

Description

The DFI600SU17DF1 offer lower losses and higher energy for soft switching applications.



Features

- 1700V600 A, VCE (sat)(typ.) = 2.50V
- Lower losses and higher energy
- Excellent short-circuit capability
- 62mm single module

Applications

- Motor drive
- Inverter
- Power supply
- Wind Turbines

Circuit diagram

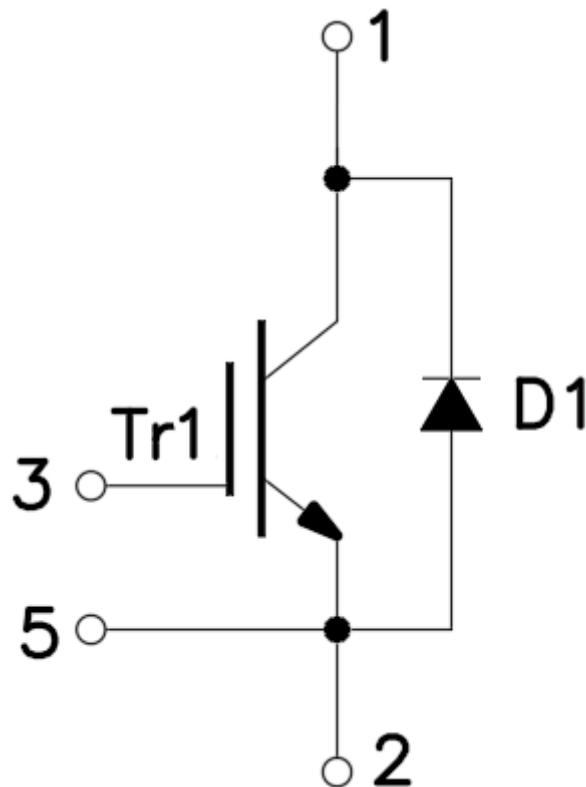


Figure 1. Out drawing & circuit diagram for DFI600SU17DF1

Pin Configuration and Marking Information

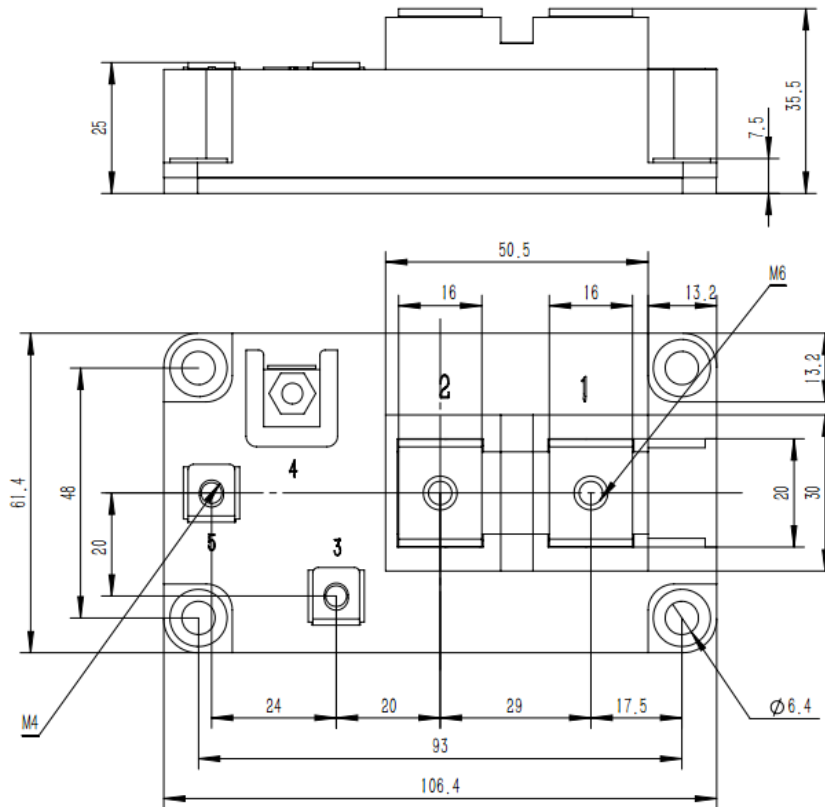


Figure 2. Pin configuration

Module

Parameter	Conditions	Value	Unit
Isolation Voltage	RMS, f = 50Hz, t = 1min	4.0	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

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	1700	V
V_{GES}	Gate-Emitter Voltage	C-E Short	$\pm 30\text{V}$	V
I_C	DC Continuous Collector Current	$T_C=100^\circ\text{C}$	600	A
I_{CM}	Pulse Collector Current	$t_p=1\text{ms}$, Note1	1200	A
P_C	Maximum Power Dissipation	$T_C=25^\circ\text{C}$, $T_j=150^\circ\text{C}$ (IGBT)	2193	W
T_{jop}	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	-	1700	V
I_F	Diode forward Current	- $T_C=100^\circ\text{C}$	600	A
I_{FRM}	Repetitive peak forward Current	$t_p=1\text{ms}$, Note1	1200	A
T_{jop}	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		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=600\text{A}$ $V_{GE}=15\text{V}$	$T_j=25^\circ\text{C}$	-	2.50	2.70	V
			$T_j=125^\circ\text{C}$	-	2.80	3.0	V
$V_{GE(th)}$	Gate-Emitter threshold Voltage	$I_C=25\text{mA}$, $V_{CE}=V_{GE}$	4.5	-	5.7	V	
Q_G	Gate charge	$V_{GE}=-15\text{V}$ to $+15\text{V}$	-	5500	-	nC	
R_{Gint}	Internal gate resistor	$f=1\text{M}$, $V_{pp}=1\text{V}$	$T_j=25^\circ\text{C}$	-	1.76	-	Ω
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$ $f=1\text{MHz}$	$T_j=25^\circ\text{C}$	-	50	-	nF
C_{oes}	Output Capacitance			-	5.9	-	nF
C_{res}	Reverse transfer Capacitance			-	4.6	-	nF
I_{CES}	Collector- Emitter Cut off Current	$V_{CE}=1700\text{V}$, $V_{GE}=0\text{V}$	$T_j=25^\circ\text{C}$	-	-	5	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 30\text{V}$, $V_{CE}=0\text{V}$	$T_j=25^\circ\text{C}$	-	-	500	nA
$t_{d(on)}$	Turn-on delay time	$V_{CC}=900\text{V}$ $I_C=600\text{A}$ $R_G=1.5\Omega$	$T_j=25^\circ\text{C}$	-	290	-	ns
			$T_j=125^\circ\text{C}$	-	105	-	
t_r	Rise time	$V_{GE}=\pm 15\text{V}$ Inductive Load	$T_j=25^\circ\text{C}$	-	82	-	ns
			$T_j=125^\circ\text{C}$	-	71	-	
$t_{d(off)}$	Turn-off delay time		$T_j=25^\circ\text{C}$	-	660	-	ns
			$T_j=125^\circ\text{C}$	-	720	-	

t _f	Fall time	V _{CC} = 900V	T _j = 25°C	-	220	-	ns
			T _j = 125°C	-	380	-	
E _{on}	Turn-on power dissipation	I _C = 600A R _G = 1.5Ω	T _j = 25°C	-	108	-	mJ
			T _j = 125°C	-	120	-	
E _{off}	Turn-off power dissipation	V _{GE} = ±15V Inductive Load	T _j = 25°C	-	92	-	mJ
			T _j = 125°C	-	158	-	
R _{th(j-c)}	Thermal Resistance, Junction to Case (IGBT)		-	-	-	0.057	°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 = 600A, V _{GE} = 0V	T _j = 25°C	-	2.5	2.7	V
			T _j = 125°C	-	2.4	-	
t _{rr}	Diode Reverse Recovery Time	I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V	T _j = 25°C	-	142	-	nS
			T _j = 125°C	-	250	-	
I _{rr}	Peak reverse recovery Current	I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V	T _j = 25°C	-	420	-	A
			T _j = 125°C	-	510	-	
Q _{rr}	Recovered charge	I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V	T _j = 25°C	-	39	-	uC
			T _j = 125°C	-	72	-	
E _{rr}	Reverse recovered energy	I _F = 600A, di/dt = 6000A/μs, V _R = 900V, V _{GE} = -15V	T _j = 25°C	-	23	-	mJ
			T _j = 125°C	-	45	-	
R _{th(j-c)}	Thermal Resistance, Junction to Case (Diode)		-	-	-	0.074	°C/W

Test Conditions



Figure 3. Switching time measure circuit

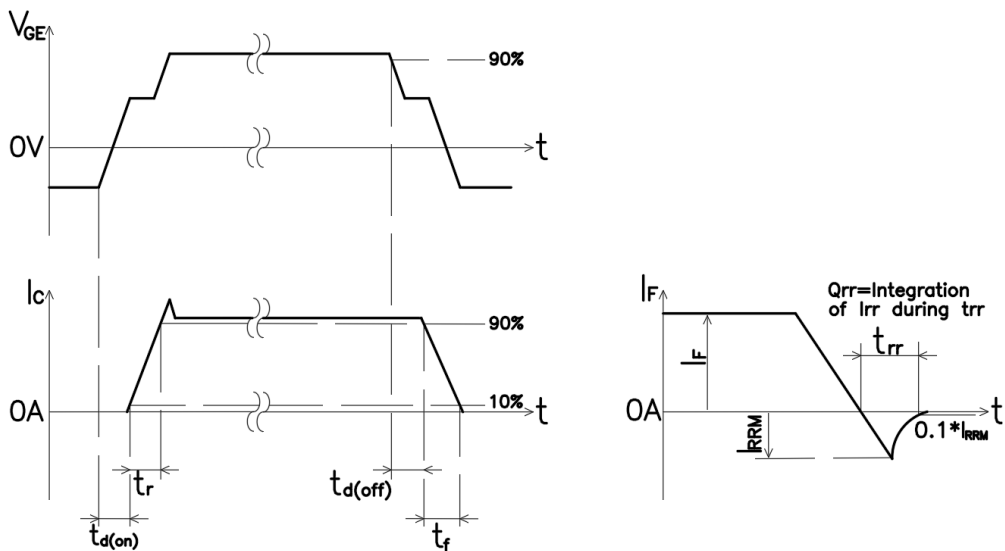


Figure 4. Switching time definition

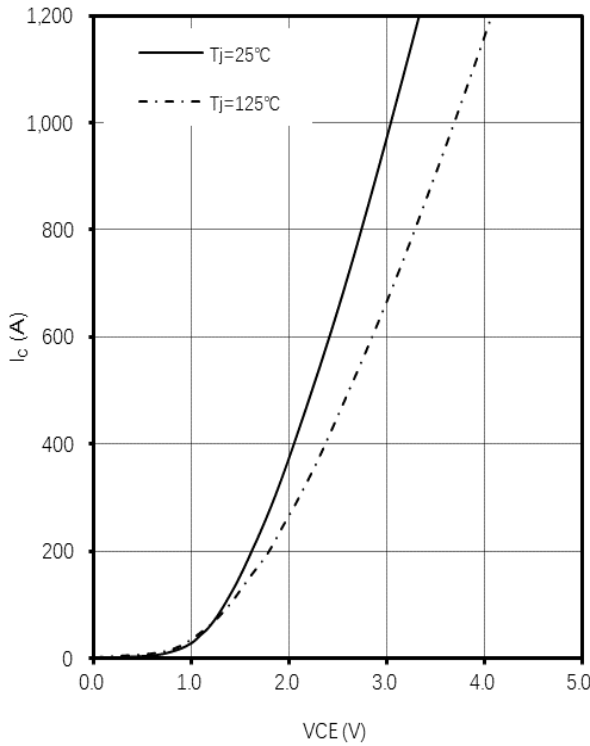


Figure 5. I_c vs V_{CE}
 $V_{GE}=15V$

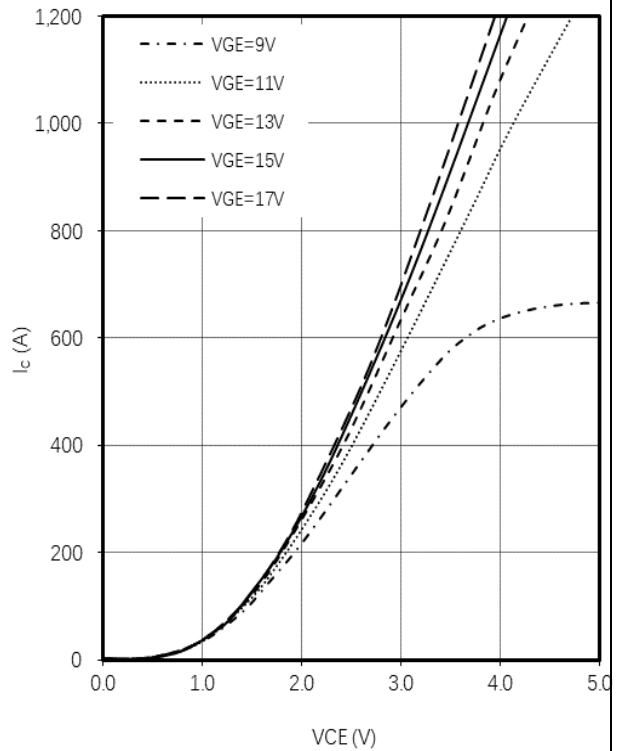


Figure 6. I_c vs V_{CE}
 $T_j=125^\circ C$

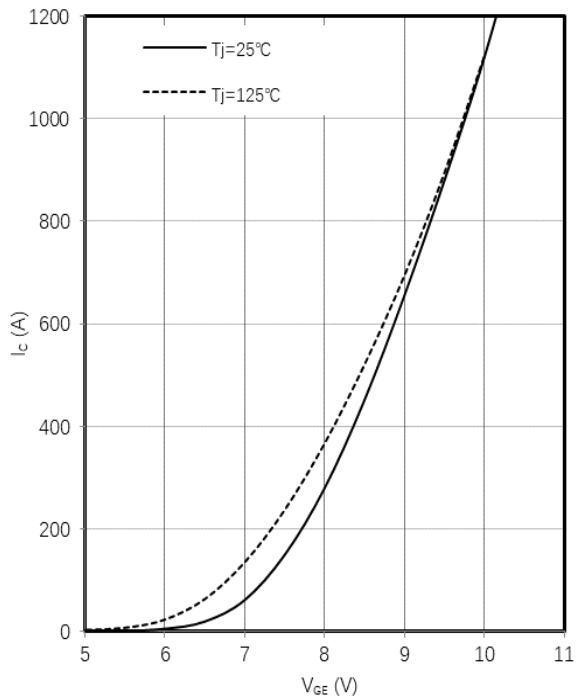


Figure 7. I_c vs V_{GE}
 $V_{CE}=20V$

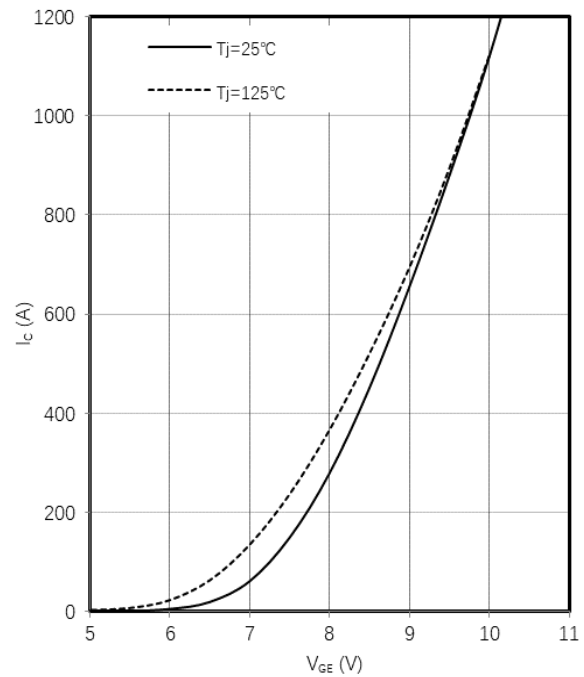


Figure 8. E_{on}, E_{off} vs I_c (Typ)
 $V_{CC}=900V, V_{GE}=+15V/-15V, R_G=1.5\Omega$

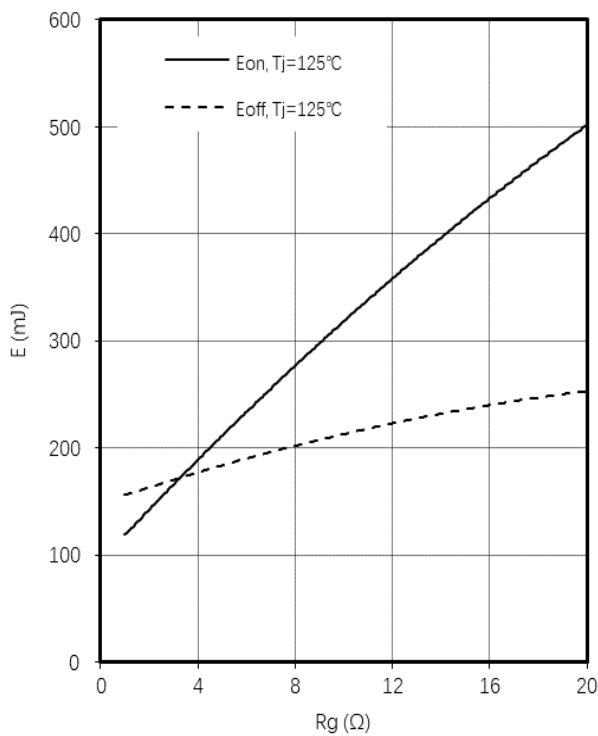


Figure 9. E_{on}, E_{off} vs R_g(Typ)
 $V_{CC}=900V, V_{GE}=+15V/-15V, I_C=600A$

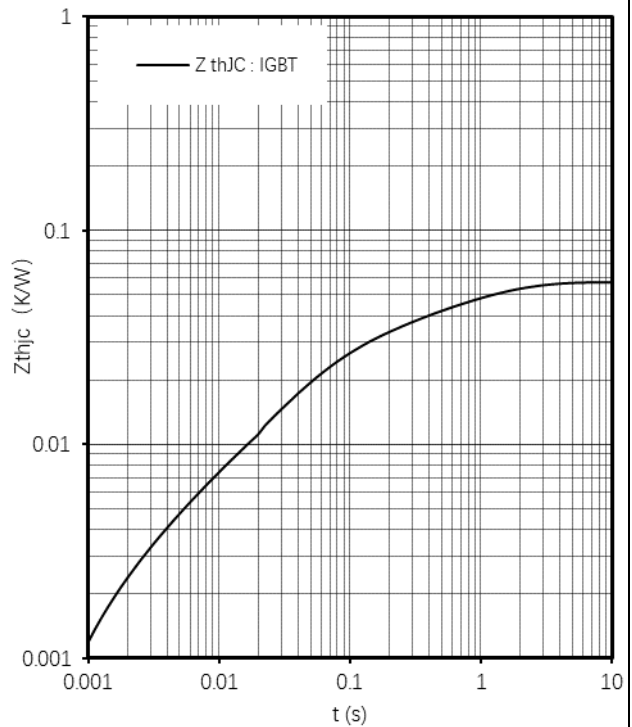


Figure 10. Transient thermal impedance IGBT ,
 $Z_{thjc}=f(t)$

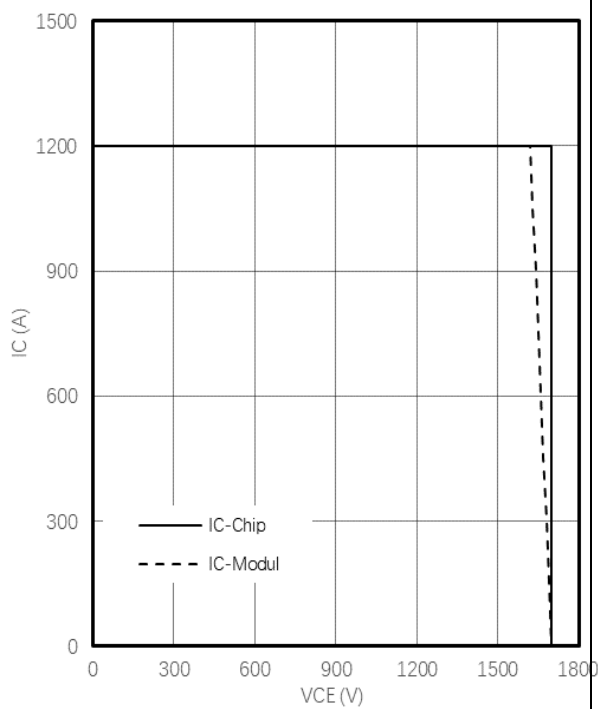


Figure 11. Reverse bias safe operating area IGBT,
 $I_C=f(V_{CE}), V_{GE}=\pm 15V, R_{Goff}=1.5\Omega, T_{vj}=125^\circ C$

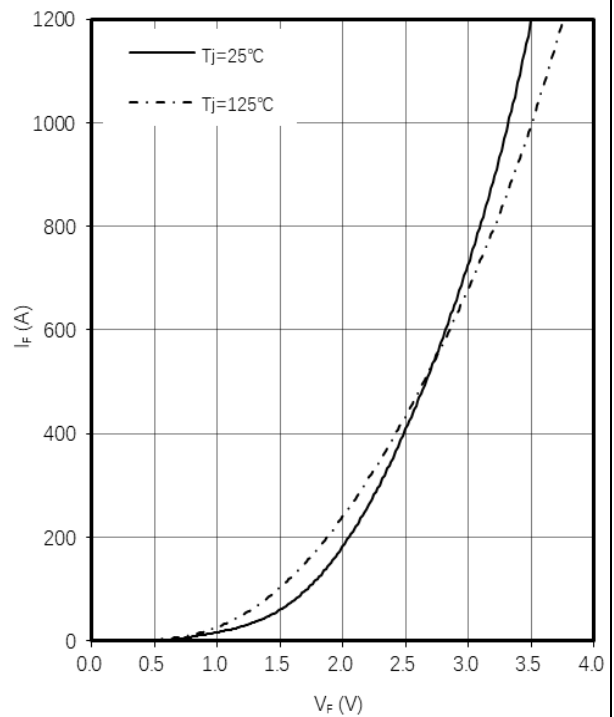
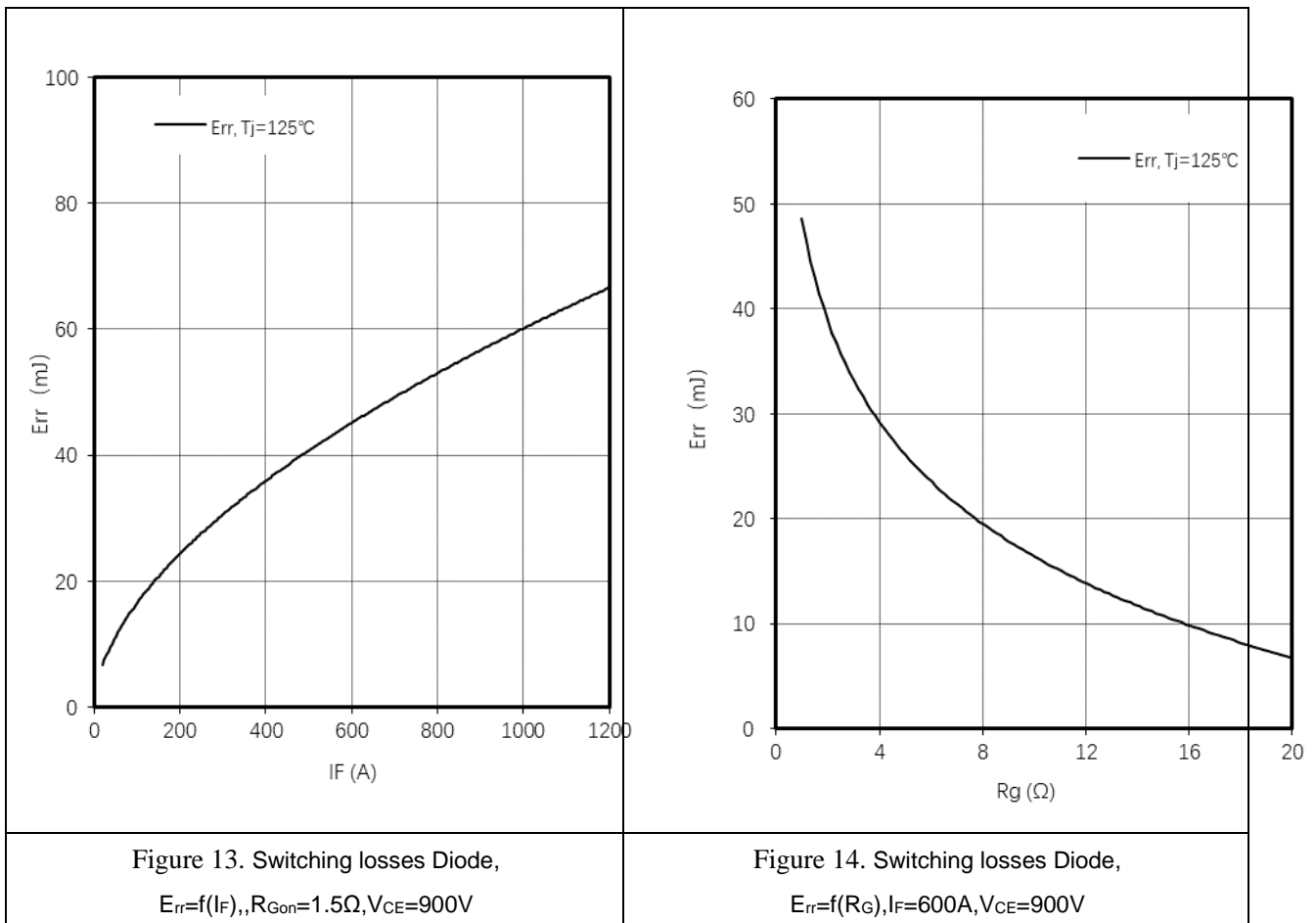


Figure 12. Forward characteristic of Diode ,
 $I_F=f(V_F)$



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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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