DFI200HF12DE2

1200V/200A Half Bridge IGBT Module

Description

- The DFI200HF12DE2 offer lower losses and higher energy for application such as inverter,power supply。

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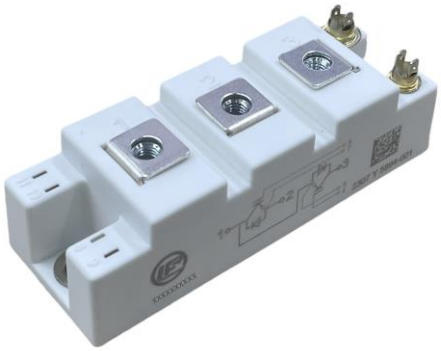

Features

- 1200V 200 A, VCE (sat)(typ.) =1.85V
- Lower losses
- Low saturation voltage $V_{CE\ (sat)}$
- Excellent short-circuit capability
- 34mm half bridge module

Applications

- Motor drive
- Solar inverter Systems
- Power supply
- UPS / EPS

Circuit diagram

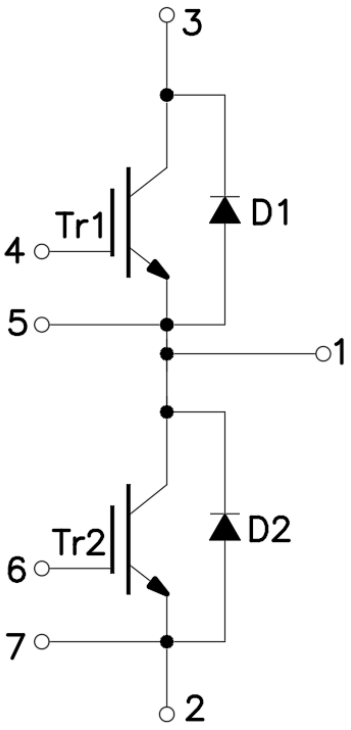

Figure 1. Out drawing & circuit diagram for DFI200HF12DE2

Pin Configuration and Marking Information

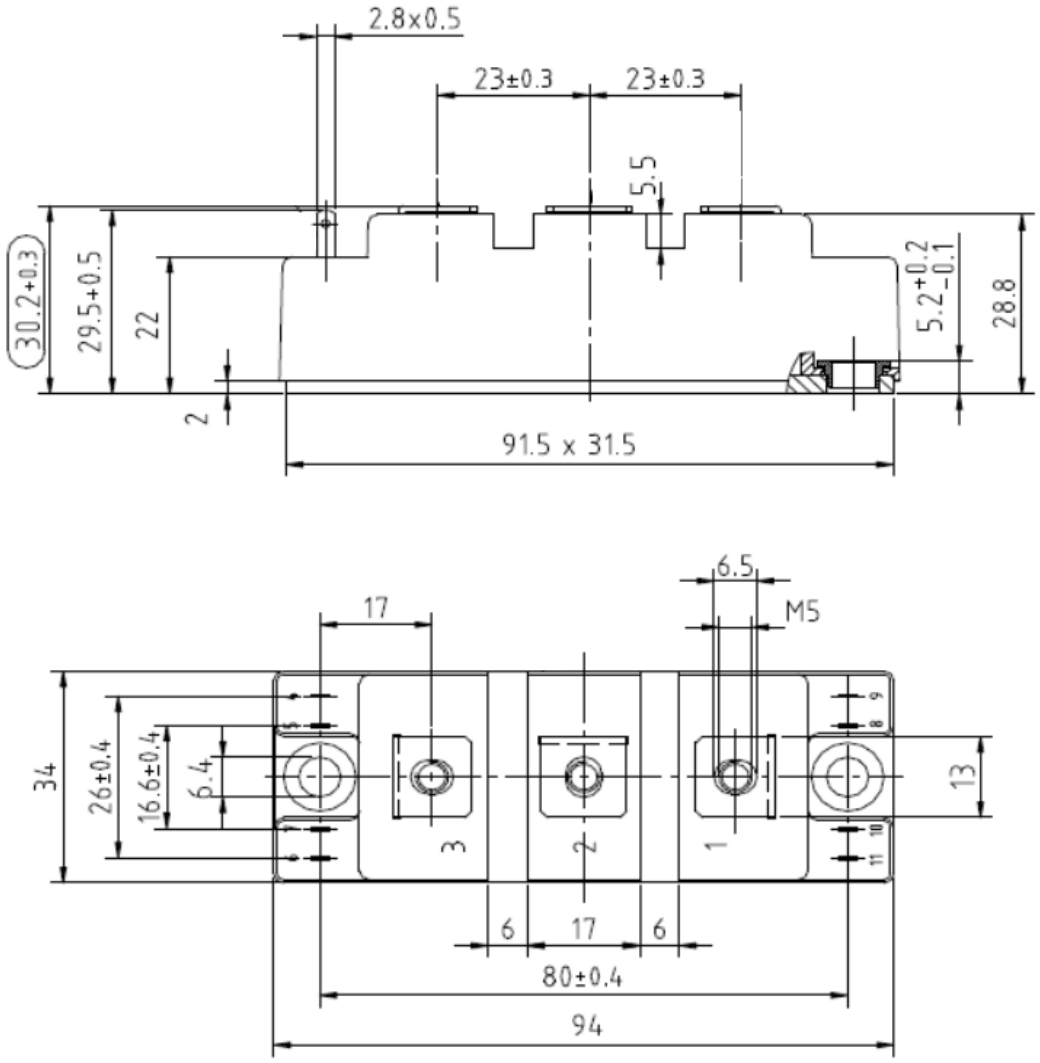

Figure 2. Pin configuration

Module

Parameter	Conditions	Value	Unit
Isolation Voltage	RMS, f = 50Hz, t =1min	2.5	KV
Material of module baseplate	-	Cu	-
Creepage distance	terminal to heatsink terminal to terminal	26 21	mm
Clearance	terminal to heatsink terminal to terminal	23.6 10	mm
CTI	-	>200	-
Module lead resistance, terminals – chip	T_C =25°C	0.8	mΩ
Mounting torque for module mounting	M5, M6	3 to 6	Nm
Weight	-	160	g

Maximum Ratings (IGBT,T_j =25°C unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-Emitter Voltage	G-E Short	1200	V
V_{GES}	Gate-Emitter Voltage	C-E Short	±30V	V
I_C	DC Continuous Collector Current	T_C =100°C	200	A
I_{CM}	Pulse Collector Current	t_p =1ms, Note1	400	A
P_C	Maximum Power Dissipation	T_C =25°C, T_j =150°C(IGBT)	670	W
T_{jop}	junction temperature	-	-40 to 150	°C
T_{stg}	Storage temperature	-	-40 to 150	°C

Note1: Pulse width limited by maximum junction temperature

Maximum Ratings (Freewheeling diode, T_j =25°C unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{RRM}	Peak Repetitive Revers Voltage	-	1200	V
I_F	Diode forward Current	- Tc =100°C	200	A
I_{FRM}	Repetitive peak forward Current	t_p =1ms, Note1	400	A
T_{jop}	junction temperature	-	-40 to 150	°C
T_{stg}	Storage temperature	-	-40 to 150	°C

Note1: Pulse width limited by maximum junction temperature

IGBT Electrical characteristics (T_j =25°C unless otherwise specified, chip)

Symbol	Item	Condition		Value			Unit
				Min.	Typ.	Max	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C =200A, V_{GE} =15V	T_j =25°C	-	1.85	-	V
			T_j =125°C	-	2.10	-	V
$V_{GE(th)}$	Gate-Emitter threshold Voltage	I_C =1mA, V_{CE} =V_{GE}		4.5	5.5	6.5	V
Q_G	Gate charge	V_{GE} = -15V to +15V		-	1100	-	nC
R_{Gint}	Internal gate resistor	f=1M, Vpp=1V	T_j =25°C	-	1	-	Ω
C_{ies}	Input Capacitance	V_{CE} =25V, V_{GE} =0V, f =1MHz	T_j =25°C	-	11.8	-	nF
C_{oes}	Output Capacitance			-	1.65	-	nF
C_{res}	Reverse transfer Capacitance			-	0.94	-	nF
I_{CES}	Collector- Emitter Cut off Current	V_{CE} =1200V, V_{GE} =0V	T_j =25°C	-	-	200	uA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±30V, V_{CE} =0V	T_j =25°C	-	-	2	uA
$t_{d(on)}$	Turn-on delay time	V_{CC} = 600V, I_C = 200A, R_G = 1.0Ω, V_{GE} =+15V/-8V, Inductive Load	T_j =25°C	-	150	-	ns
			T_j =125°C	-	184	-	
t_r	Rise time		T_j =25°C	-	54	-	ns
			T_j =125°C	-	57	-	
$t_{d(off)}$	Turn-off delay time		T_j =25°C	-	410	-	ns
			T_j =125°C	-	460	-	

t_f	Fall time	V_{CC} = 600V I_C = 200A R_G = 1.0Ω V_{GE} =+15V/-8V Inductive Load	T_j =25°C	-	100	-	ns
			T_j=125°C	-	168	-	
E_{on}	Turn-on power dissipation		T_j =25°C	-	28.2	-	mJ
			T_j =125°C	-	40.5	-	
E_{off}	Turn-off power dissipation		T_j =25°C	-	15.1	-	mJ
			T_j =125°C	-	20.7	-	
$R_{th(j-c)}$	Thermal Resistance, Junction to Case (IGBT)			-	0.2	-	°C/W

Freewheeling Diode Electrical characteristics (T_j =25°C unless otherwise specified, chip)

Symbol	Item	Condition		Value			Unit
				Min.	Typ.	Max	
V_F	Diode Forward Voltage	I_F =200A, V_{GE} =0V	T_j =25°C	-	1.89	-	V
			T_j =125°C	-	2.04	-	
t_{rr}	Diode Reverse Recovery Time	I_F=200A, di/dt= 2600A/μs, V_R=600V, V_{GE} = -15V	T_j =25°C		145	-	nS
			T_j =125°C		200	-	
I_{rr}	Peak reverse recovery Current		T_j =25°C	-	150	-	A
			T_j =125°C	-	190	-	
Q_{rr}	Recovered charge		T_j=25°C	-	14.50	-	uC
			T_j =125°C	-	21.00	-	
E_{rr}	Reverse recovered energy		T_j =25°C	-	4.5	-	mJ
			T_j =125°C	-	7.4	-	
$R_{th(j-c)}$	Thermal Resistance, Junction to Case (Diode)			-	0.30	-	°C/W

Test Conditions

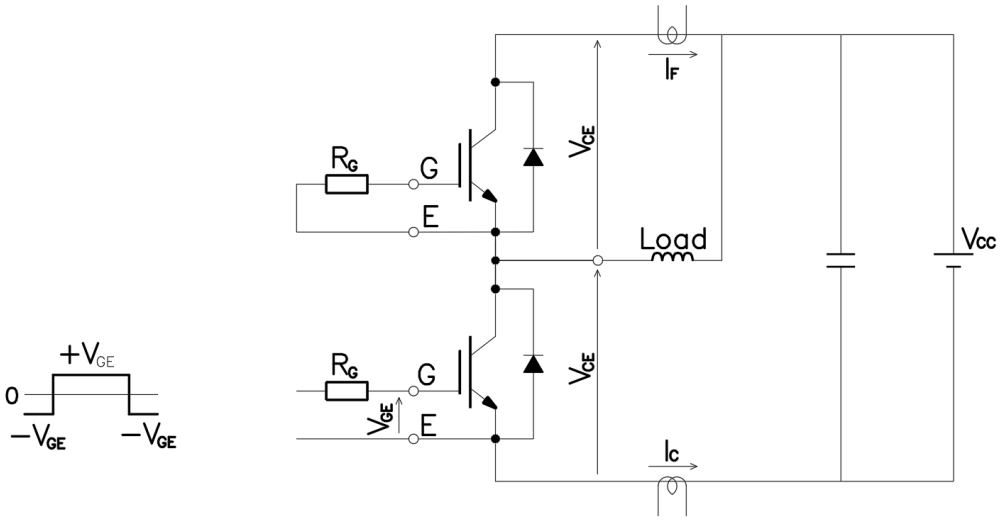

Figure 3. Switching time measure circuit

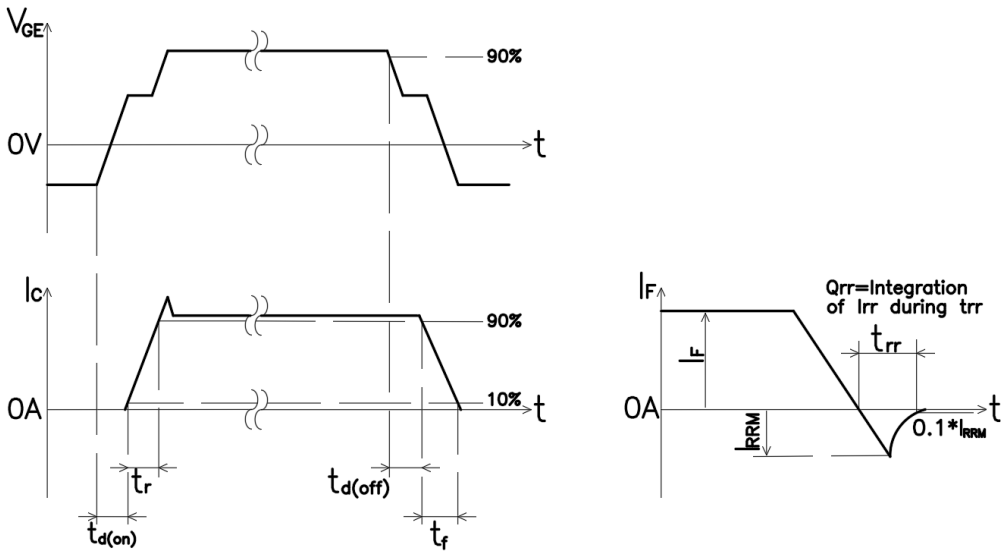

Figure 4. Switching time definition

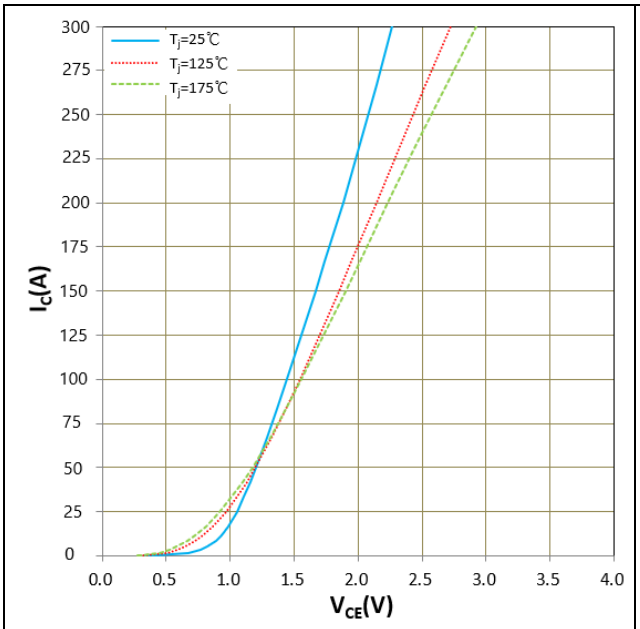

Figure 5. Ic vs V_{CE}
V_{GE} =15V

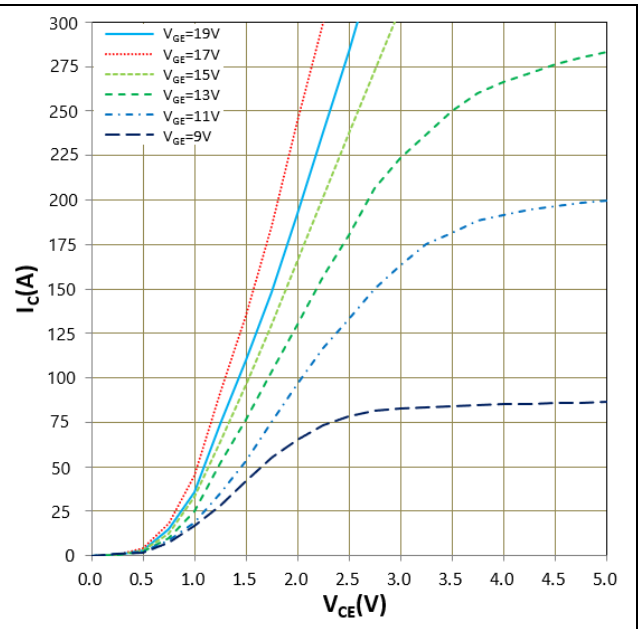

Figure 6. Ic vs V_{CE}
T_j =175°C

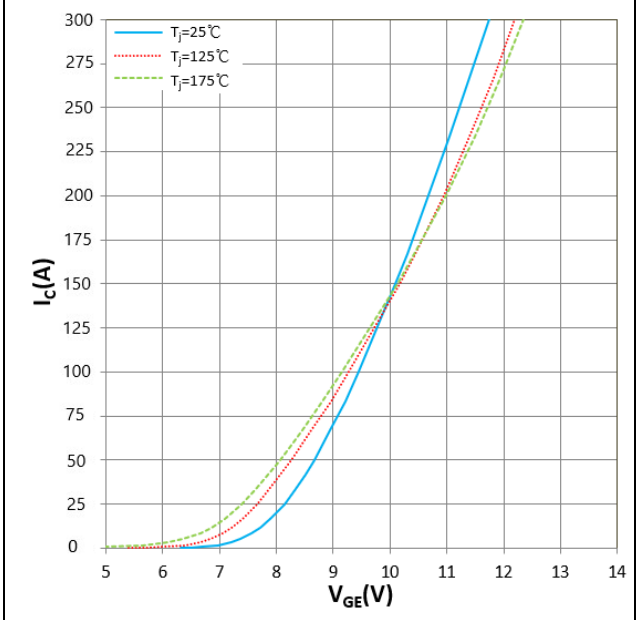

Figure 7. Ic vs V_{GE}
V_{CE} =20V

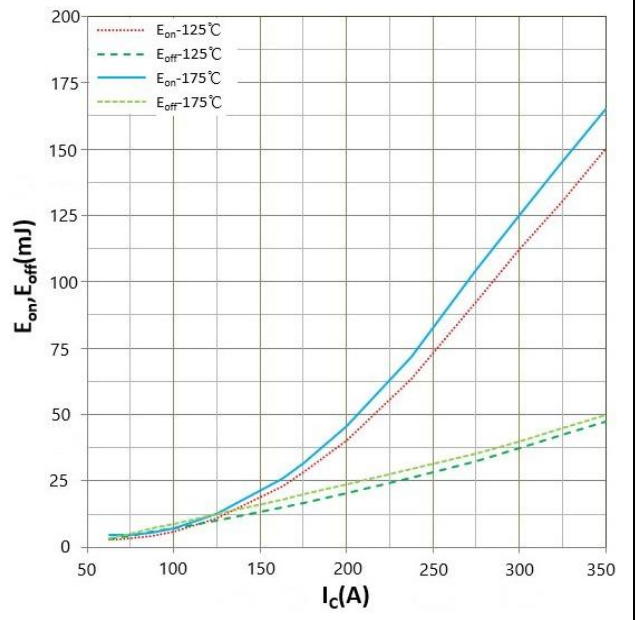

Figure8. E_{on}, E_{off} vs Ic(Typ)
V_{CC} =600V, V_{GE} =+15V/-8V, R_{GON} = R_{GOFF} =1.0Ω

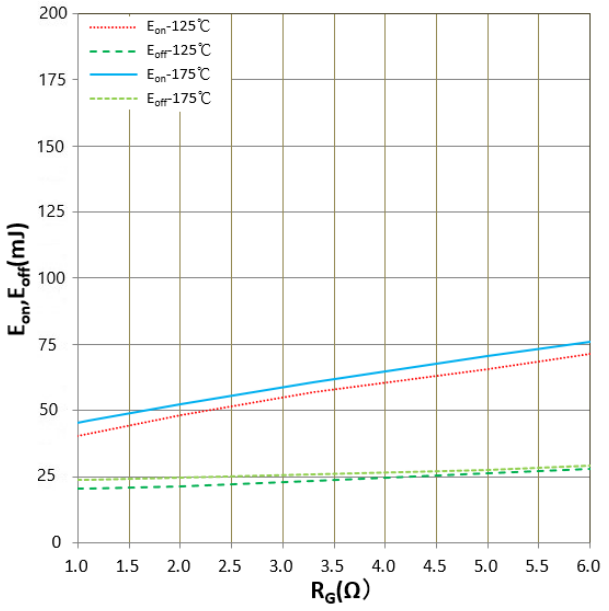

Figure 9. E_{on}, E_{off} vs R_g(Typ)
V_{CC} =600V, V_{GE} =+15V/-8V, I_C =200A

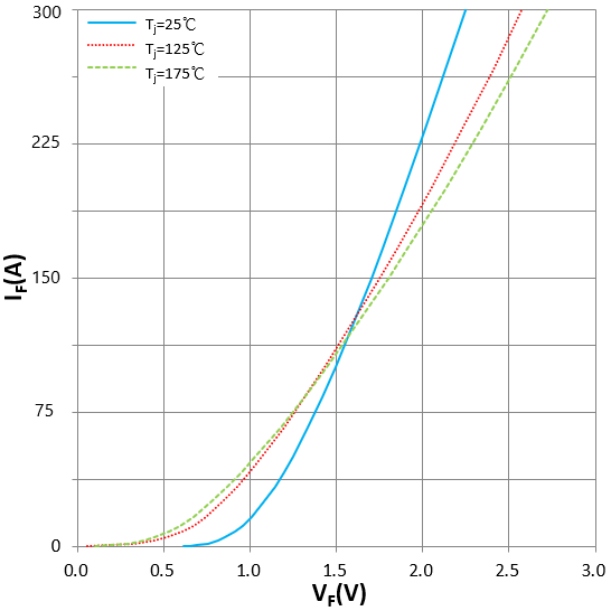

Figure 10. Forward characteristic of Diode ，
I_F=f(V_F)

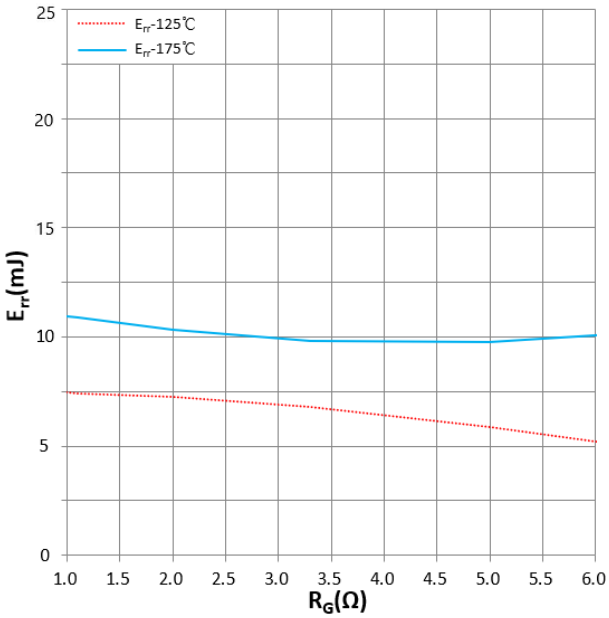

Figure 11. Switching losses Diode,
V_{CC} =600V, V_{GE} =+15V/-8V, I_F =200A

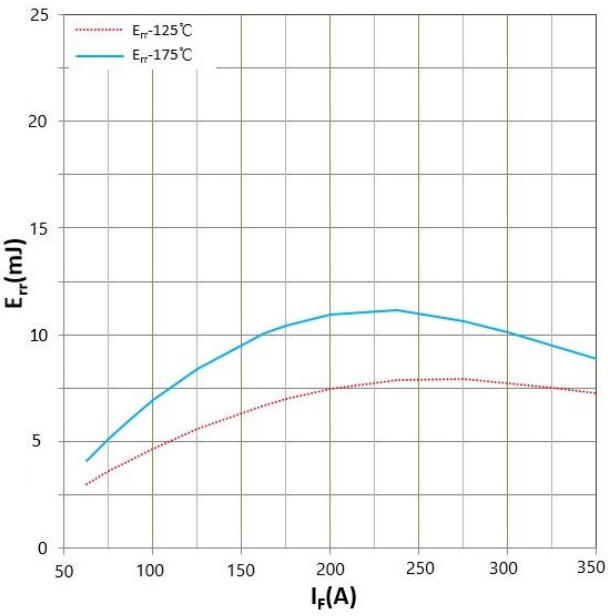

Figure 12. Switching losses Diode,
V_{CC} =600V, V_{GE} =+15V/-8V, R_{GON} = R_{GOFF} =1.0Ω

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The data contained in this document is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the product's suitability for the intended application and the completeness of the product data concerning such application.

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