

HCG150FH120A21

1200V/150A Half Bridge IGBT Module

Description

The HCG150FH120A21 offer ultrafast switching speed for high frequency application.



Features

- 1200V150A, $V_{CE(sat)}(typ.) = 3.0V$
- Ultrafast switching speed
- Excellent short circuit ruggedness
- 62 mm half bridge module

Applications

- Welder
- Inverter
- Power supply
- Inductiveheating
- UPS EPS

Circuit diagram

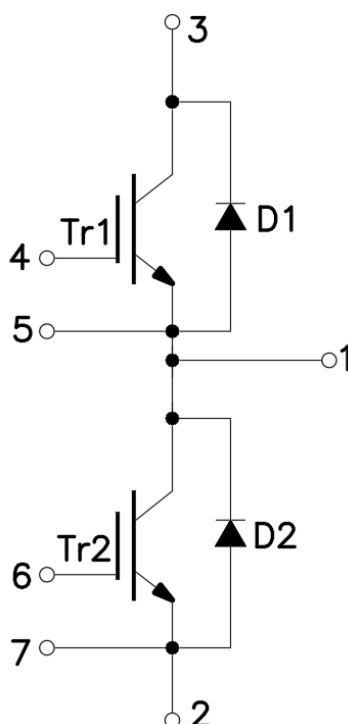


Figure 1. Out drawing & circuit diagram for HCG150FH120A21

HCG150FH120A21

1200V/150A Half Bridge IGBT Module

Pin Configuration and Marking Information

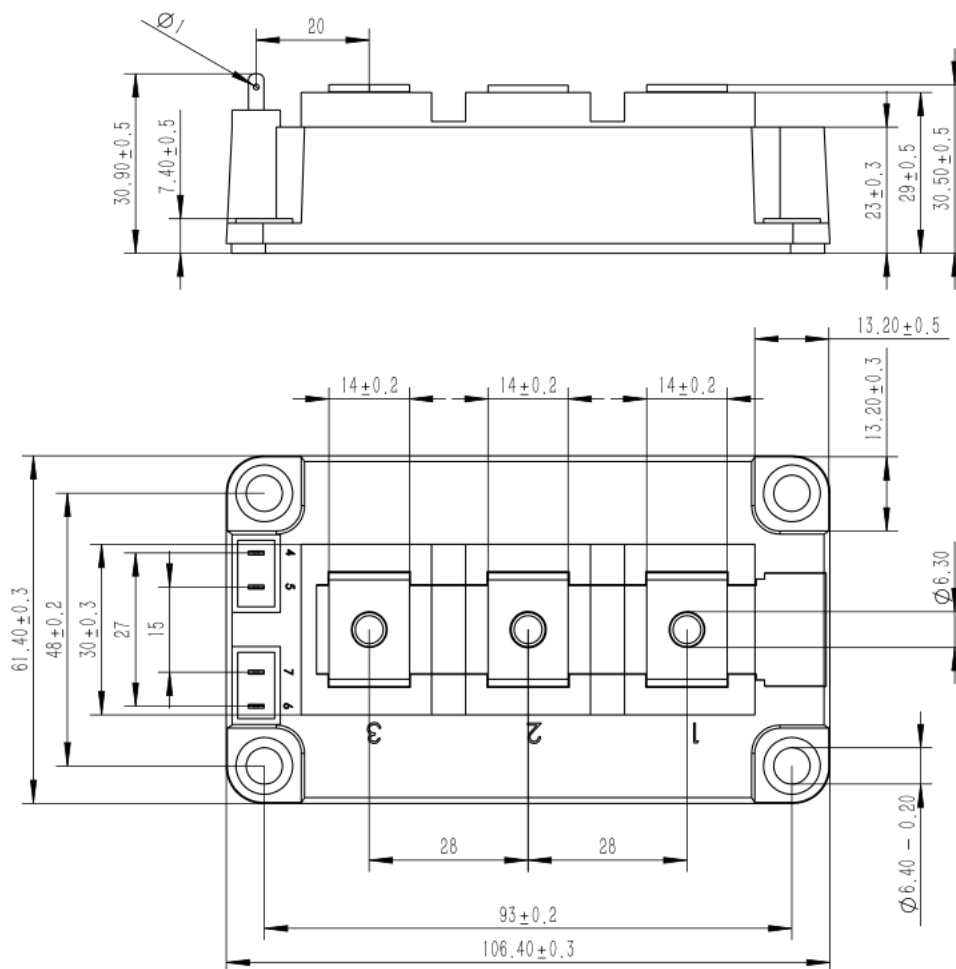


Figure 2. Pin configuration

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	47 26	mm
Clearance	terminal to heatsink terminal to terminal	29 14	mm
CTI	-	>200	-
Module lead resistance, terminals – chip	T _C =25°C	0.8	mΩ
Mounting torque for module mounting	M6	3 to 6	Nm
Weight	-	315	g

HCG150FH120A21

1200V/150A Half Bridge IGBT Module

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	1200	V
V_{GES}	Gate-Emitter Voltage	C-E Short	$\pm 30\text{V}$	V
I_C	DC Continuous Collector Current	$T_C=100^{\circ}\text{C}$	150	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)	740	W
T_j	junction temperature	-	-40 to 150	$^{\circ}\text{C}$
T_{stg}	Storage temperature	-	-40 to 125	$^{\circ}\text{C}$

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	-	1200	V
I_F	Diode forward Current	$T_C=100^{\circ}\text{C}$	150	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 125	$^{\circ}\text{C}$

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	$I_C=150A$	$T_j=25^{\circ}C$	-	3.00	3.20	V
	Voltage	$V_{GE}=15V$	$T_j=125^{\circ}C$	-	3.60	-	V
$V_{GE(th)}$	Gate-Emitter threshold Voltage	$I_C=1mA, V_{CE}=V_{GE}$		4.5	-	5.7	V
Q_G	Gate charge	$V_{GE} = -15V$ to $+15V$		-	1.3	-	μC
R_{Gint}	Internal gate resistor	$f=1M, V_{pp}=1V$	$T_j=25^{\circ}C$	-	1.3	-	Ω
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V$	$T_j=25^{\circ}C$	-	13.0	-	nF
C_{oes}	Output Capacitance	$f=1MHz$		-	1.80	-	nF
C_{res}	Reverse transfer Capacitance			-	1.05	-	nF
I_{CES}	Collector- Emitter Cut off Current	$V_{CE}=1200V, V_{GE}=0V$	$T_j=25^{\circ}C$	-	-	5	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE} = 30V, V_{CE}=0V$	$T_j=25^{\circ}C$	-	-	400	nA
$t_{d(on)}$	Turn-on delay time		$T_j=25^{\circ}C$	-	40	-	ns
			$T_j=125^{\circ}C$	-	45	-	
t_r	Rise time		$T_j=25^{\circ}C$	-	65	-	ns
			$T_j=125^{\circ}C$	-	70	-	
$t_{d(off)}$	Turn-off delay time		$T_j=25^{\circ}C$	-	500	-	ns
			$T_j=125^{\circ}C$	-	535	-	

HCG150FH120A21

1200V/150A Half Bridge IGBT Module

t _f	Fall time	V _{CC} =600V	T _j =25°C	-	100	-	ns
			T _j =125°C	-	130	-	
E _{on}	Turn-on power dissipation	I _C = 150A V _{GE} =+15V/-15V	T _j =25°C	-	6.0	-	mJ
			T _j =125°C	-	7.4	-	
E _{off}	Turn-off power dissipation	R _G =6.8Ω Inductive load	T _j =25°C	-	3.4	-	mJ
			T _j =125°C	-	8.0	-	
R _{th(j-c)}	Thermal Resistance, Junction to Case (IGBT)			-		0.169	°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 =150A, V _{GE} =0V	T _j =25°C	-	1. 9	2. 2	V
			T _j =125°C	-	1. 9	-	
t _{rr}	Reverse recovery time	V _{rr} =600V, I _F =150A di/dt=2240A/μs	T _j =25°C	-	130	-	ns
			T _j =125°C	-	220	-	
I _{rr}	Peak reverse recovery Current		T _j =25°C	-	135	-	A
			T _j =125°C	-	170	-	
Q _{rr}	Recovered charge		T _j =25°C	-	11.00	-	nC
			T _j =125°C	-	18.50	-	
E _{rr}	Reverse recovered energy		T _j =25°C	-	3.40	-	mJ
			T _j =125°C	-	6.60	-	
R _{th(j-c)}	Thermal Resistance, Junction to Case (Diode)			-		0.175	°C/W

HCG150FH120A21

1200V/150A Half Bridge IGBT Module

Test Conditions

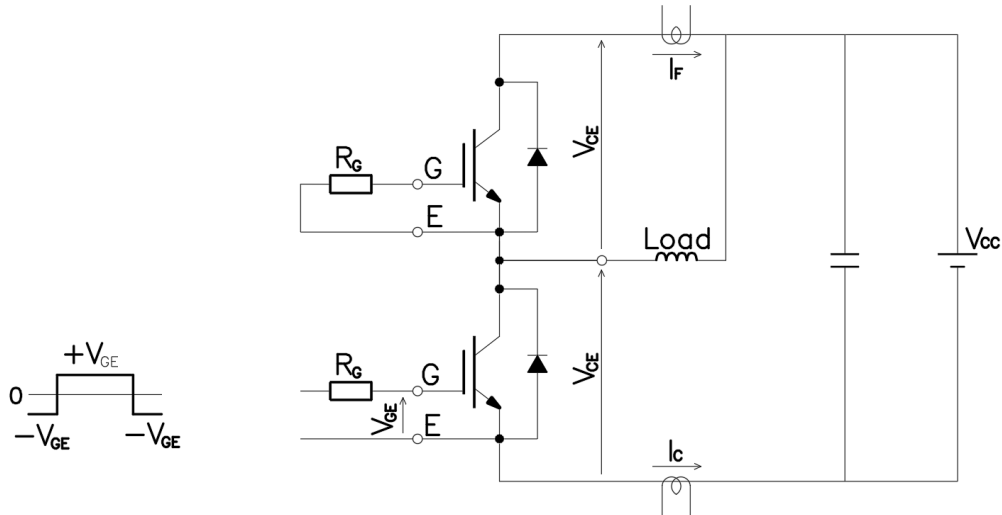


Figure 3. Switching time measure circuit

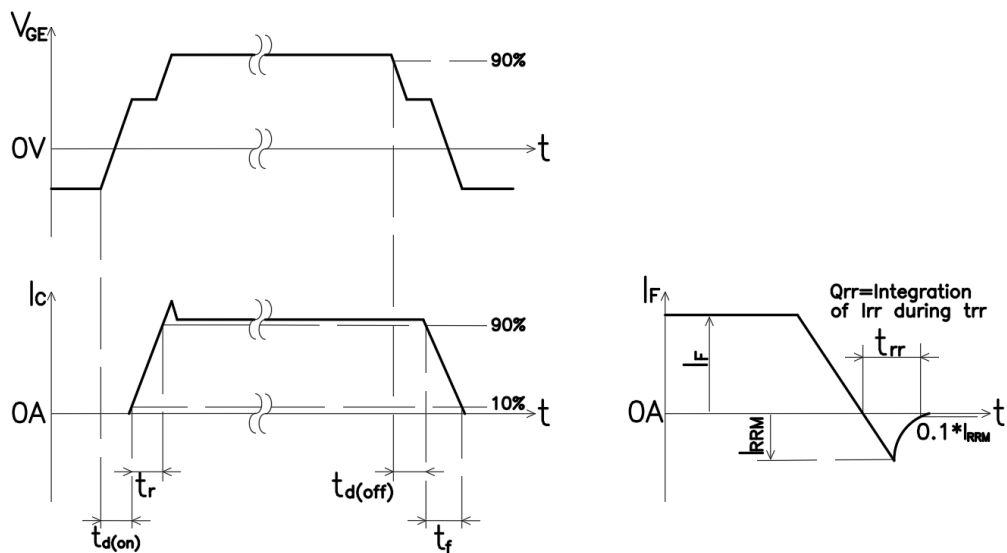
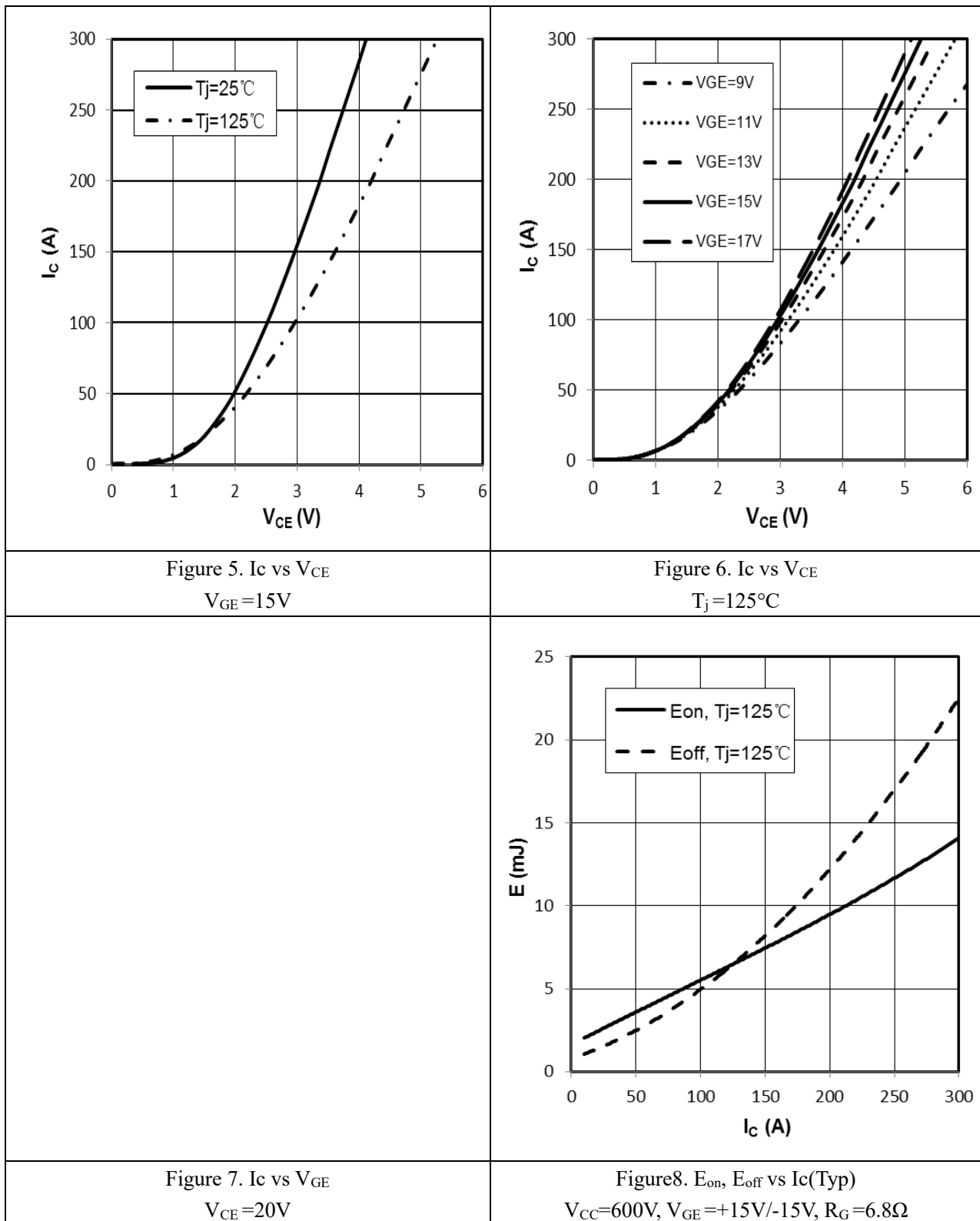


Figure 4. Switching time definition

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1200V/150A Half Bridge IGBT Module

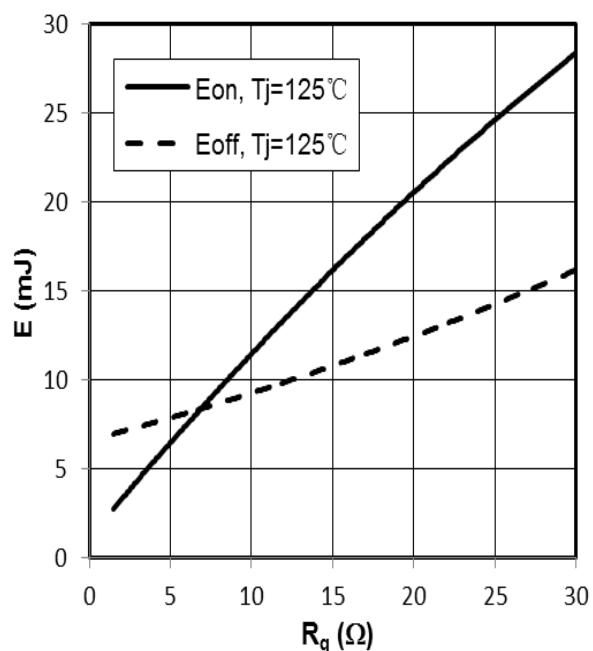


Figure 9. E_{on} , E_{off} vs R_g (Typ)
 $V_{CC}=600V$, $V_{GE}=+15V/-15V$, $I_C=150A$

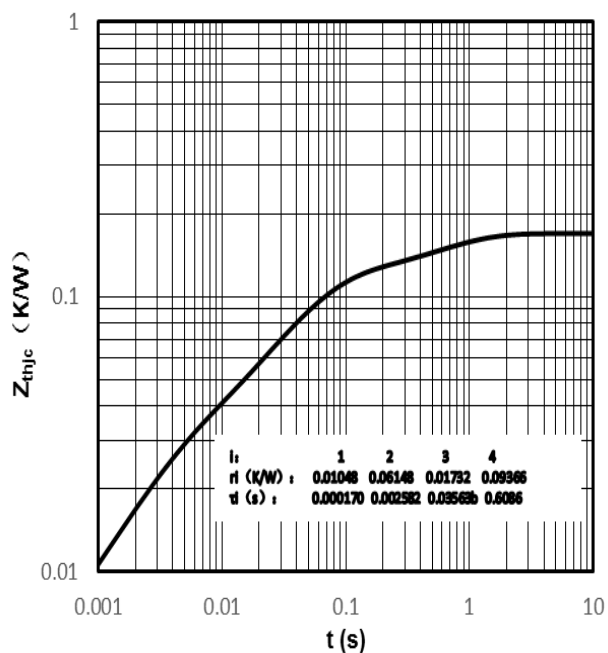


Figure 10. Transient thermal impedance IGBT ,
 $Z_{thjc}=f(t)$

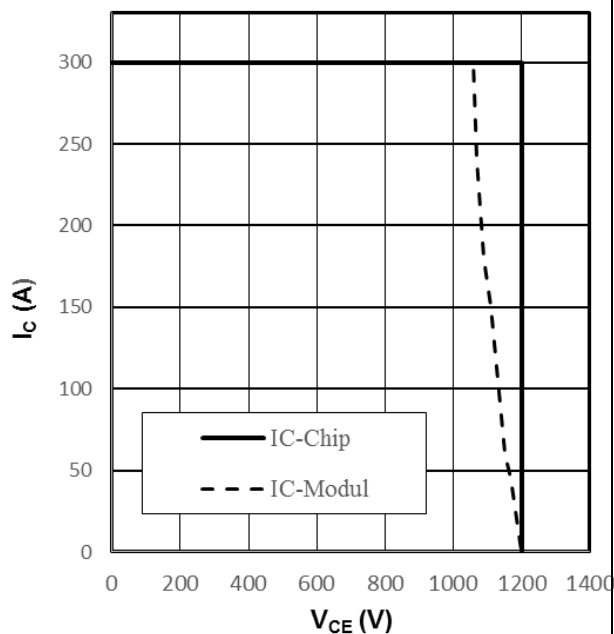


Figure 11. Reverse bias safe operating area IGBT,
 $I_C=f(V_{CE})$, $V_{GE}=\pm 15V$, $R_{Goff}=5.6\Omega$, $T_{vj}=125^\circ C$

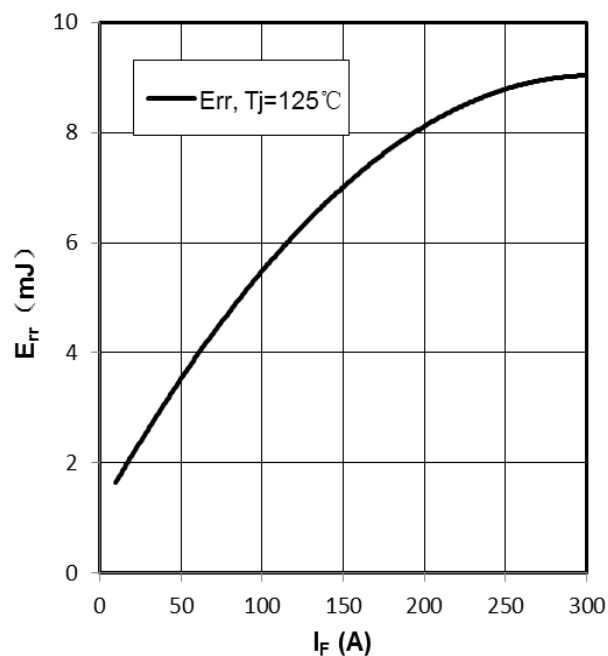
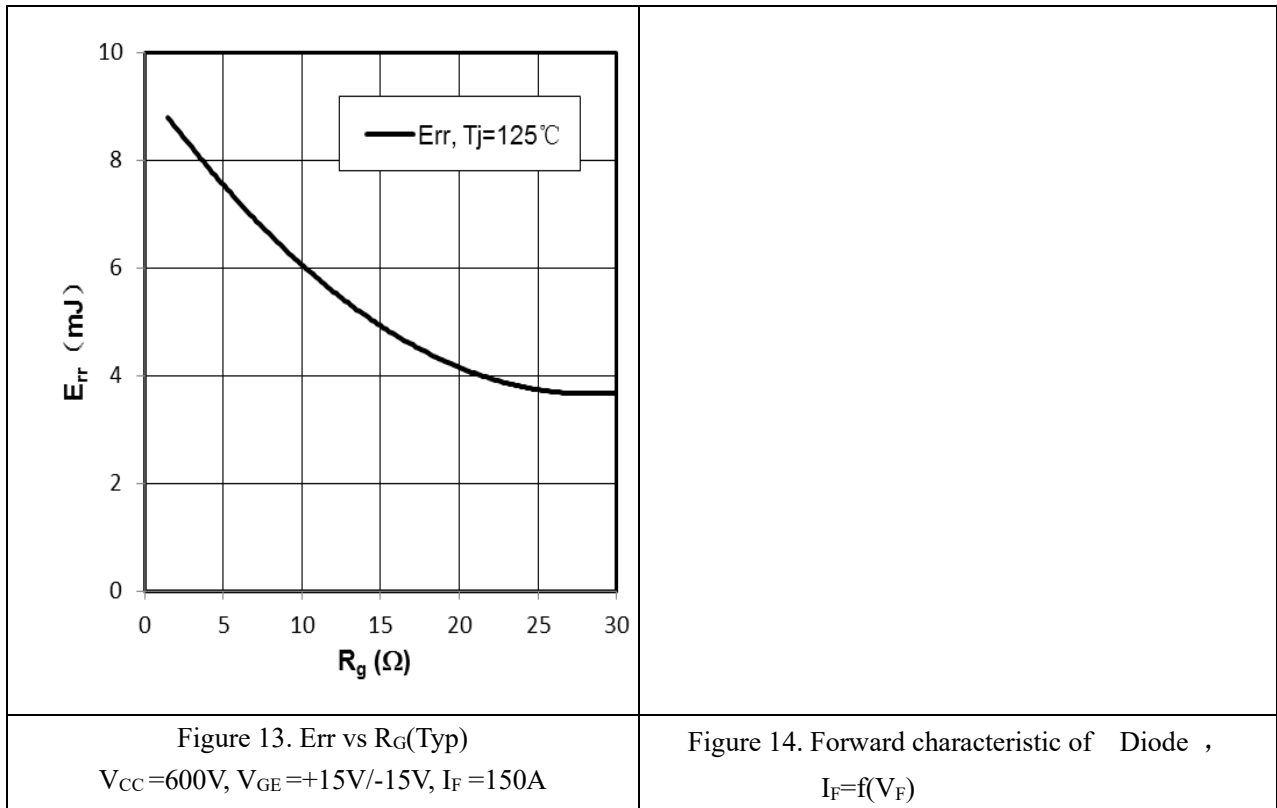


Figure 12. E_{rr} vs I_F (Typ)
 $V_{CC}=600V$, $V_{GE}=+15V/-15V$, $R_G=5.6\Omega$

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This product data sheet describes the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively under the terms and conditions of the supply agreement. There will be no guarantee or of any kind for the product and its characteristics.

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.

Due to technical requirements, our product may contain dangerous substances. For information on the types in question, please contact the sales staff responsible for you.

Changes to this product data sheet are reserved.

Please contact the sales staff (Email:sales@hiitio.com) for further information on the product, technology, delivery terms, conditions and prices.

Revision History

Document Version	Description of Changes
RevX.0.1	Released

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