

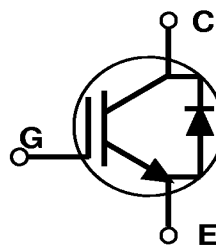
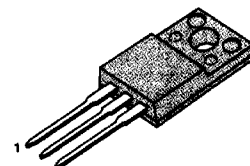
FEATURES

- * Short Circuit rated 10 μ s @ T_C=100°C
- * High Speed Switching
- * Low Saturation Voltage
: V_{CE(sat)} = 2.1 V @ I_C=10A
- * High Input Impedance
- * CO-PAK, IGBT with FRD
: T_{rr} = 50ns (Typ)

APPLICATIONS

- * AC & DC Motor controls
- * General Purpose Inverters
- * Robotics , Servo Controls
- * Power Supply
- * Lamp Ballast

TO-220F



ABSOLUTE MAXIMUM RATINGS

Symbol	Characteristics	Rating	Units
V _{CES}	Collector-Emitter Voltage	600	V
V _{GES}	Gate-Emitter Voltage	±20	V
I _C	Collector Current @ T _C = 25°C	16	A
	Collector Current @ T _C = 100°C	10	A
I _{CM(1)}	Pulsed Collector Current	30	A
I _F	Diode Continuous Forward Current @ T _C = 100°C	12	A
I _{FM}	Diode Maximum Forward Current	92	A
P _D	Maximum Power Dissipation @T _C = 25°C	35	W
	Maximum Power Dissipation @T _C = 100°C	14	W
T _{SC}	Short Circuit Withstand Time	10	μs
T _J	Operating Junction Temperature	-55 ~ 150	°C
T _{STG}	Storage Temperature Range	-55 ~ 150	°C
TL	Maximum Lead Temp. For Soldering	300	°C
	Purposes, 1/8" from case for 5 seconds		

Notes: (1) Repetitive rating : Pulse width limited by max. junction temperature

ELECTRICAL CHARACTERISTICS (IGBT PART)(T_C=25°C, Unless Otherwise Specified)

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
BV _{CES}	C - E Breakdown Voltage	V _{GE} = 0V , I _C = 250μA	600	-	-	V
ΔV _{CES} / ΔT _J	Temperature Coeff. of Breakdown Voltage	V _{GE} = 0V , I _C = 1mA	-	0.6	-	V/°C
V _{GE(th)}	G - E threshold voltage	I _C = 10mA , V _{CE} = V _{GE}	5.0	6.0	8.0	V
I _{CES}	Collector cutoff Current	V _{CE} = V _{CES} , V _{GE} = 0V	-	-	250	μA
I _{GES}	G - E leakage Current	V _{GE} = V _{GES} , V _{CE} = 0V	-	-	100	nA
V _{CE(sat)}	Collector to Emitter saturation voltage	I _C = 10A, V _{GE} = 15V	-	2.1	2.7	V
		I _C = 16A, V _{GE} = 15V	-	2.4	-	V
Cies	Input capacitance	V _{GE} = 0V , f = 1MHz V _{CE} = 30V	-	665	-	pF
Coes	Output capacitance		-	107	-	pF
Cres	Reverse transfer capacitance		-	22	-	pF
td(on)	Turn on delay time	V _{CC} = 300V , I _C = 10A V _{GE} = 15V R _G = 20Ω Inductive Load	-	15	-	ns
tr	Turn on rise time		-	17	-	ns
td(off)	Turn off delay time		-	80	-	ns
tf	Turn off fall time		-	110	220	ns
Eon	Turn on Switching Loss		-	0.1	-	mJ
Eoff	Turn off Switching Loss		-	0.2	-	mJ
Ets	Total Switching Loss		-	0.3	0.5	mJ
T _{SC}	Short Circuit withstand Time	V _{CC} = 300V, V _{GE} = 15V @T _C = 100°C	10	-	-	μs
Qg	Total Gate Charge	V _{CC} = 300V V _{GE} = 15V I _C = 10A	-	44	66	nC
Qge	Gate-Emitter Charge		-	10	15	nC
Qgc	Gate-Collector Charge		-	15	22	nC

ELECTRICAL CHARACTERISTICS (DIODE PART)(T_C=25°C, Unless Otherwise Specified)

Symbol	Characteristics	Test Conditions		Min	Typ	Max	Units
V _{FM}	Diode Forward Voltage	I _F =12A	T _C =25°C	-	1.4	1.7	V
			T _C =100°C	-	1.3	-	
T _{rr}	Diode Reverse	I _F =12A, V _R =200V -di/dt=200A/μs	T _C =25°C	-	50	75	ns
	Recovery Time		T _C =100°C	-	75	-	
I _{rr}	Diode Peak Reverse		T _C =25°C	-	3.5	5.0	A
	Recovery Current		T _C =100°C	-	4.5	-	
Q _{rr}	Diode Reverse		T _C =25°C	-	65	138	nC
	Recovery Charge		T _C =100°C	-	124	-	

THERMAL RESISTANCE

Symbol	Characteristics	Min	Typ	Max	Units
R _{θJC}	Junction-to-Case (IGBT)	-	-	3.57	°C/W
R _{θJC}	Junction-to-Case (DIODE)	-	-	5.0	°C/W
R _{θJA}	Junction-to-Ambient	-	-	85	°C/W

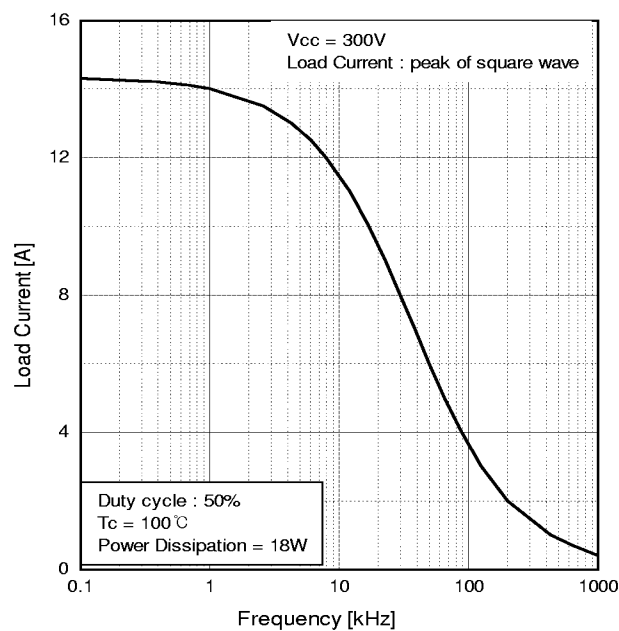


Fig.1 Typical Load Current vs. Frequency

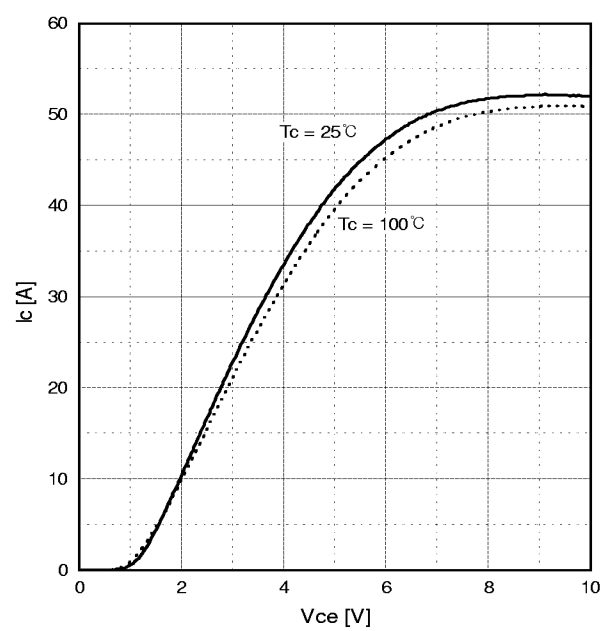


Fig.2 Typical Output Characteristics

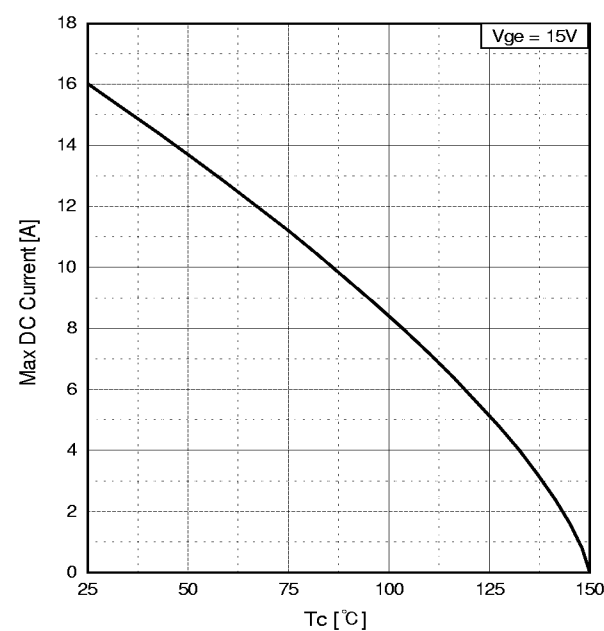


Fig.3 Maximum Collector Current vs. Case Temperature

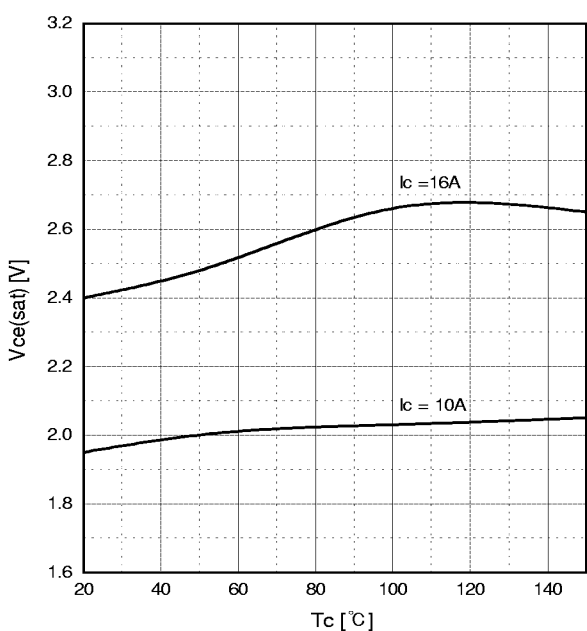


Fig.4 Collector to Emitter Voltage vs. Case Temperature

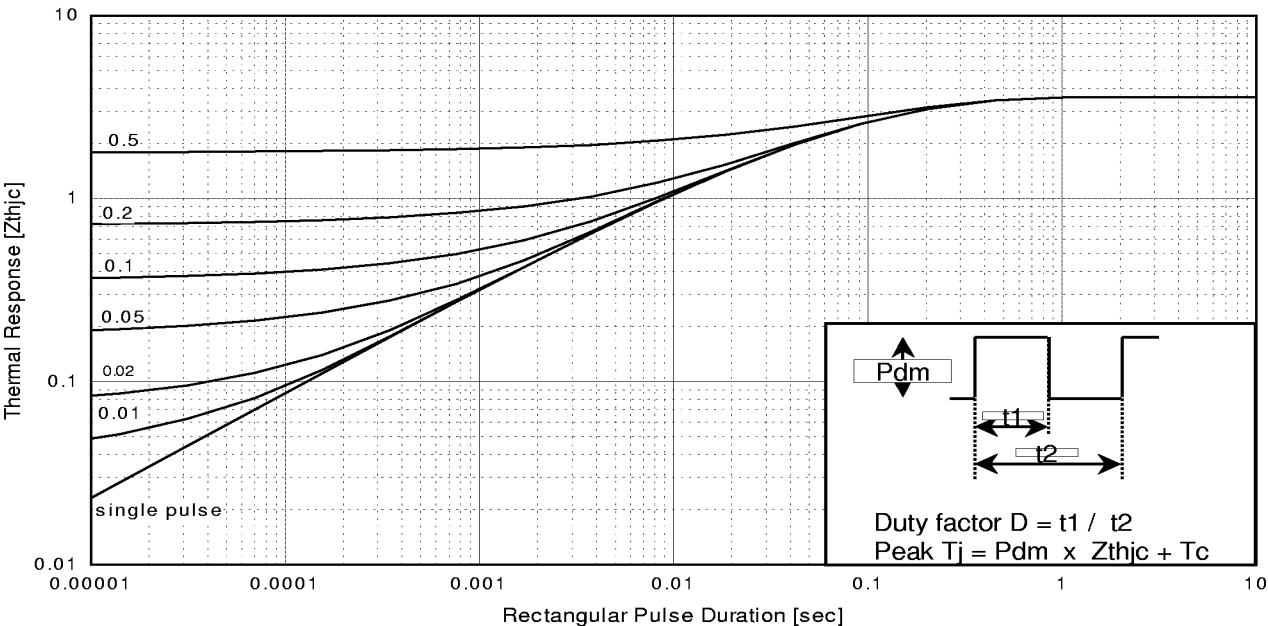


Fig.5 Maximum Effective Transient Thermal Impedance, Junction to Case

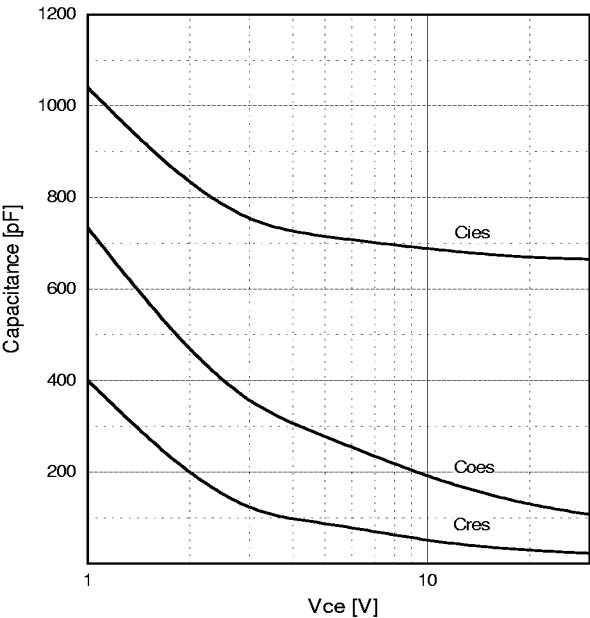


Fig.6 Typical Capacitance vs. Collector to Emitter Voltage

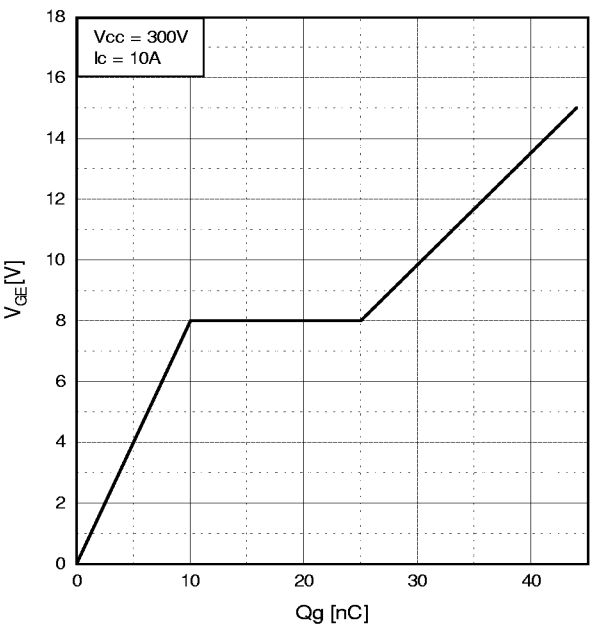
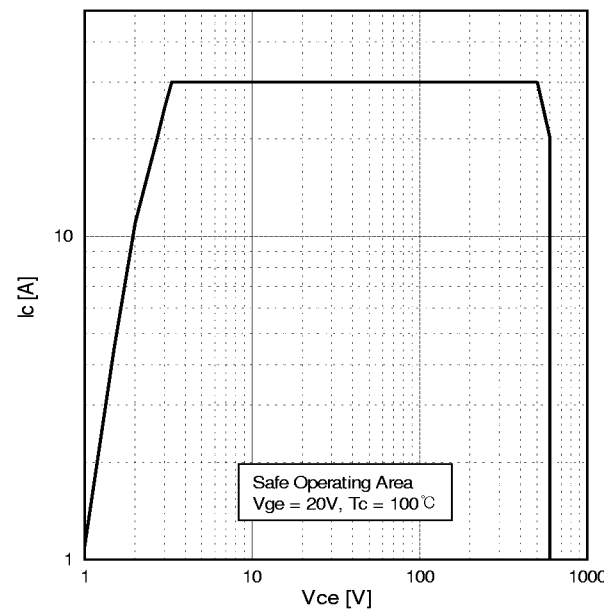
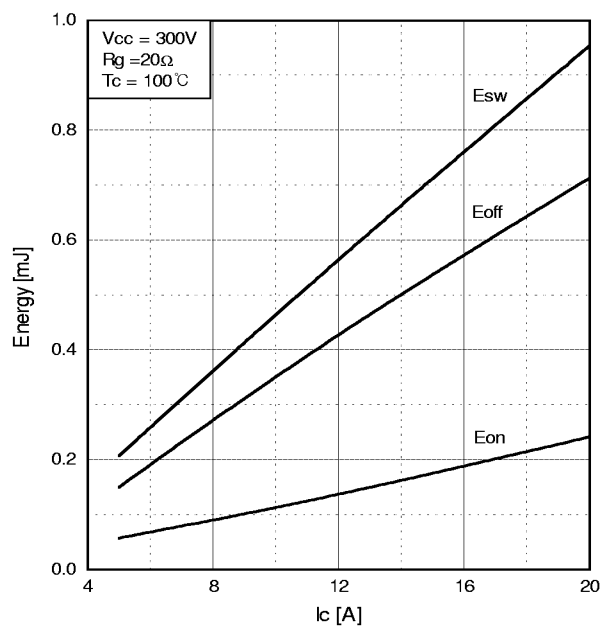
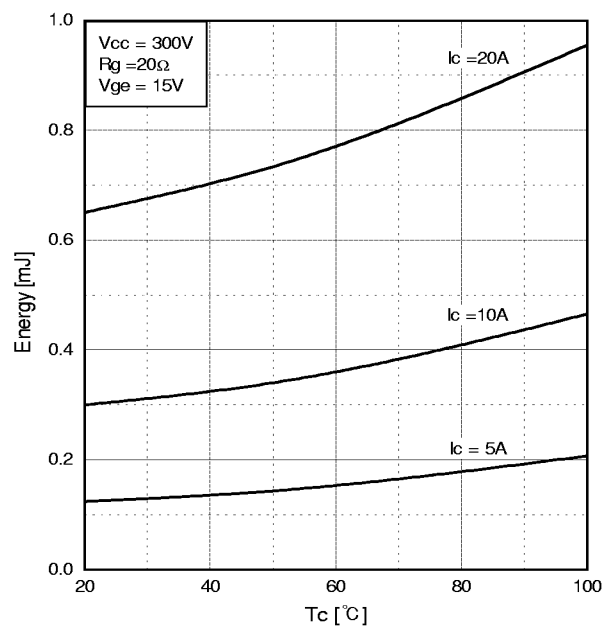
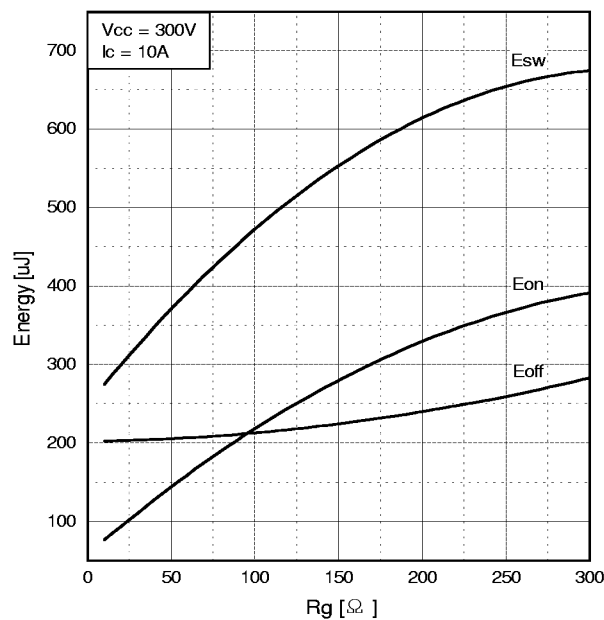


Fig.7 Typical Gate Charge vs. Gate to Emitter Voltage





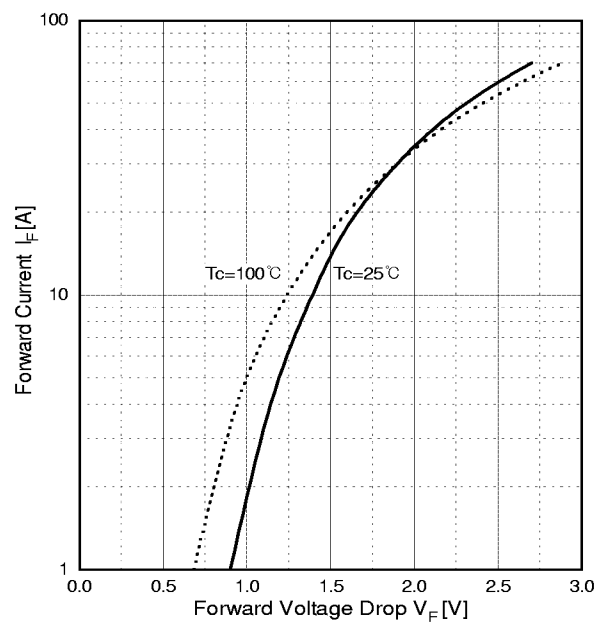


Fig.12 Typical Forward Voltage Drop vs. Forward Current

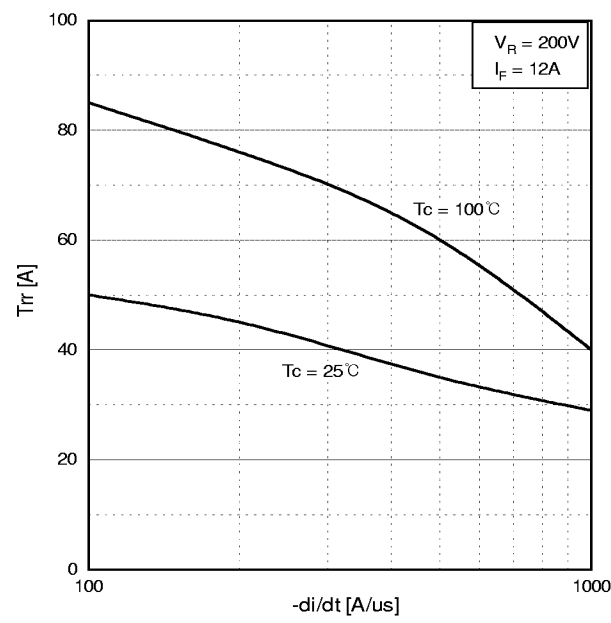


Fig.13 Typical Reverse Recovery Time vs. di/dt

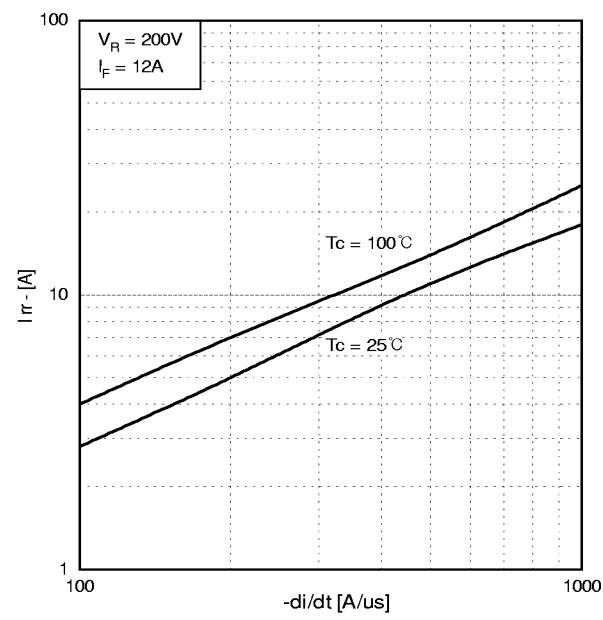


Fig.14 Typical Reverse Recovery Current vs. di/dt

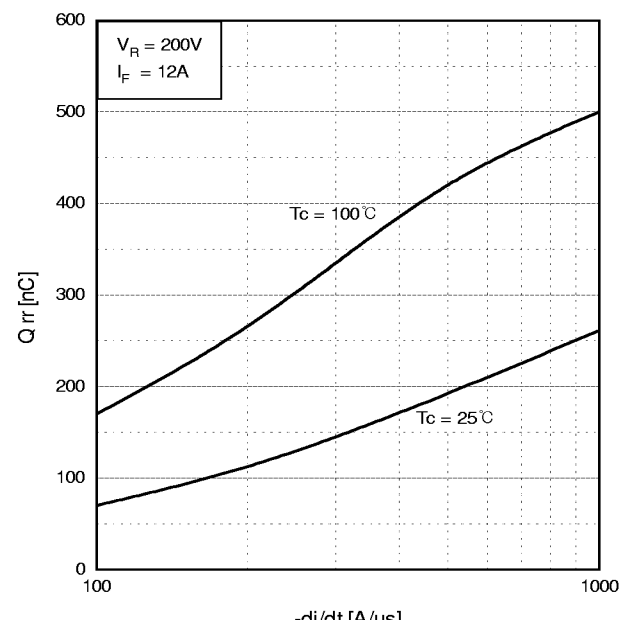


Fig.15 Typical Stored Charge vs. di/dt