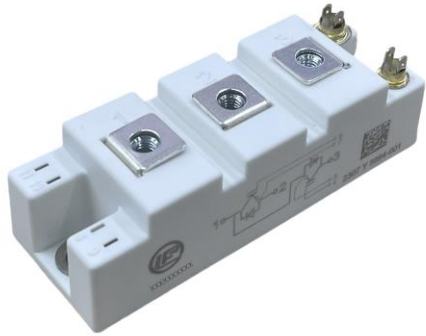


Description

The DFI200HF07DE1 offer ultrafast switching speed for high frequency application.



Features

- 650V200 A, $V_{CE(sat)}(typ.) = 1.9V$
- Low inductive design
- Lower losses and higher energy
- 34mm half bridge module

Applications

- Welder
- Inverter
- Solar
- Inductive heating
- UPS EPS

Circuit diagram

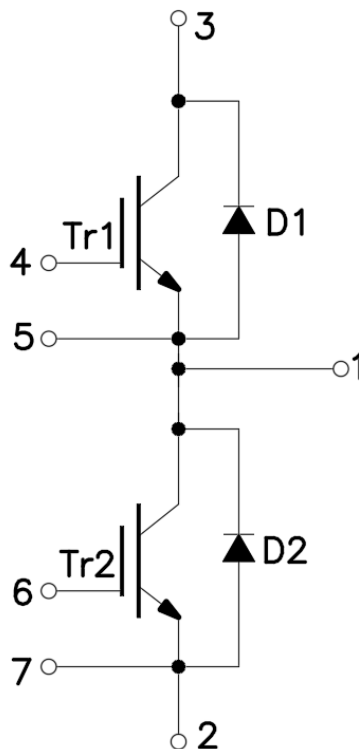


Figure 1. Out drawing & circuit diagram for DFI200HF07DE1

Pin Configuration and Marking Information

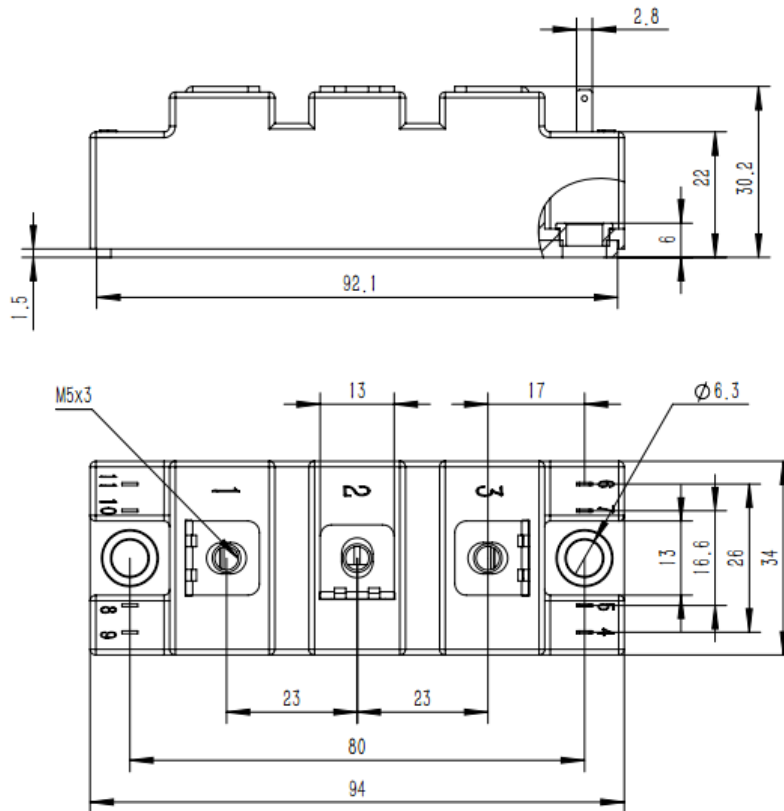


Figure 2. Pin configuration

Module

Parameter	Conditions	Value	Unit
Isolation Voltage	RMS, f = 50Hz, t = 1 min	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, $T_j=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-Emitter Voltage	G-E Short	650	V
V_{GES}	Gate-Emitter Voltage	C-E Short	$\pm 30\text{V}$	V
I_C	DC Continuous Collector Current	$T_C=100^\circ\text{C}$	200	A
I_{CM}	Pulse Collector Current	$t_p=1\text{ms}$, Note1	300	A
P_C	Maximum Power Dissipation	$T_C=25^\circ\text{C}$, $T_j=150^\circ\text{C}$ (IGBT)	490	W
T_j	junction temperature	-	-40 to 150	$^\circ\text{C}$
T_{stg}	Storage temperature	-	-40 to 150	$^\circ\text{C}$

Note1: Pulse width limited by maximum junction temperature

Maximum Ratings (Freewheeling diode, $T_j=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V_{RRM}	Peak Repetitive Revers Voltage	-	650	V
I_F	Diode forward Current	$T_C=100^\circ\text{C}$	200	A
I_{FRM}	Repetitive peak forward Current	$t_p=1\text{ms}$, Note1	300	A
T_j	junction temperature	-	-40 to 150	$^\circ\text{C}$
T_{stg}	Storage temperature	-	-40 to 150	$^\circ\text{C}$

Note1: Pulse width limited by maximum junction temperature

IGBT Electrical characteristics ($T_j=25^\circ\text{C}$ unless otherwise specified, chip)

Symbol	Item	Condition		Value			Unit	
				Min.	Typ.	Max		
$V_{CE(sat)}$ (Chip)	Collector-Emitter Saturation Voltage	$I_C=200\text{A}$ $V_{GE}=15\text{V}$	$T_j=25^\circ\text{C}$	-	1.90	2.10	V	
			$T_j=125^\circ\text{C}$	-	2.10	-	V	
$V_{GE(th)}$	Gate-Emitter threshold Voltage	$I_C=1\text{mA}$, $V_{CE}=V_{GE}$		5.0	-	6.0	V	
Q_G	Gate charge	$V_{GE}=-15\text{V}$ to $+15\text{V}$		-	0.93	-	μC	
R_{Gint}	Internal gate resistor	$f=1\text{M}$, $V_{pp}=1\text{V}$	$T_j=25^\circ\text{C}$	-	6.2	-	Ω	
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$ $f=1\text{MHz}$	$T_j=25^\circ\text{C}$	-	8.00	-	nF	
C_{oes}	Output Capacitance			-	1.50	-	nF	
C_{res}	Reverse transfer Capacitance			-	0.5	-	nF	
I_{CES}	Collector- Emitter Cut off Current	$V_{CE}=600\text{V}$, $V_{GE}=0\text{V}$		-	-	1	mA	
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=30\text{V}$, $V_{CE}=0\text{V}$		-	-	400	nA	
$t_{d(on)}$	Turn-on delay time	$V_{CC}=300\text{V}$ $I_C=200\text{A}$	$T_j=25^\circ\text{C}$	-	150	-	ns	
			$T_j=125^\circ\text{C}$	-	160	-	ns	
t_r	Rise time	$V_{GE}=+15\text{V}/-15\text{V}$ $R_G=2\Omega$	$T_j=25^\circ\text{C}$	-	65	-	ns	
			$T_j=125^\circ\text{C}$	-	60	-	ns	
$t_{d(off)}$	Turn-off delay time	Inductive load		$T_j=25^\circ\text{C}$	-	215	-	ns

		$V_{CC}=300V$ $I_C=200A$ $V_{GE}=+15V/-15V$ $R_G=2\Omega$ Inductive load	$T_j=125^\circ C$	-	230	-	ns
t_f	Fall time		$T_j=25^\circ C$	-	60	-	ns
			$T_j=125^\circ C$	-	65	-	ns
E_{on}	Turn-on power dissipation		$T_j=25^\circ C$	-	1.4	-	mJ
			$T_j=125^\circ C$	-	2.4	-	mJ
E_{off}	Turn-off power dissipation		$T_j=25^\circ C$	-	5.2	-	mJ
		$T_j=125^\circ C$	-	5.5	-	mJ	
$R_{th(j-c)}$	Thermal Resistance, Junction to Case (IGBT)		-	-	0.305	$^\circ C/W$	

Freewheeling Diode Electrical characteristics ($T_j=25^\circ C$ unless otherwise specified, chip)

Symbol	Item	Condition	Value			Unit	
			Min.	Typ.	Max		
V_F	Diode Forward Voltage	$I_F=200A, V_{GE}=0V$	$T_j=25^\circ C$	-	1.6	2.0	V
			$T_j=125^\circ C$	-	1.4	-	
I_{rr}	Peak reverse recovery Current		$T_j=25^\circ C$	-	95	-	A
			$T_j=125^\circ C$	-	135	-	A
Q_{rr}	Recovered charge	$V_{rr}=300V, I_F=200A$ $di/dt=2800A/\mu s$	$T_j=25^\circ C$	-	4.4	-	μC
			$T_j=125^\circ C$	-	10	-	μC
E_{rr}	Reverse recovered energy		$T_j=25^\circ C$	-	1.5	-	mJ
			$T_j=125^\circ C$	-	3.1	-	mJ
$R_{th(j-c)}$	Thermal Resistance, Junction to Case (Diode)		-		0.385	$^\circ C/W$	

Test Conditions

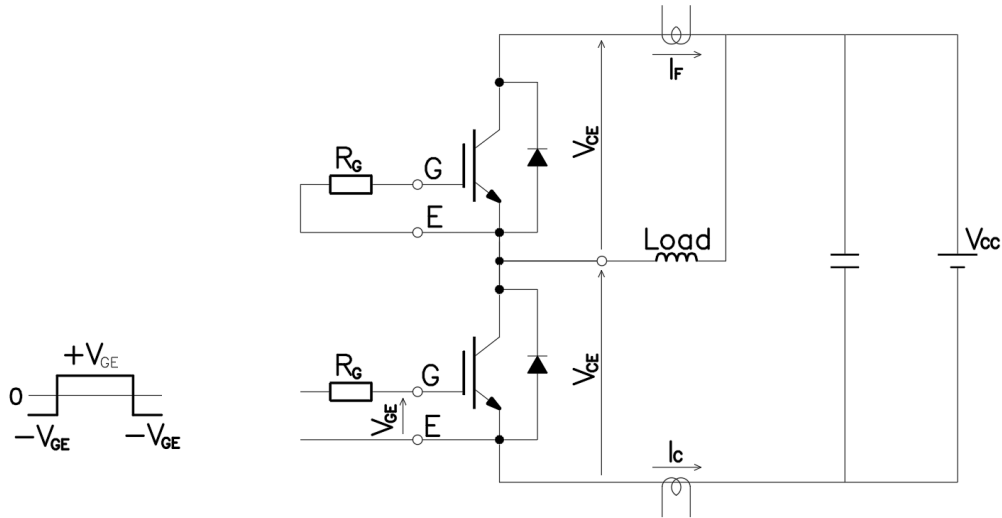


Figure 3. Switching time measure circuit

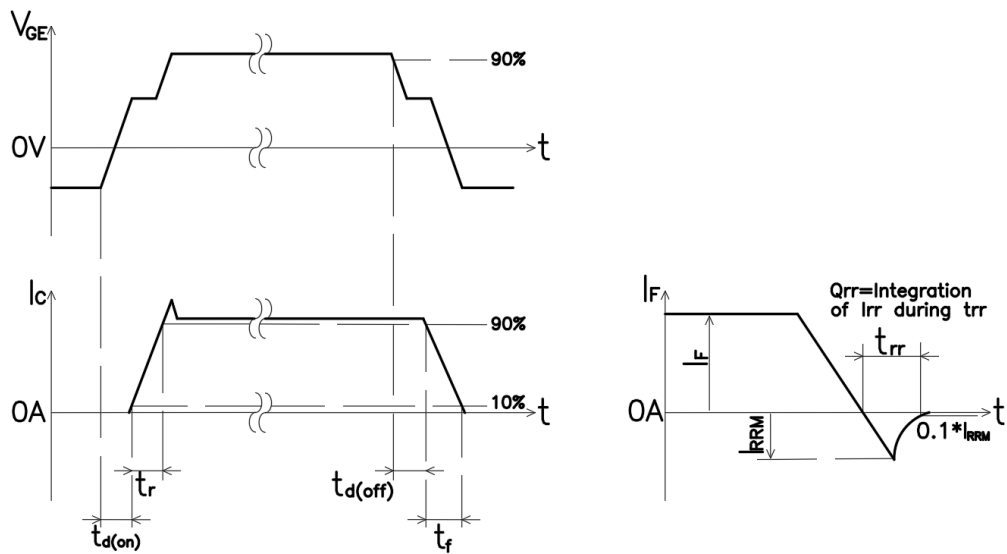


Figure 4. Switching time definition

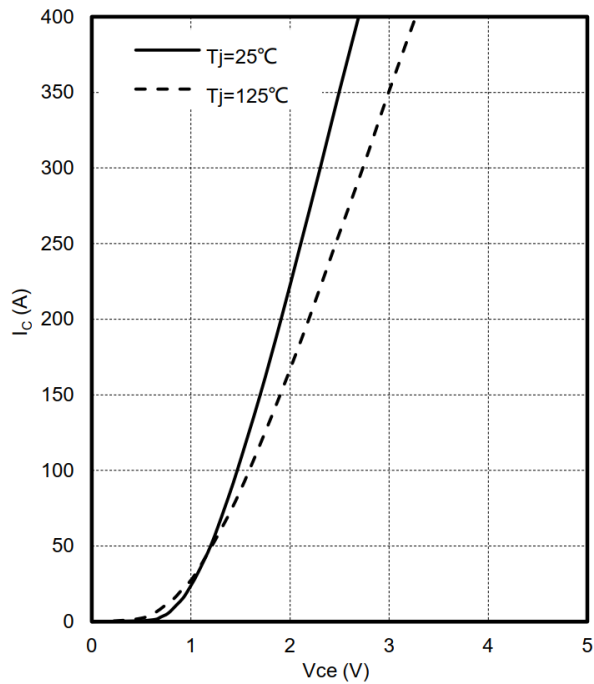


Figure 5. I_c vs V_{ce}
 $V_{GE} = 15\text{V}$

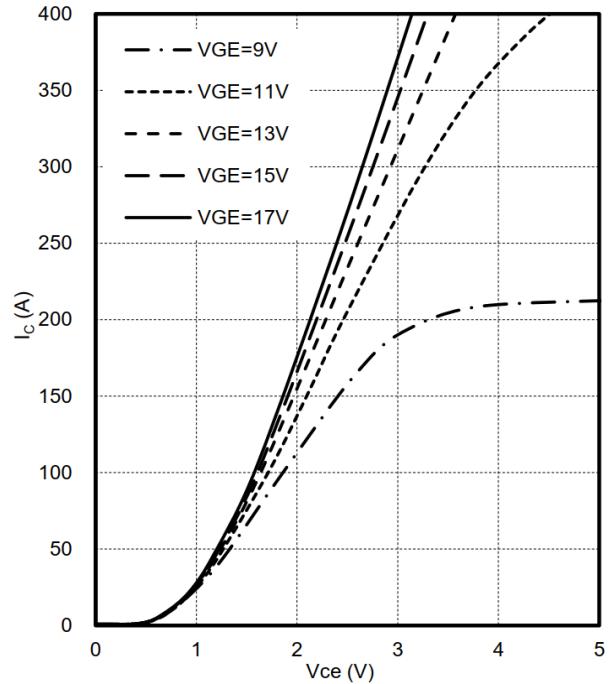


Figure 6. I_c vs V_{ce}
 $T_j = 125^\circ\text{C}$

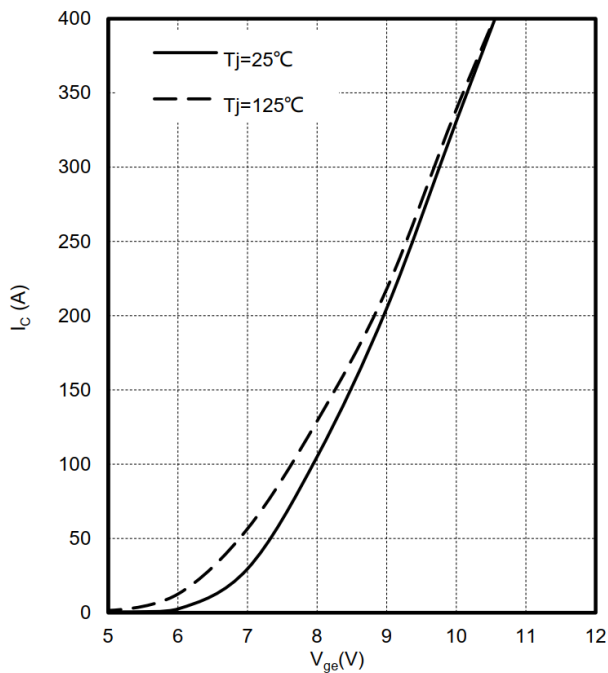


Figure 7. I_c vs V_{GE}
 $V_{CE} = 20\text{V}$

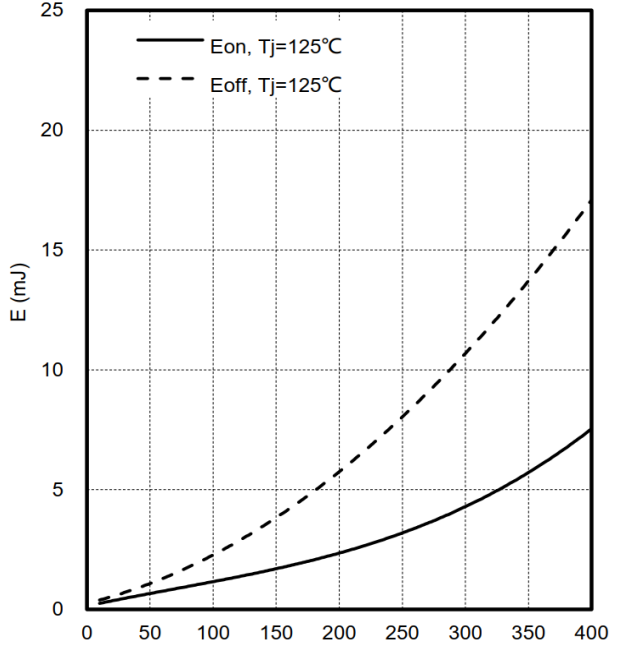


Figure 8. E_{on} , E_{off} vs I_c (Typ)
 $V_{CC} = 300\text{V}$, $V_{GE} = +15\text{V}/-15\text{V}$, $R_G = 2\Omega$

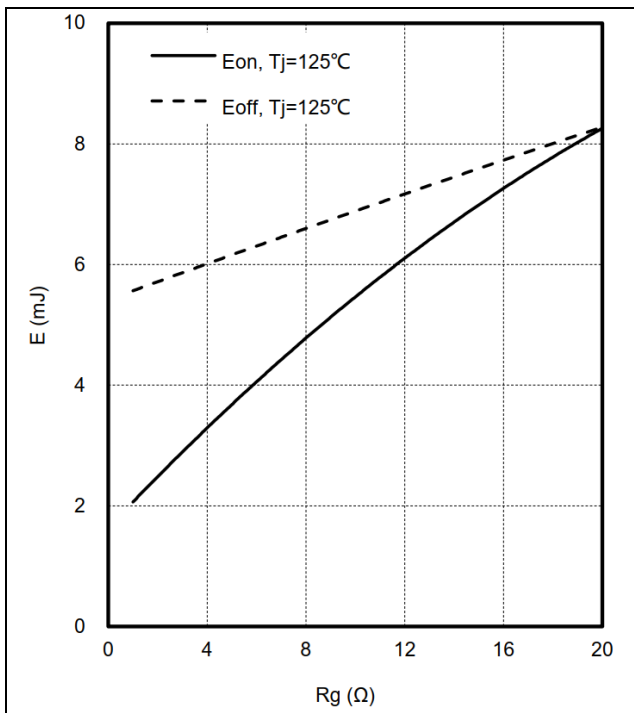


Figure 9. E_{on} , E_{off} vs R_g (Typ)
 $V_{CC}=300V$, $V_{GE}=+15V/-15V$, $I_C=200A$

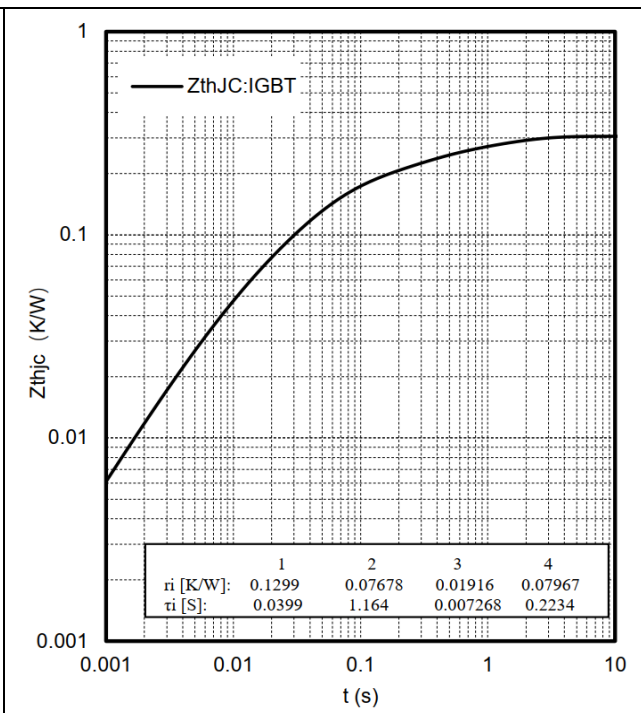


Figure 10. Transient thermal impedance IGBT ,
 $Z_{thjc}=f(t)$

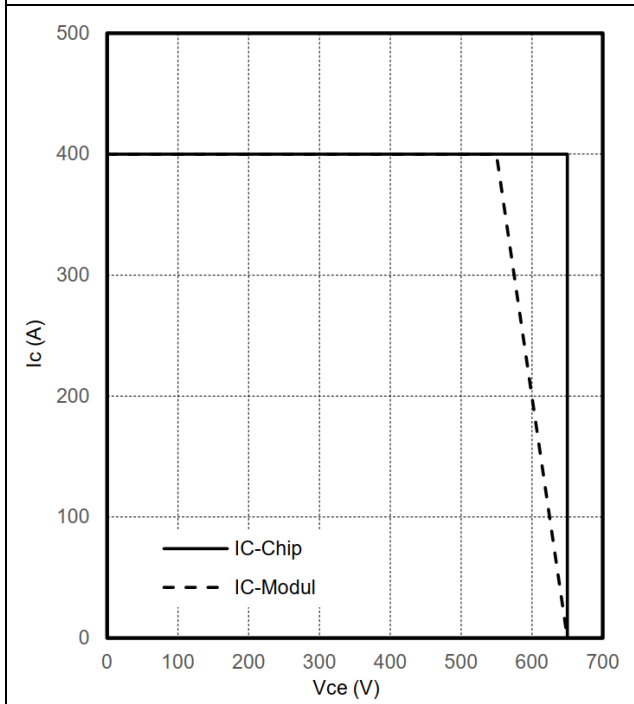


Figure 11. Reverse bias safe operating area IGBT,
 $I_C=f(V_{CE})$, $V_{GE}=\pm 15V$, $R_{Goff}=2\Omega$, $T_{vj}=125^\circ C$

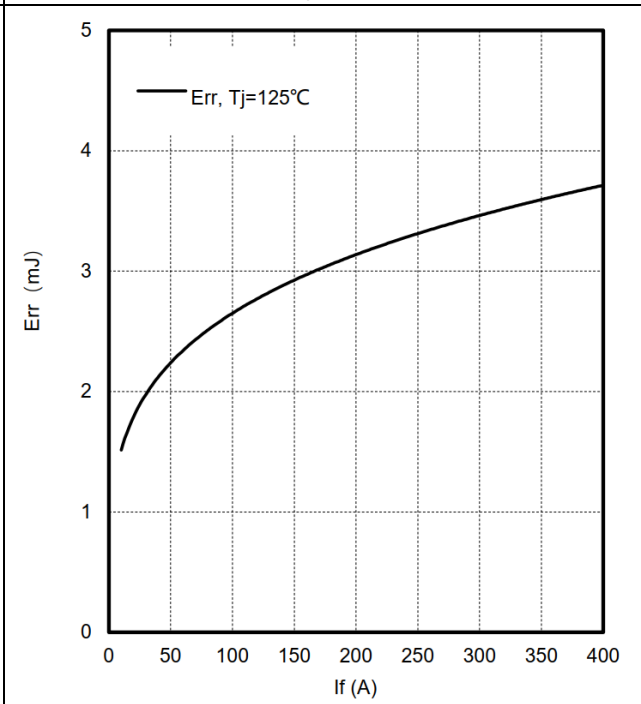


Figure 12. E_{rr} vs I_f (Typ)
 $V_{CC}=300V$, $V_{GE}=+15V/-15V$, $R_G=2\Omega$

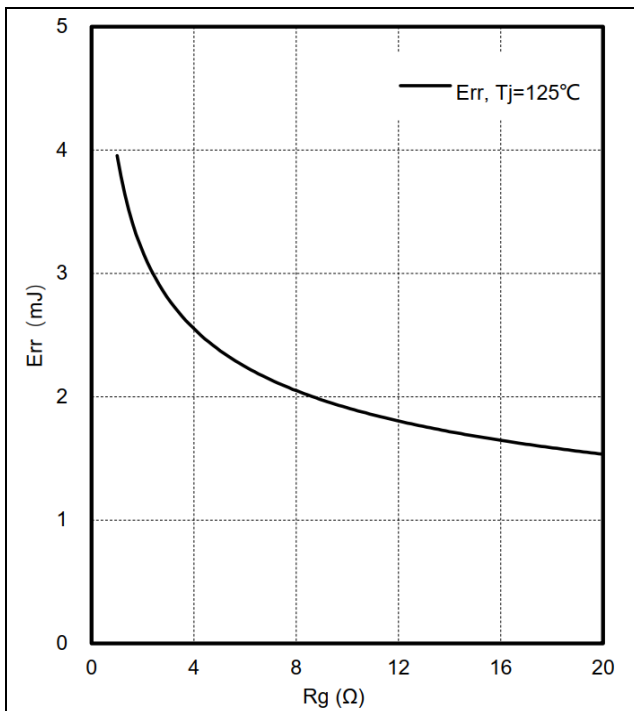


Figure 13. Err vs R_G(Typ)
 $V_{CC}=300V, V_{GE}=+15V/-15V, I_F=200A$

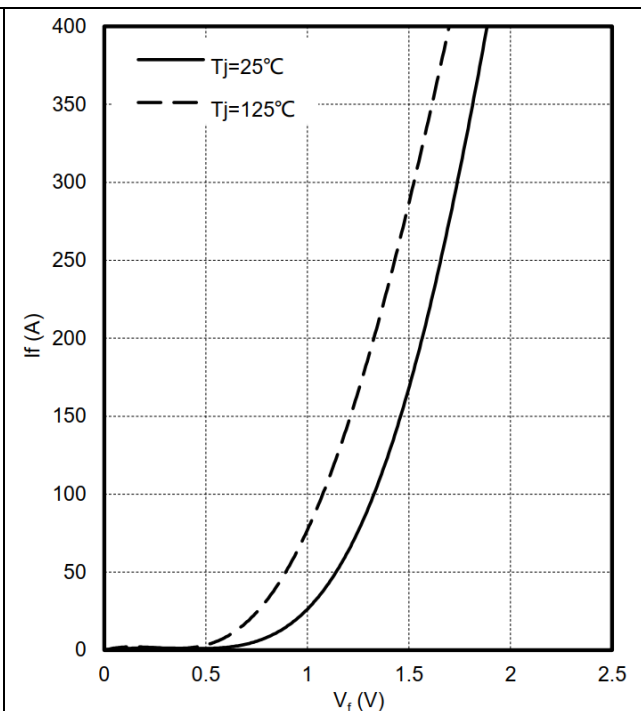


Figure 14. forward characteristic of Diode ,
 $I_F=f(V_F)$

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