC	T _c =25°C	I _{C25}	82	A
		T _c =100°C	I _{C100}	50	A
	1ms	T _c =25°C	I _{CP}	328	A
Max. power dissipation(IGBT)	P _C	310	W		
Operating temperature	T _J	+150	°C		
Storage temperature	T _{stg}	-40 to +150	°C		
Screw torque	-	70	N·m		

1MBH50D-060 / IGBT+FWD

Item	Symbol	Rating	Unit		
Collector-Emitter voltage	V _{CES}	600	V		
Gate-Emitter voltage	V _{GES}	±20	V		
Collector current	DC	T _c =25°C	I _{C25}	82	A
		T _c =100°C	I _{C100}	50	A
	1ms	T _c =25°C	I _{CP}	328	A
Max. power dissipation (IGBT)	P _C	310	W		
Max. power dissipation (FWD)	P _C	140	W		
Operating temperature	T _J	+150	°C		
Storage temperature	T _{stg}	-40 to +150	°C		
Screw torque	-	70	N·m		

■ Equivalent Circuit Schematic



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

1MBH50-060 / 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=50mA	V
Collector-Emitter saturation voltage	VCE(sat)	-	-	3.0	VGE=15V, Ic=50A	V
Input capacitance	Cies	-	3000	-	VGE=0V	pF
Output capacitance	Coes	-	650	-	VCE=10V	
Reverse transfer capacitance	Cres	-	150	-	f=1MHz	
Turn-on time	ton	-	-	1.2	VCC=300V, Ic=50A	µs
	tr	-	-	0.6	VGE=±15V	
Turn-off time	toff	-	-	1.0	RG=62 ohm	µs
	tf	-	-	0.35	(Half Bridge)	

1MBH50D-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=50mA	V
Collector-Emitter saturation voltage	VCE(sat)	-	-	3.0	VGE=15V, Ic=50A	V
Input capacitance	Cies	-	3000	-	VGE=0V	pF
Output capacitance	Coes	-	650	-	VCE=10V	
Reverse transfer capacitance	Cres	-	150	-	f=1MHz	
Turn-on time	ton	-	-	1.2	VCC=300V, Ic=50A	µs
	tr	-	-	0.6	VGE=±15V	
Turn-off time	toff	-	-	1.0	RG=62 ohm	µs
	tf	-	-	0.35	(Half Bridge)	
FWD forward on voltage	VF	-	-	3.0	IF=50A, VGE=0V	V
Reverse recovery time	trr	-	-	0.3	IF=50A, VGE=-10V, di/dt=100A/µs	µs

● Thermal resistance characteristics

1MBH50-060 / IGBT

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	Rth(j-c)	-	-	0.40	IGBT	°C/W

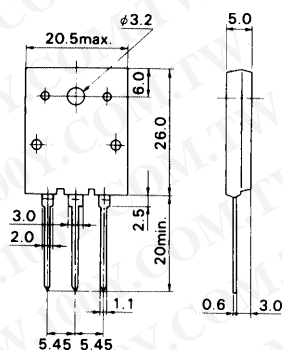
1MBH50D-060 / IGBT+FWD

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	Rth(j-c)	-	-	0.40	IGBT	°C/W
	Rth(j-c)	-	-	0.89	FWD	°C/W

■ Outline drawings, mm

1MBH50-060, 1MBH50D-060

TO-3PL

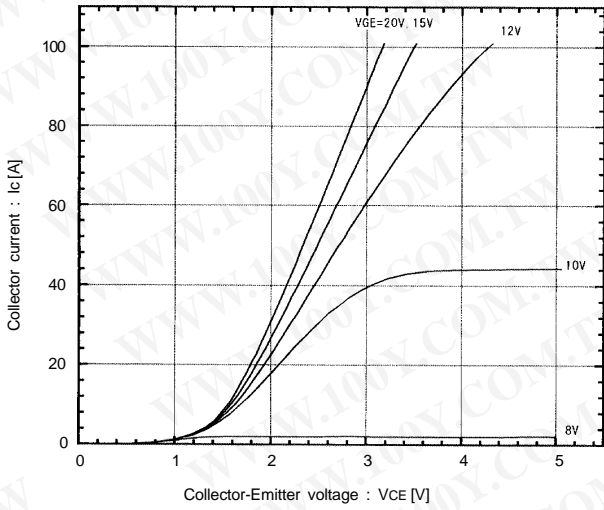


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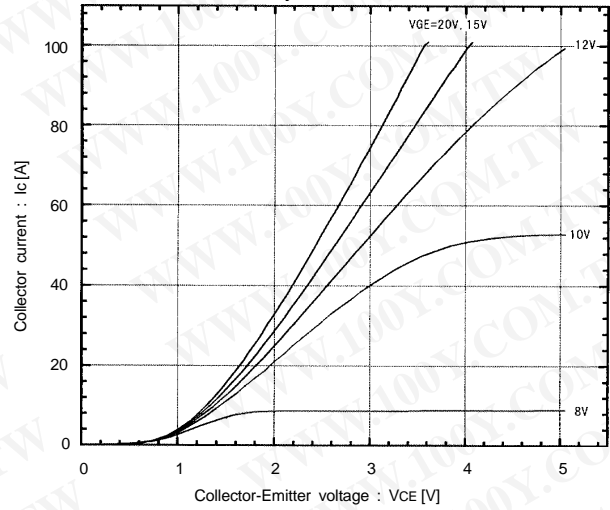
Characteristics

1MBH50-060,1MBH50D-060

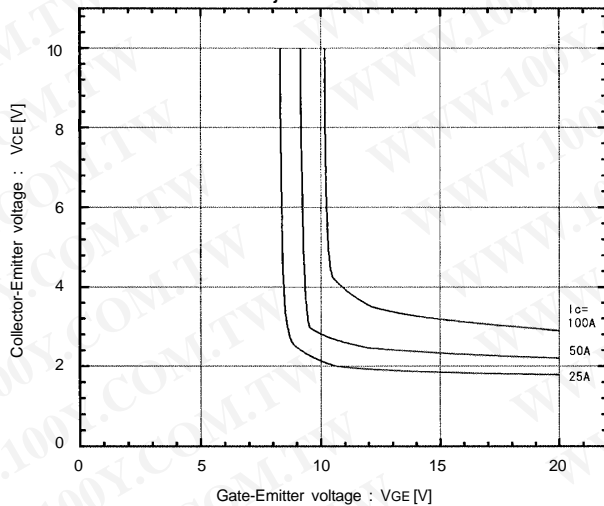
Collector current vs. Collector-Emitter voltage
 $T_j=25^\circ\text{C}$



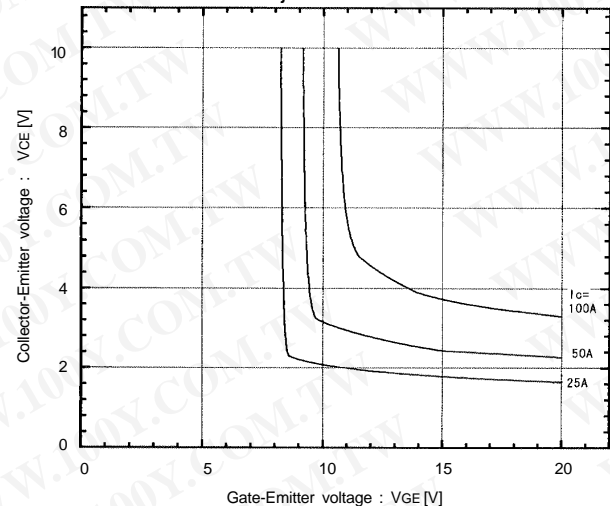
Collector current vs. Collector-Emitter voltage
 $T_j=125^\circ\text{C}$



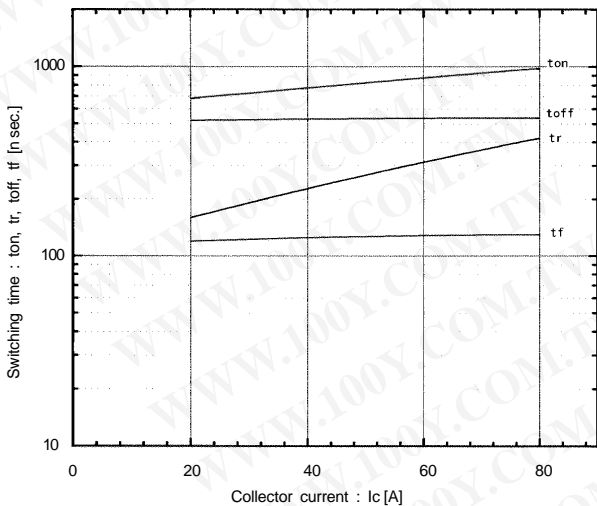
Collector-Emitter vs. Gate-Emitter voltage
 $T_j=25^\circ\text{C}$



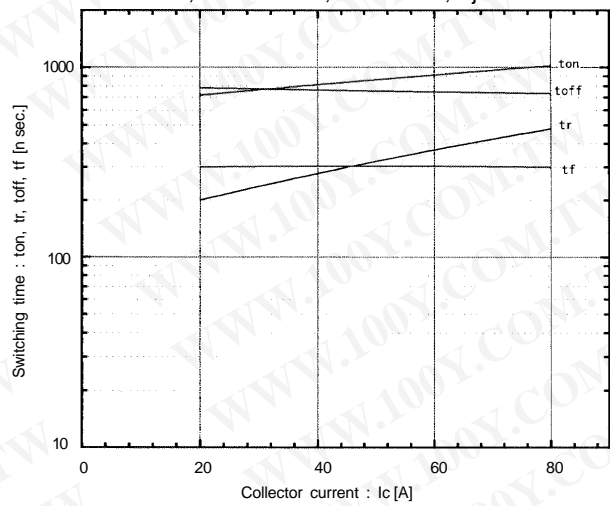
Collector-Emitter vs. Gate-Emitter voltage
 $T_j=125^\circ\text{C}$



Switching time vs. Collector current
 $V_{CC}=300\text{V}, R_G=62\ \text{ohm}, V_{GE}=\pm 15\text{V}, T_j=25^\circ\text{C}$

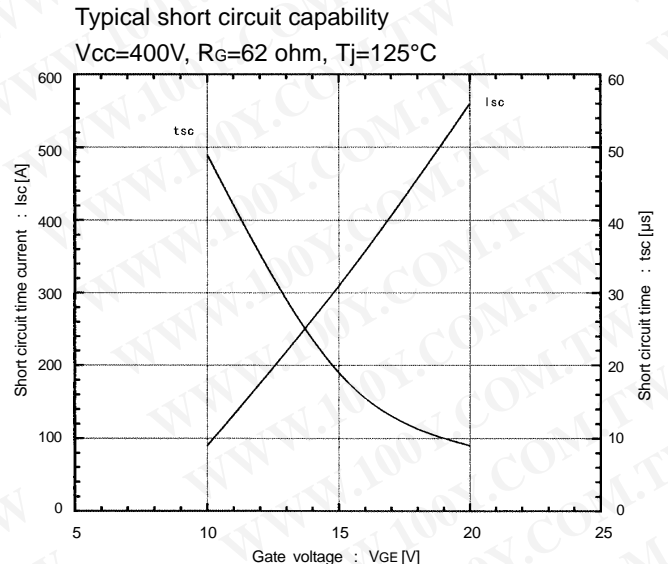
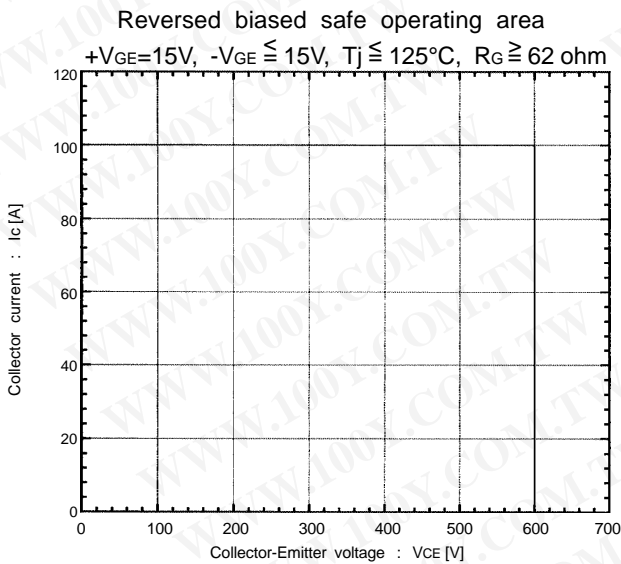
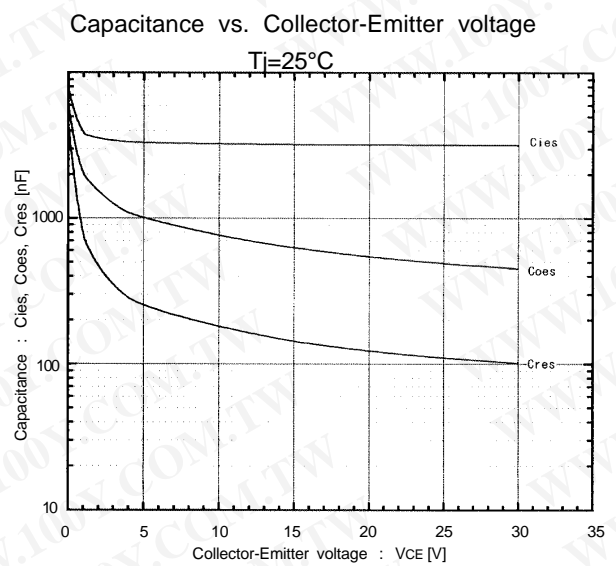
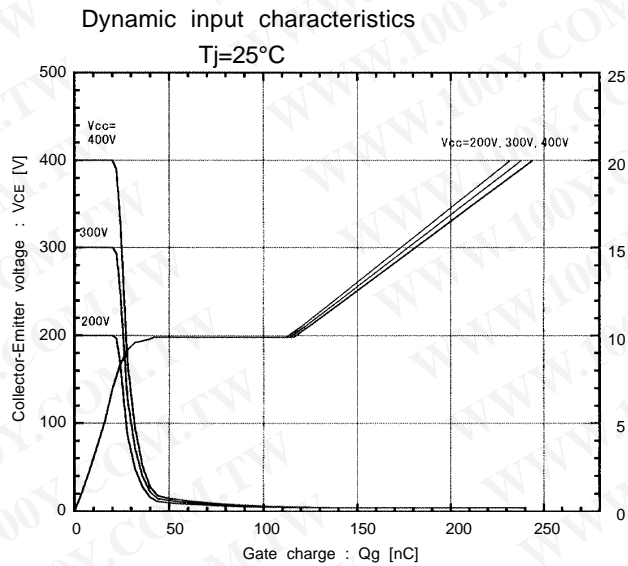
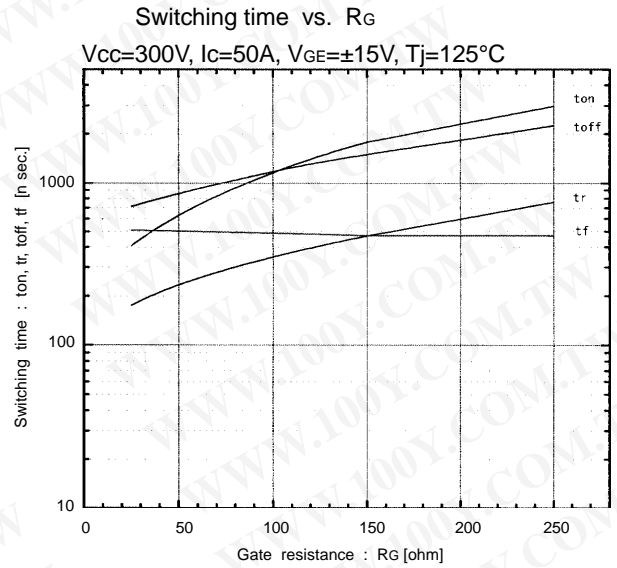
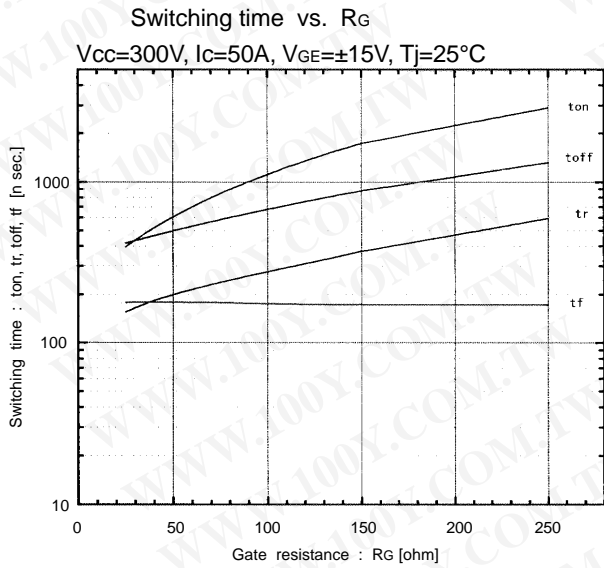


Switching time vs. Collector current
 $V_{CC}=300\text{V}, R_G=62\ \text{ohm}, V_{GE}=\pm 15\text{V}, T_j=125^\circ\text{C}$



Characteristics

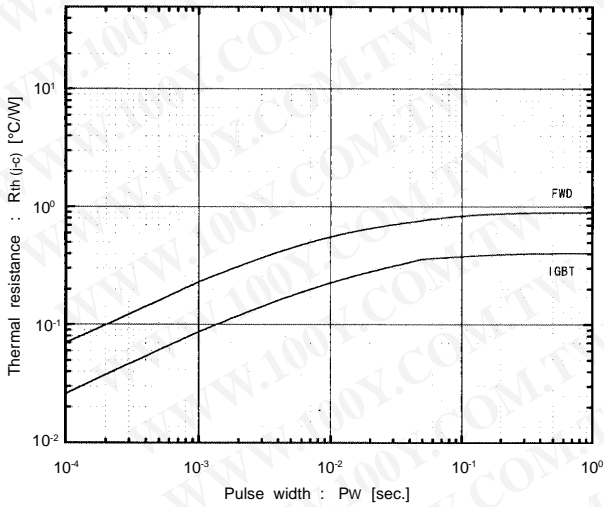
1MBH50-060,1MBH50D-060



■ Characteristics

1MBH50-060, 1MBH50D-060

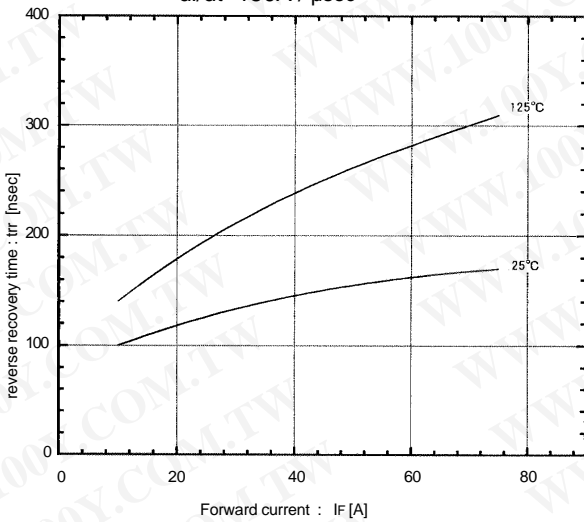
Transient thermal resistance



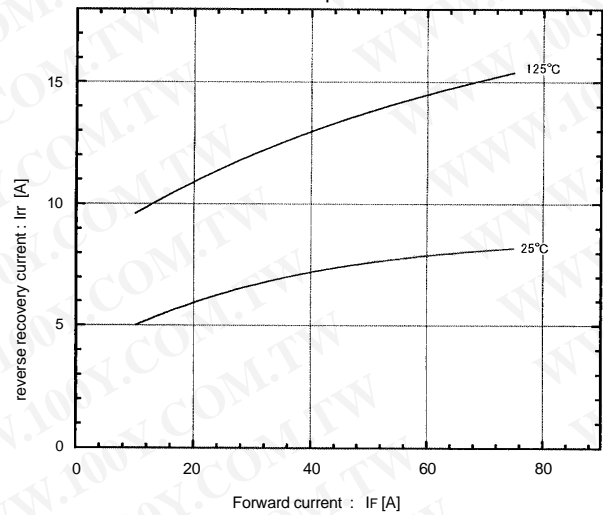
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1MBH50D-060

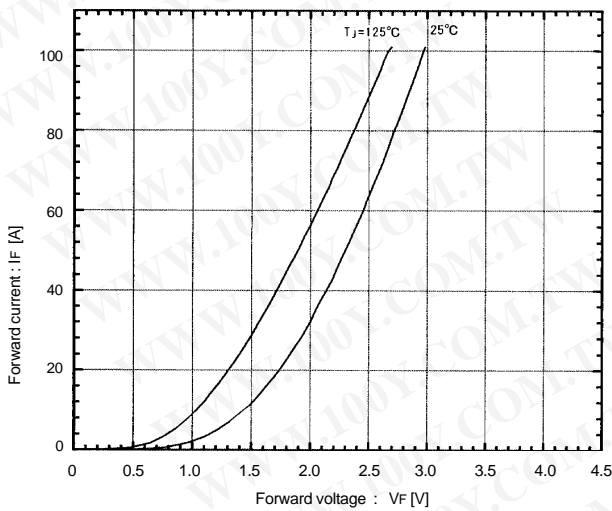
Reverse recovery time vs. Forward current
 $-di/dt=150A/\mu sec$



Reverse recovery current vs. Forward current
 $-di/dt=150A/\mu sec$



Forward current vs. Forward voltage



Reverse recovery time characteristics vs. $-di/dt$
 $IF=50A, Tj=125°C$

