

Final datasheet

英飞凌软恢复和超快恢复 1200V 发射极控制 7 二极管，适用于工业和家用电器应用

特性

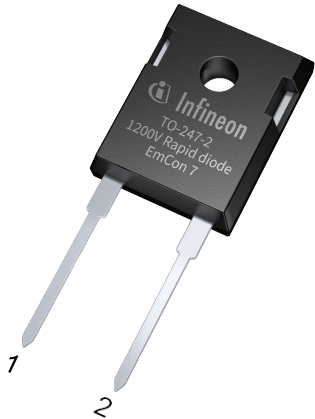
- $V_{RRM} = 1200\text{ V}$
- $I_F = 140\text{ A}$
- 1200V发射极控制技术
- 最高结温 $T_{vjmax} = 175^{\circ}\text{C}$
- 低正向电压 (V_F)
- 反向恢复电荷低
- 超快恢复时间
- 软恢复特性
- 无铅引脚镀层；符合 RoHS 标准
- 防潮设计

潜在应用

- 组串式逆变器
- 电动汽车充电桩
- 热泵

产品验证

- 符合 JEDEC47/20/22 相关测试的工业应用要求

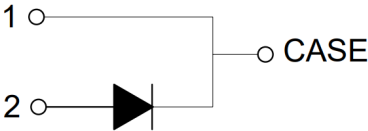


- Green
- Halogen-free
- Lead-free
- RoHS

描述

引脚定义：

- 引脚 1 和背面 – 阴极
- 引脚 2 – 阳极



Type	Package	Marking
IDWD140E120D7	PG-TO247-2-STD-NA8.8	E140MD7



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1 封装

1 封装

表 1 特征值

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Internal emitter inductance measured 5 mm (0.197 in.) from case	L_E			13		nH
Storage temperature	T_{stg}		-55		150	°C
Soldering temperature	T_{sold}	wave soldering 1.6 mm (0.063 in.) from case for 10 s			260	°C
Mounting torque	M	M3 screw, Maximum of mounting processes: 3			0.6	Nm
Thermal resistance, junction-ambient	$R_{th(j-a)}$				40	K/W
Diode thermal resistance, junction-case	$R_{th(j-c)}$			0.21	0.27	K/W

2 二极管

表 2 最大额定值

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} \geq 25\text{ °C}$		1200	V
Diode forward current, limited by T_{vjmax}	I_F		$T_c = 25\text{ °C}$	207	A
			$T_c = 91\text{ °C}$	140	
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpulse}			560	A
Diode surge non repetitive forward current, sine halfwave	I_{FSM}	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	462	A
Diode surge repetitive forward current, sine halfwave ¹⁾	I_{FRM}	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	420	A
Power dissipation	P_{tot}		$T_c = 25\text{ °C}$	561	W
			$T_c = 100\text{ °C}$	280	

1) 未经过生产测试。测试采用 20k 脉冲（周期为 10 ms 的半波整流正弦波）进行。

表 3 特征值

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Diode forward voltage	V_F	$I_F = 140 \text{ A}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$		2.5	3	V
			$T_{vj} = 150 \text{ }^{\circ}\text{C}$		2.35		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$		2.3		
Reverse leakage current	I_R		$T_{vj} = 25 \text{ }^{\circ}\text{C}$			20	μA
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$		2400		
Diode reverse recovery time	t_{rr}	$V_R = 800 \text{ V}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		225		ns
			$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		190		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		245		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		160		
Diode reverse recovery charge	Q_{rr}	$V_R = 800 \text{ V}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		3.1		μC
			$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		2.85		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		7.55		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		6.1		

(表格续下页.....)

表 3 (续) 特征值

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Diode peak reverse recovery current	I_{rrm}	$V_R = 800 \text{ V}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		27		A
			$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		26		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		50		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		47		
Diode peak rate of fall of reverse recovery current	di_{rr}/dt	$V_R = 800 \text{ V}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		115		A/ μs
			$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		140		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		210		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		260		
Reverse recovery energy	E_{rec}	$V_R = 800 \text{ V}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		0.85		mJ
			$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		0.7		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 140 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		2.15		
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_F = 70 \text{ A}$, $-di_F/dt = 1000 \text{ A}/\mu\text{s}$		1.75		
Operating junction temperature	T_{vj}			-40		175	$^{\circ}\text{C}$

注： 为了获得最佳的使用寿命和可靠性，英飞凌建议工作条件不超过本数据手册中所述最大额定值的 80%。

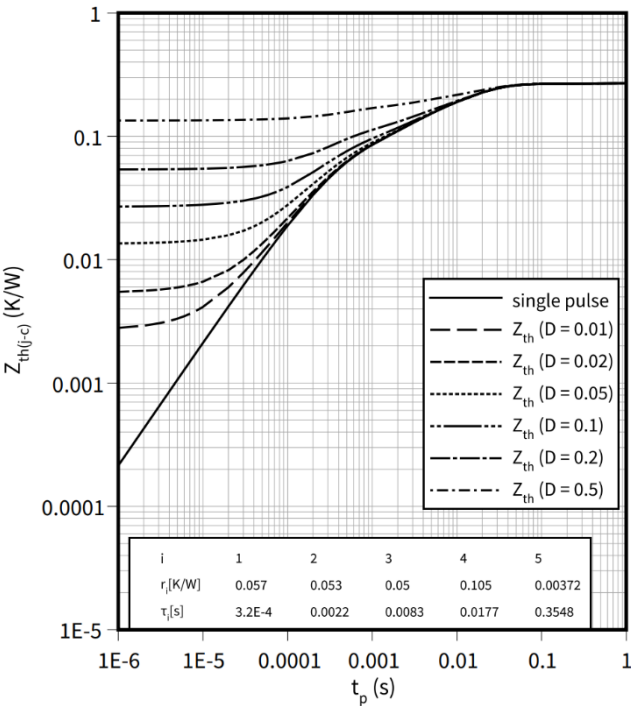
除非另有规定，电气特性均在 $T_{vj} = 25^{\circ}\text{C}$ 的条件下测得。

动态测试电路，寄生电感 $L_o = 27 \text{ nH}$ ，寄生电容 $C_o = 12 \text{ pF}$ ，如图 E 所示，IKY140N120CH7 被用作 IGBT。

3 特性图

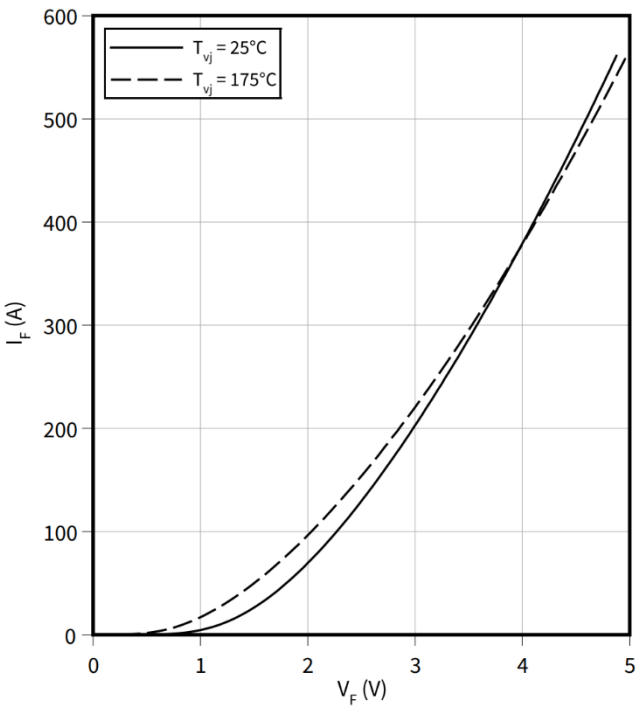
Diode transient thermal impedance as a function of pulse width

$Z_{th(j-c)} = f(t_p)$
 $D = t_p/T$



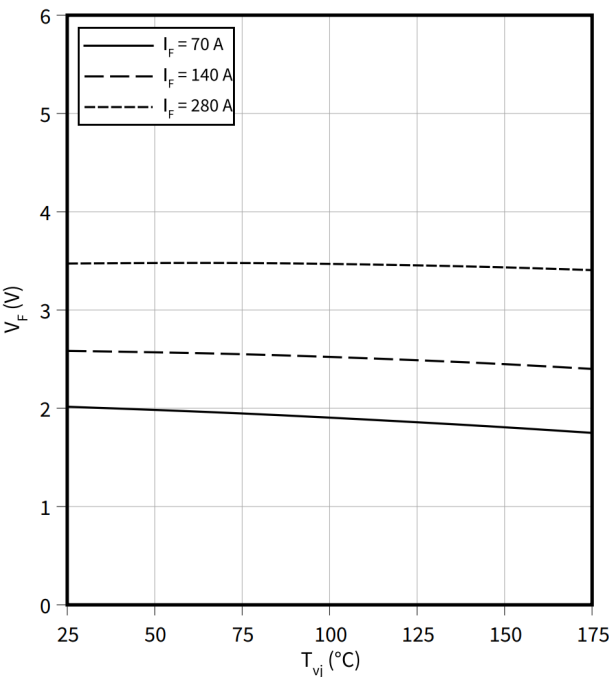
Typical diode forward current as a function of forward voltage

$I_F = f(V_F)$



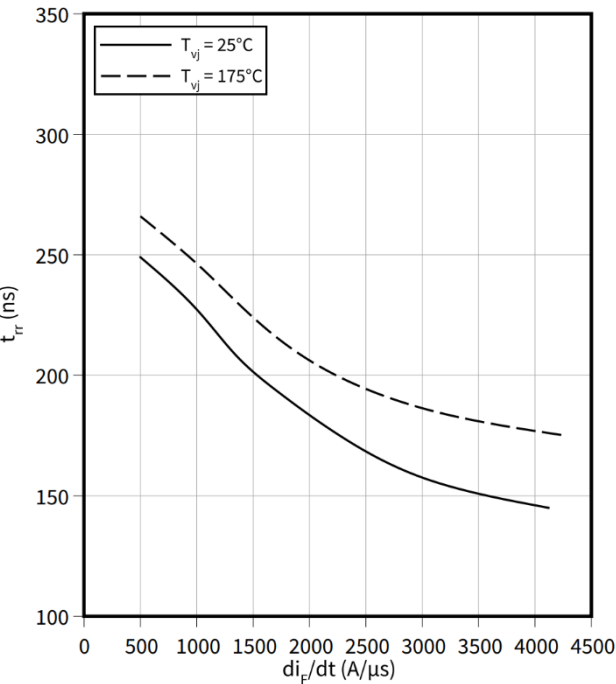
Typical diode forward voltage as a function of junction temperature

$V_F = f(T_{vj})$



Typical reverse recovery time as a function of diode current slope

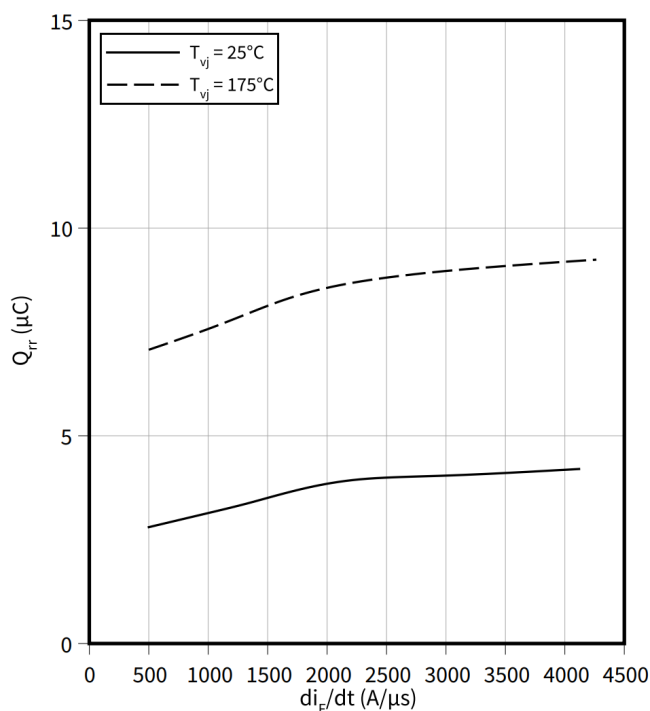
$t_{rr} = f(di_F/dt)$
 $V_R = 800\text{ V}, I_F = 140\text{ A}$



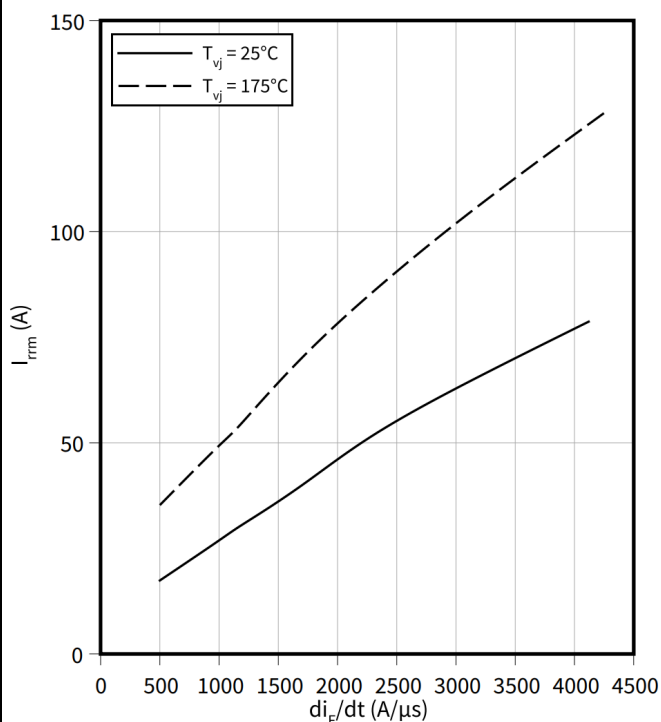
3 特性图

Typical reverse recovery charge as a function of diode current slope

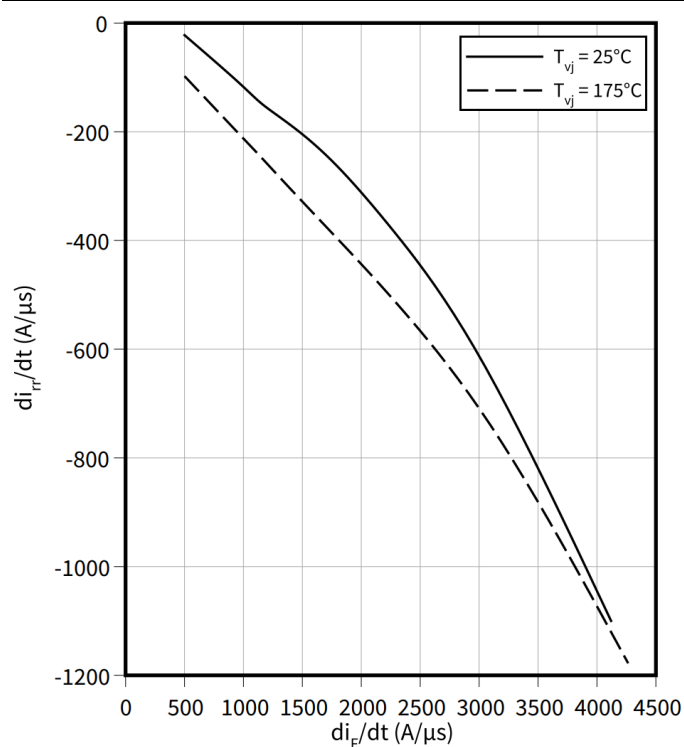
$$Q_{rr} = f(di_F/dt)$$

 $V_R = 800 \text{ V}, I_F = 140 \text{ A}$
**Typical reverse recovery current as a function of diode current slope**

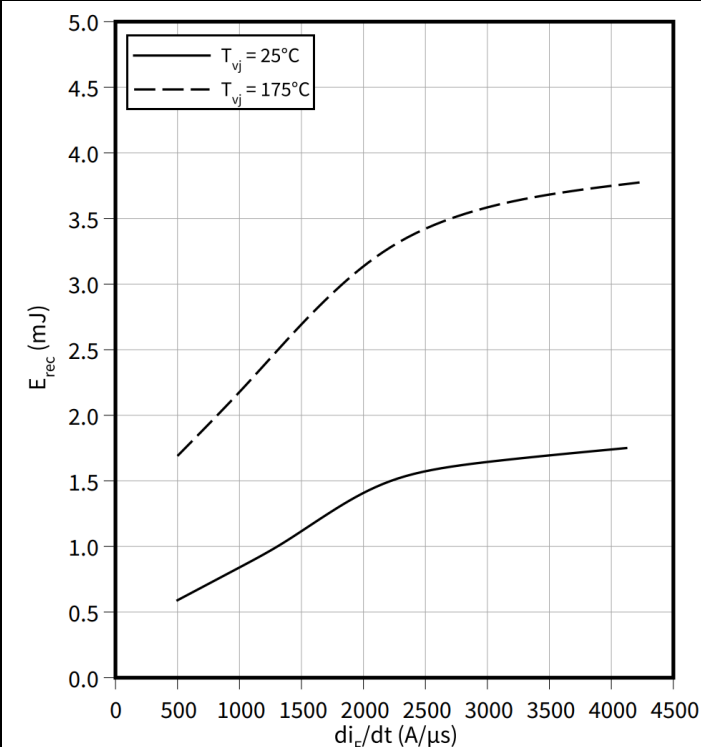
$$I_{rrm} = f(di_F/dt)$$

 $V_R = 800 \text{ V}, I_F = 140 \text{ A}$
**Typical diode peak rate of fall of reverse recovery current as a function of diode current slope**

$$di_{rr}/dt = f(di_F/dt)$$

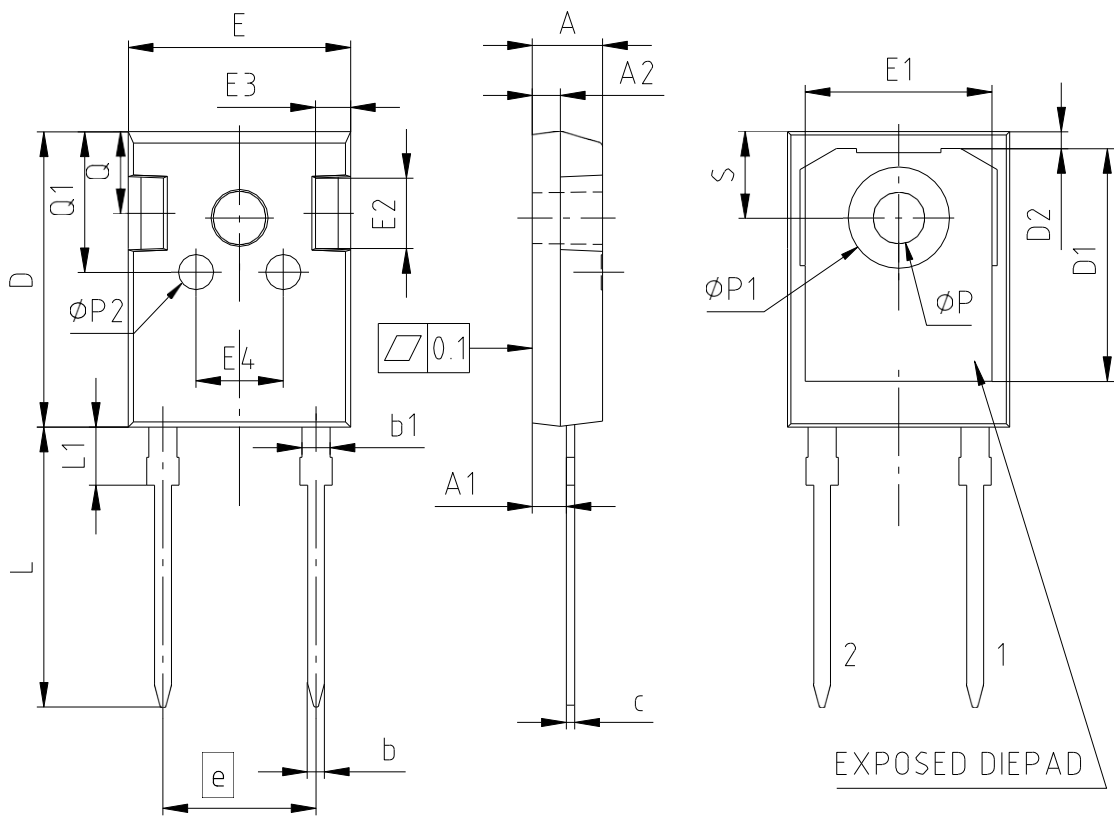
 $V_R = 800 \text{ V}, I_F = 140 \text{ A}$
**Typical reverse energy losses as a function of diode current slope**

$$E_{rec} = f(di_F/dt)$$

 $V_R = 800 \text{ V}, I_F = 140 \text{ A}$


4 封装外形

PG-TO247-2-STD-NA8.8



PACKAGE - GROUP		PG-TO247-2-U01			
NUMBER:					
DIMENSIONS	MILLIMETERS				
	MIN.	MAX.			
A	4.90	5.10	L	19.80	20.10
A1	2.31	2.51	L1	---	4.30
A2	1.90	2.10	ϕP	3.50	3.70
b	1.16	1.26	$\phi P1$	7.00	7.40
b1	1.96	2.06	$\phi P2$	2.40	2.60
c	0.59	0.66	Q	5.60	6.00
D	20.90	21.10	Q1	9.80	10.20
D1	16.25	16.85	S	6.05	6.25
D2	1.05	1.35			
E	15.70	15.90			
E1	13.10	13.50			
E2	4.90	5.10			
E3	2.40	2.60			
E4	6.00	6.40			
e	10.88				
N	2				

ALL DIMENSIONS DO NOT INCLUDE
MOLD FLASH OR PROTRUSIONS.

图 1

5 测试条件

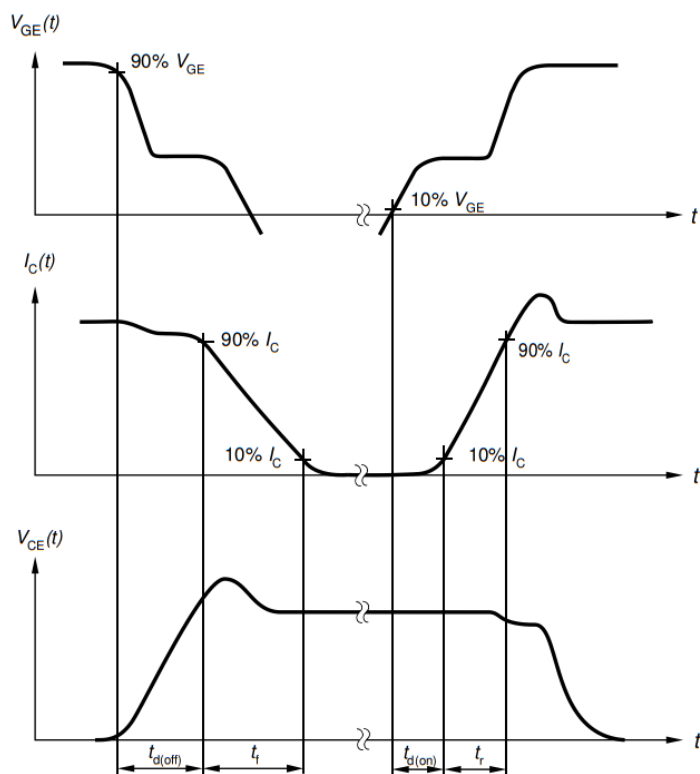


Figure A. Definition of switching times

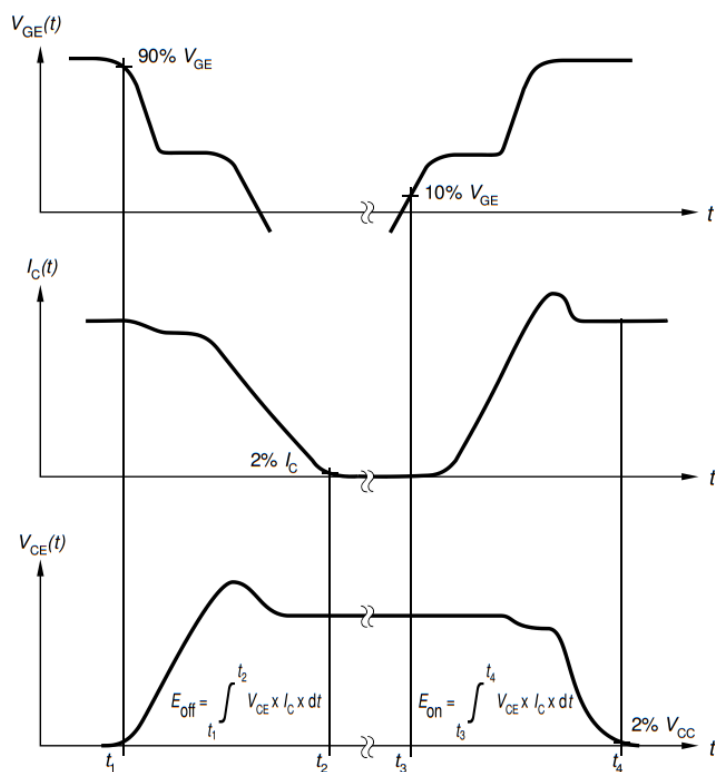


Figure B. Definition of switching losses

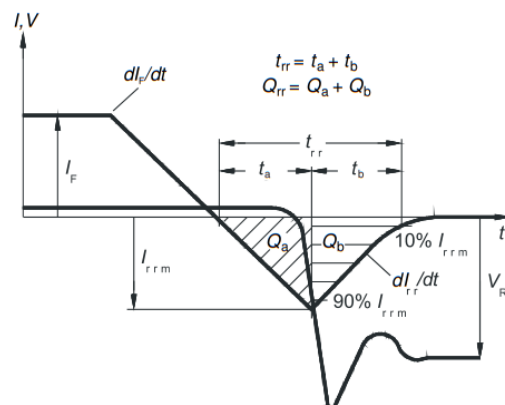


Figure C. Definition of diode switching characteristics

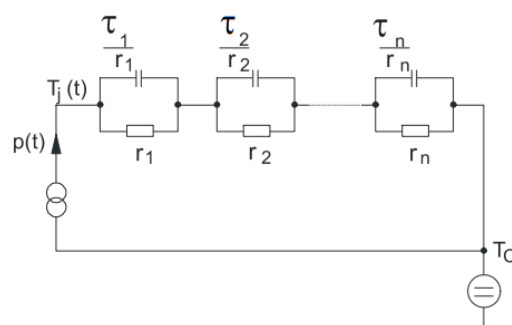


Figure D. Thermal equivalent circuit

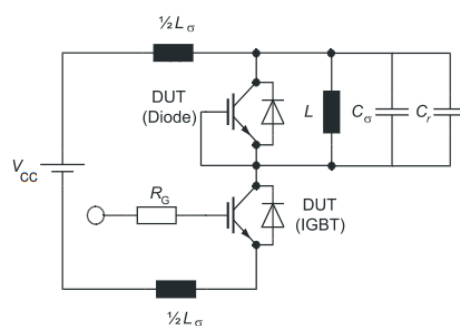


Figure E. **Dynamic test circuit**
 Parasitic inductance L_{σ} ,
 parasitic capacitor C_{σ} ,
 relief capacitor C_r ,
 (only for ZVT switching)

修订记录

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1.00	2023-12-15	Final datasheet

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