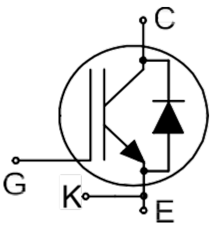
英飞凌第六代，高速软开关系列

采用 Trench 和 Fieldstop 技术的高速软开关 TRENCHSTOP™ IGBT 6 与软快速恢复反并联二极管共同封装

特性：



1200V TRENCHSTOP™ IGBT6 技术提供：
- 展现在硬开关和谐振拓扑中的高效率
- 由于 V_{CEsat} 具有正温度系数，因此易于并联
- 低电磁干扰
- 低栅极电荷 Q_G
- 非常软、快速恢复的全电流反并联二极管
- 最高结温 175°C
- 无铅镀层；符合RoHS标准
- 完整的产品系列和 PSpice 模型：

http://www.infineon.com/igbt/

应用：

- 工业级不间断电源（UPS）
- 充电器
- 储能
- 三电平组串太阳能逆变器
- 焊接

产品验证

符合JEDEC47/20/22相关测试的工业应用要求

关键性能和封装参数

Type	V_{CE}	I_C	V_{CEsat}, T_{vj}=25°C	T_{vjmax}	**Marking**	**Package**
IKY75N120CS6	1200V	75A	1.85V	175°C	K75MCS6	PG-TO247-4-2

本数据手册的原文使用英文撰写。为方便起见，英飞凌提供了译文；由于翻译过程中可能使用了自动化工具，英飞凌不保证译文的准确性。为确认准确性，请务必访问 infineon.com 参考最新的英文版本（控制文档）。

目录

最大额定值

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_{vj} \geq 25°C$	V_{CE}	1200	V
DC collector current, limited by T_{vjmax} T_c = 25°C T_c = 100°C	I_C	150.0 75.0	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}	300.0	A
Turn off safe operating area $V_{CE} \leq 1200V$, $T_{vj} \leq 175°C$	-	300.0	A
Diode forward current, limited by T_{vjmax} T_c = 25°C T_c = 100°C	I_F	150.0 75.0	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	300.0	A
Gate-emitter voltage Transient Gate-emitter voltage ($t_p \leq 0.5µs$, $D < 0.001$)	V_{GE}	±20 25	V
Power dissipation T_c = 25°C Power dissipation T_c = 100°C	P_{tot}	880.0 440.0	W
Operating junction temperature	T_{vj}	-40...+175	°C
Storage temperature	T_{stg}	-55...+150	°C
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	°C

热阻抗

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
R_{th} 特性						
IGBT thermal resistance, junction - case	$R_{th(j-c)}$		-	-	0.17	K/W
Diode thermal resistance, junction - case	$R_{th(j-c)}$		-	-	0.41	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		-	-	40	K/W

电气特性，测于 T_{vj}= 25°C 的条件下，除非另有规定

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
静态特性						
Collector-emitter saturation voltage	V_{CEsat}	$V_{GE}=15.0$V, $I_C=75.0$A $T_{vj}=25$°C $T_{vj}=125$°C $T_{vj}=175$°C	- - -	1.85 2.15 2.25	2.15 - -	V
Diode forward voltage	V_F	$V_{GE}=0$V, $I_F=75.0$A $T_{vj}=25$°C $T_{vj}=175$°C	- -	2.10 2.15	2.20 -	V
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C=3.50$mA, $V_{CE}=V_{GE}$	5.1	5.7	6.3	V
Zero gate voltage collector current	I_{CES}	$V_{CE}=1200$V, $V_{GE}=0$V $T_{vj}=25$°C $T_{vj}=175$°C	- -	- 3500	1600 -	µA
Gate-emitter leakage current	I_{GES}	$V_{CE}=0$V, $V_{GE}=20$V	-	-	600	nA
Transconductance	g_{fs}	$V_{CE}=20$V, $I_C=75.0$A	-	60.0	-	S

电气特性，测于 T_{vj} = 25°C的条件下，除非另有规定

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
动态特性						
Input capacitance	C_{ies}	$V_{CE}=25$V, $V_{GE}=0$V, f = 1MHz	-	4900	-	pF
Output capacitance	C_{oes}		-	360	-	
Reverse transfer capacitance	C_{res}		-	225	-	
Gate charge	Q_G	$V_{CC}=960$V, $I_C=75.0$A, $V_{GE}=15$V	-	530.0	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	13.0	-	nH

开关特性、感性负载

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
IGBT 特性，测于T_{vj} = 25°C的条件下						
Turn-on delay time	$t_{d(on)}$	$T_{vj}=25$°C, $V_{CC}=600$V, $I_C=75.0$A, $V_{GE}=0.0/15.0$V, $R_{G(on)}=4.0\Omega$, $R_{G(off)}=4.0\Omega$, $L\sigma=70$nH, $C\sigma=67$pF $L\sigma$, $C\sigma$ from Fig. E Energy losses include “tail” and diode reverse recovery.	-	32	-	ns
Rise time	t_r		-	32	-	ns
Turn-off delay time	$t_{d(off)}$		-	300	-	ns
Fall time	t_f		-	31	-	ns
Turn-on energy	E_{on}		-	2.20	-	mJ
Turn-off energy	E_{off}		-	2.95	-	mJ
Total switching energy	E_{ts}		-	5.15	-	mJ

二极管特性， T_{vj} = 25°C

Diode reverse recovery time	t_{rr}	T_{vj} = 25°C, V_R = 600V, I_F = 75.0A, di_F/dt = 2700A/µs, $L\sigma$ = 70nH, $C\sigma$ = 67pF	-	205	-	ns
Diode reverse recovery charge	Q_{rr}		-	4.70	-	µC
Diode peak reverse recovery current	I_{rrm}		-	76.0	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-1500	-	A/µs

开关特性、感性负载

Parameter	**Symbol**	**Conditions**	**Value**			**Unit**
			min.	**typ.**	**max.**	
IGBT 特性，测于 T_{vj} = 175°C的条件						
Turn-on delay time	$t_{d(on)}$	T_{vj} = 175°C, V_{CC} = 600V, I_C = 75.0A, V_{GE} = 0.0/15.0V, $R_{G(on)}$ = 4.0Ω, $R_{G(off)}$ = 4.0Ω, $L\sigma$ = 70nH, $C\sigma$ = 67pF $L\sigma$, $C\sigma$ from Fig. E Energy losses include “tail” and diode reverse recovery.	-	33	-	ns
Rise time	t_r		-	33	-	ns
Turn-off delay time	$t_{d(off)}$		-	370	-	ns
Fall time	t_f		-	58	-	ns
Turn-on energy	E_{on}		-	3.30	-	mJ
Turn-off energy	E_{off}		-	5.30	-	mJ
Total switching energy	E_{ts}		-	8.60	-	mJ

二极管特性，测于 T_{vj} = 175°C的条件下

Diode reverse recovery time	t_{rr}	T_{vj} = 175°C, V_R = 600V, I_F = 75.0A, di_F/dt = 2700A/µs, $L\sigma$ = 70nH, $C\sigma$ = 67pF	-	340	-	ns
Diode reverse recovery charge	Q_{rr}		-	10.60	-	µC
Diode peak reverse recovery current	I_{rrm}		-	105.0	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-1050	-	A/µs

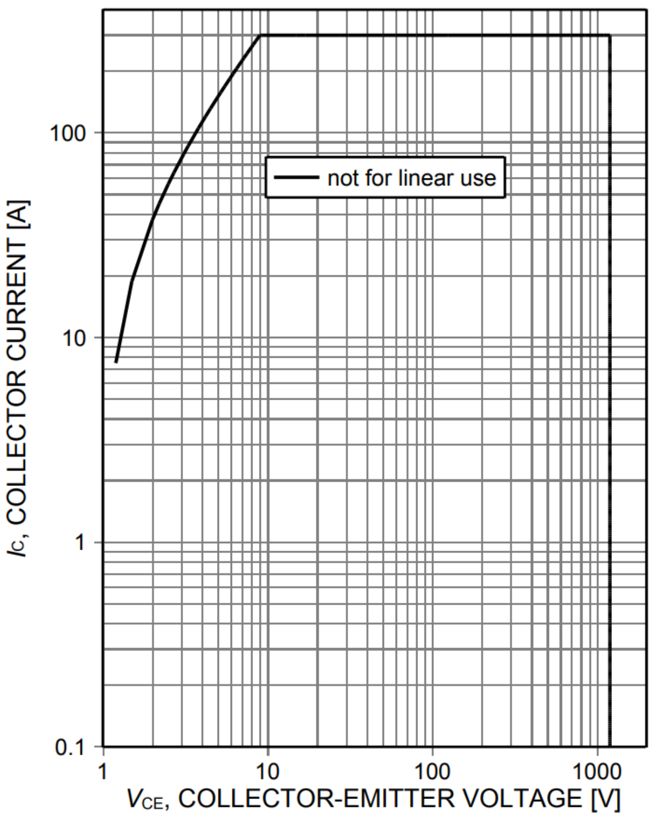


Figure 1. **Forward bias safe operating area**
(D=0, T_{vj}≤175°C; V_{GE}=15V, pulse width limited by T_{vjmax})

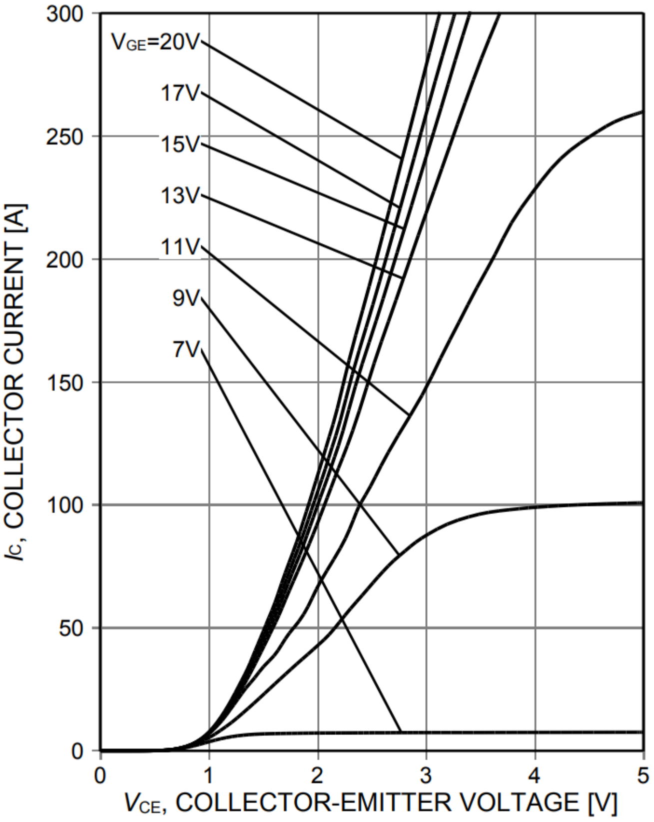


Figure 2. **Typical output characteristic**
(T_{vj}=25°C)

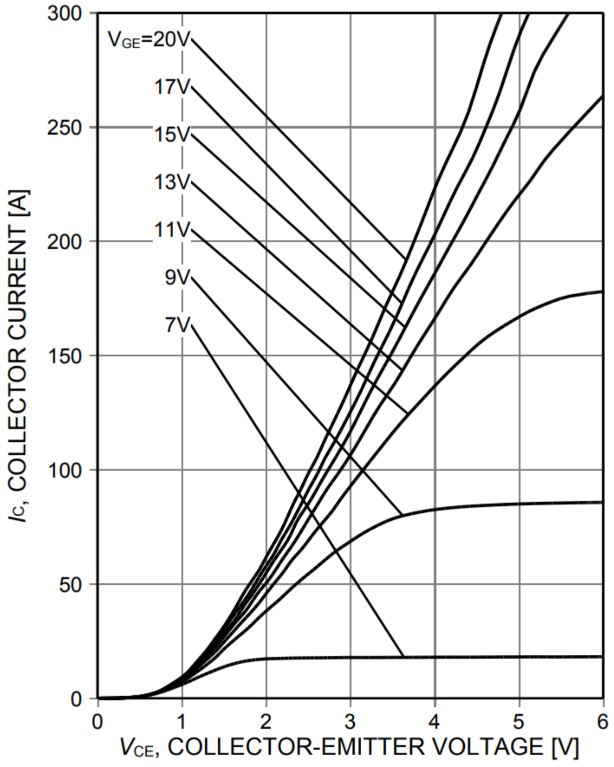


Figure 3. **Typical output characteristic**
(T_{vj}=175°C)

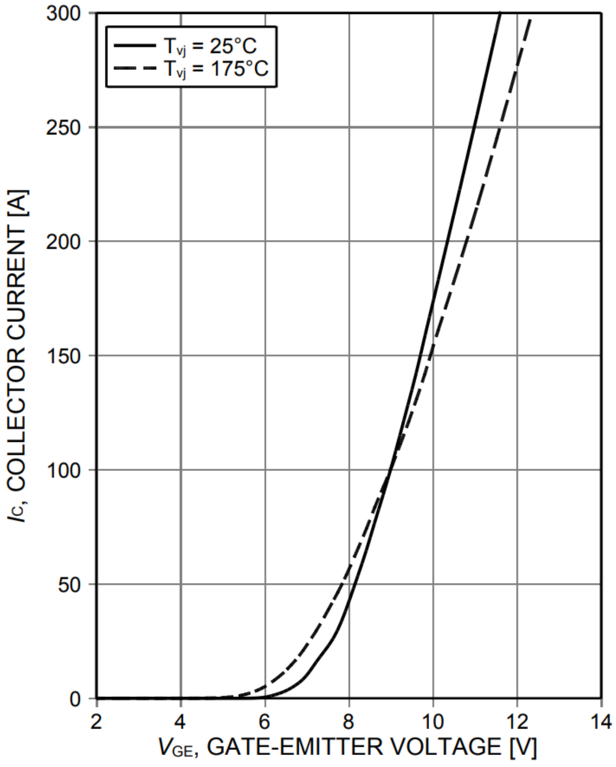


Figure 4. **Typical transfer characteristic**
(V_{CE}=20V)

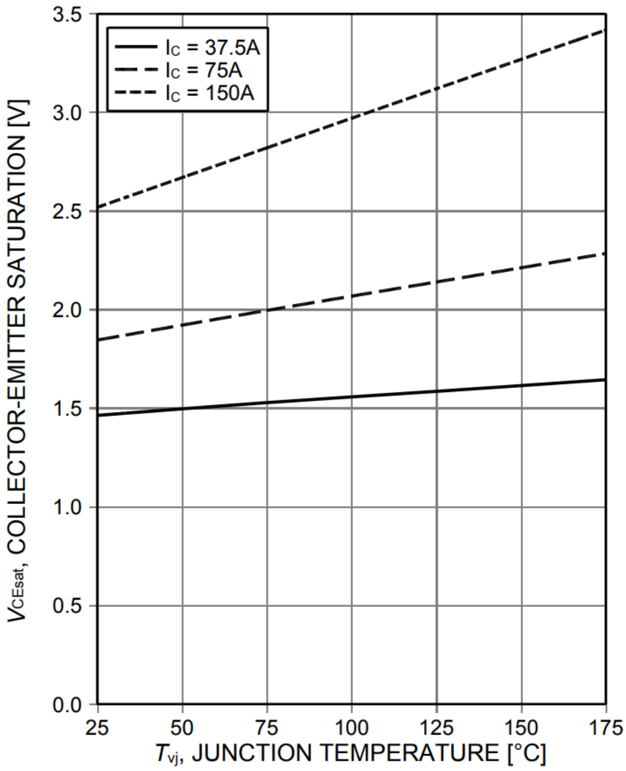


Figure 5. **Typical collector-emitter saturation voltage as a function of junction temperature**
(V_{GE}=15V)

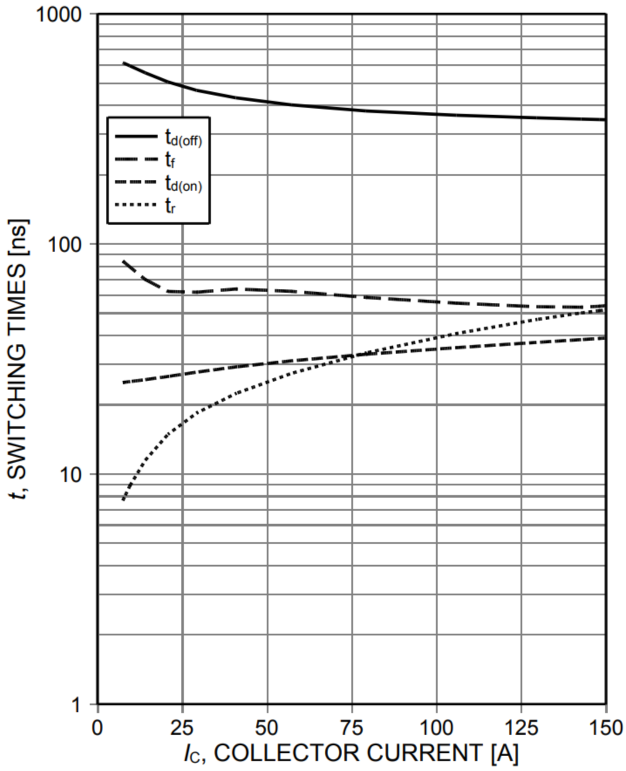


Figure 6. **Typical switching times as a function of collector current**
(inductive load, T_{vj}=175°C, V_{CE}=600V, V_{GE}=0/15V, R_G=4Ω, Dynamic test circuit in Figure E)

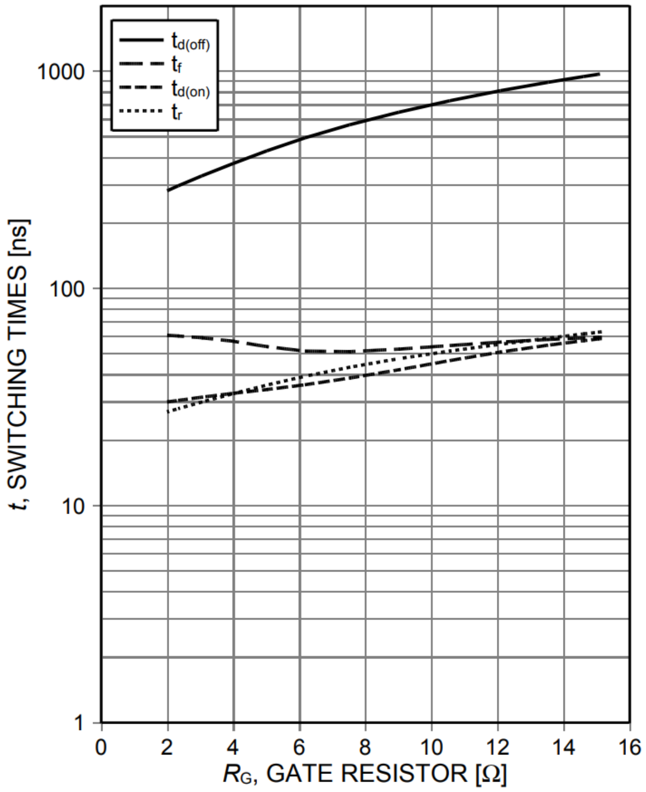


Figure 7. **Typical switching times as a function of gate resistor**
(inductive load, T_{vj}=175°C, V_{CE}=600V, V_{GE}=0/15V, I_C=75A, Dynamic test circuit in Figure E)

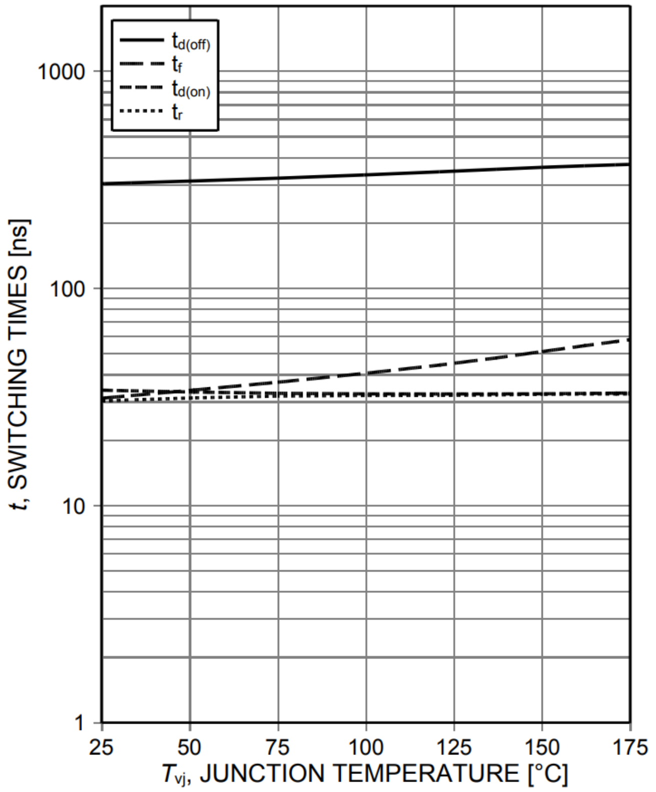


Figure 8. **Typical switching times as a function of junction temperature**
(inductive load, V_{CE}=600V, V_{GE}=0/15V, I_C=75A, R_G=4Ω, Dynamic test circuit in Figure E)

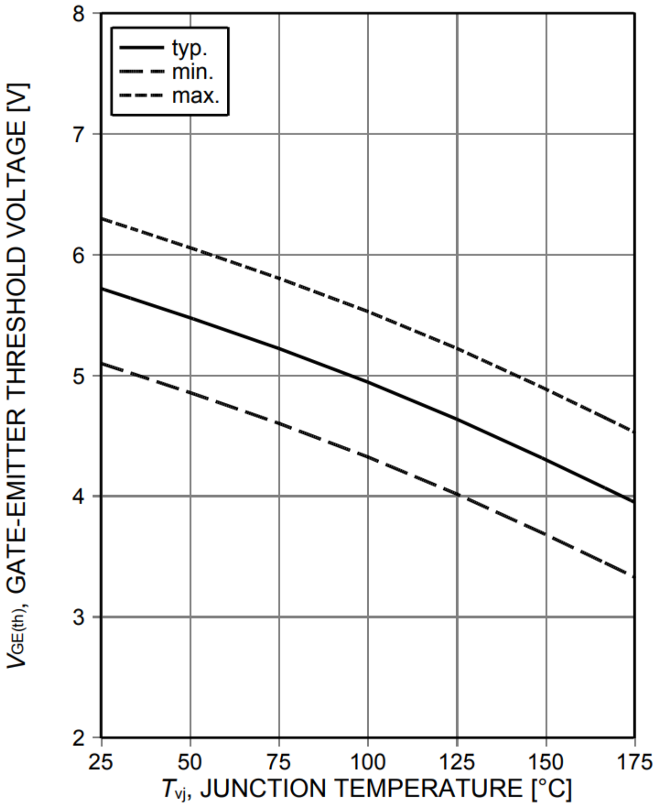


Figure 9. **Gate-emitter threshold voltage as a function of junction temperature**
(I_C=3.5mA)

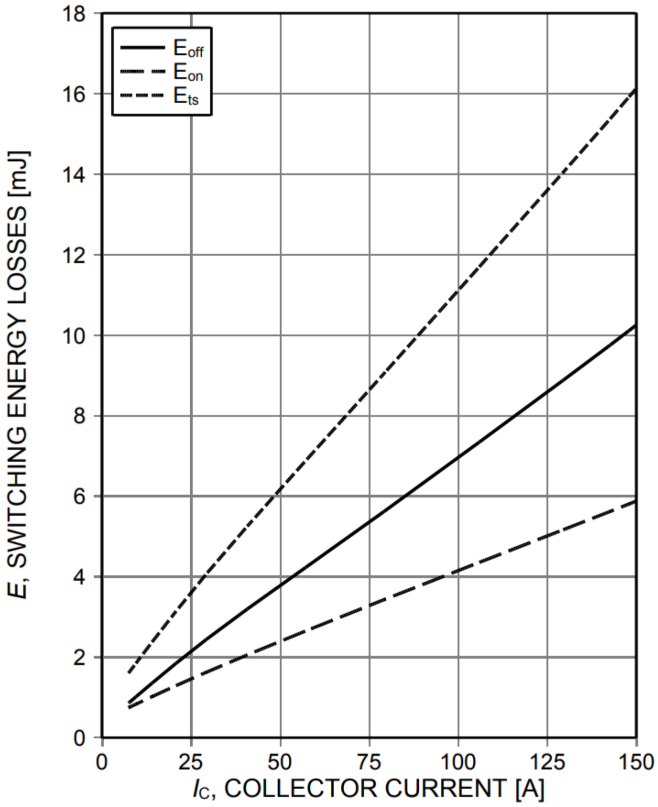


Figure 10. **Typical switching energy losses as a function of collector current**
(inductive load, T_{vj}=175°C, V_{CE}=600V, V_{GE}=0/15V, R_G=4Ω, Dynamic test circuit in Figure E)

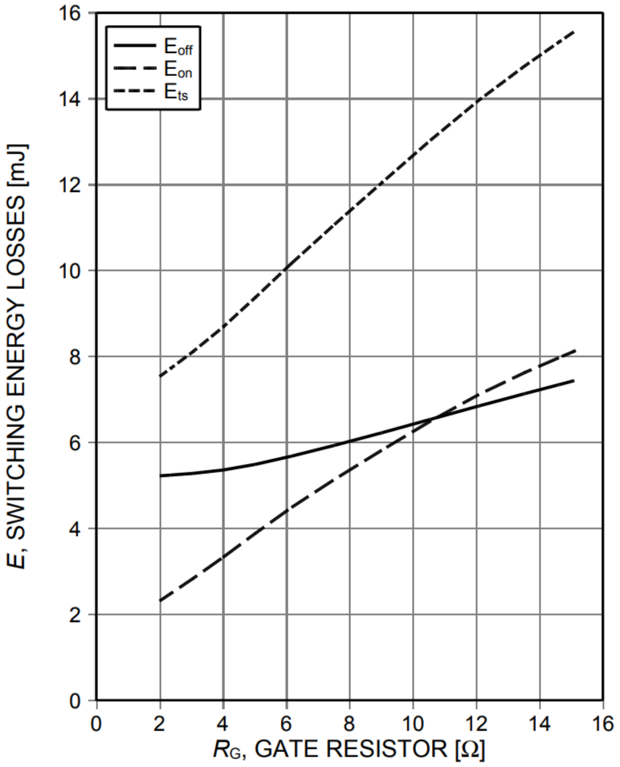


Figure 11. **Typical switching energy losses as a function of gate resistor**
(inductive load, T_{vj}=175°C, V_{CE}=600V, V_{GE}=0/15V, I_C=75A, Dynamic test circuit in Figure E)

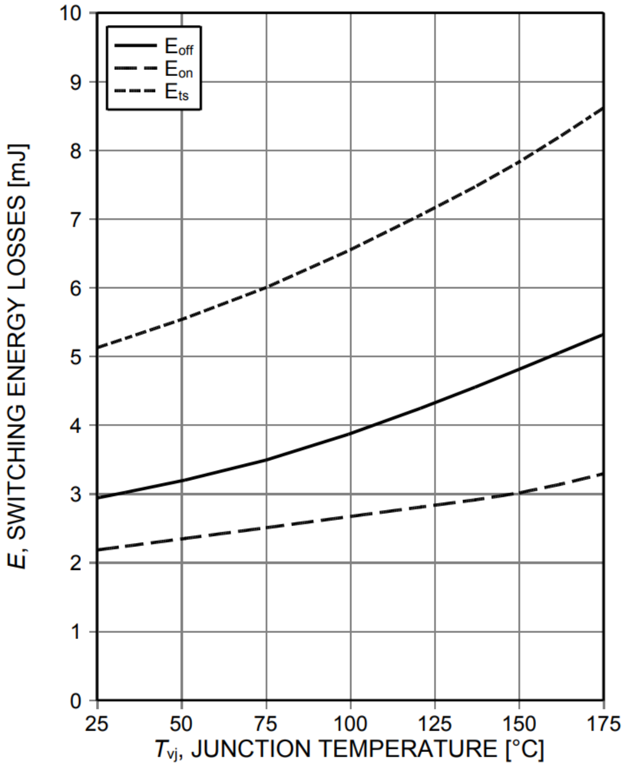


Figure 12. **Typical switching energy losses as a function of junction temperature**
(inductive load, V_{CE}=600V, V_{GE}=0/15V, I_C=75A, R_G=4Ω, Dynamic test circuit in Figure E)

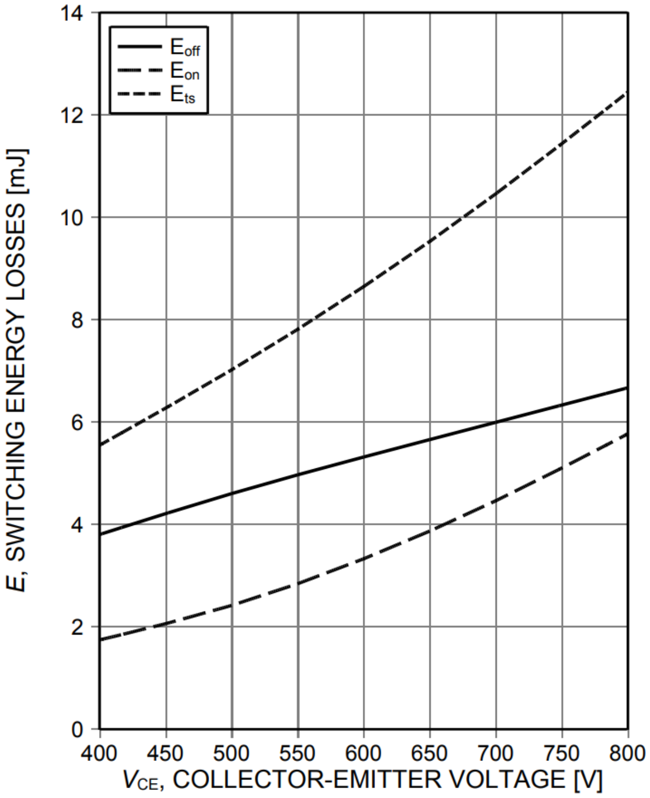


Figure 13. **Typical switching energy losses as a function of collector emitter voltage**
(inductive load, T_{vj}=175°C, V_{GE}=0/15V, I_C=75A, R_G=4Ω, Dynamic test circuit in Figure E)

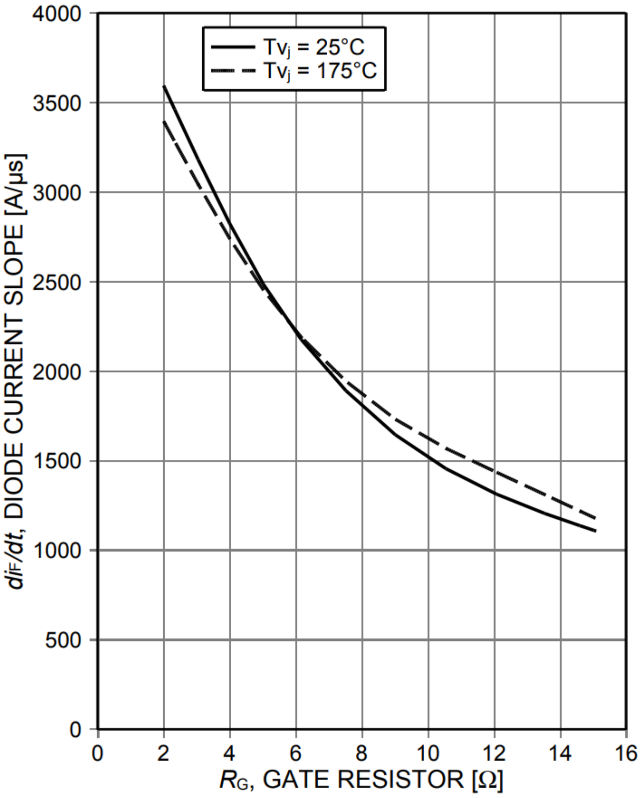


Figure 14. **Typical diode current slope as a function of gate resistor**
(inductive load, V_{CE}=600V, V_{GE}=0/15V, I_C=75A, Dynamic test circuit in Figure E)

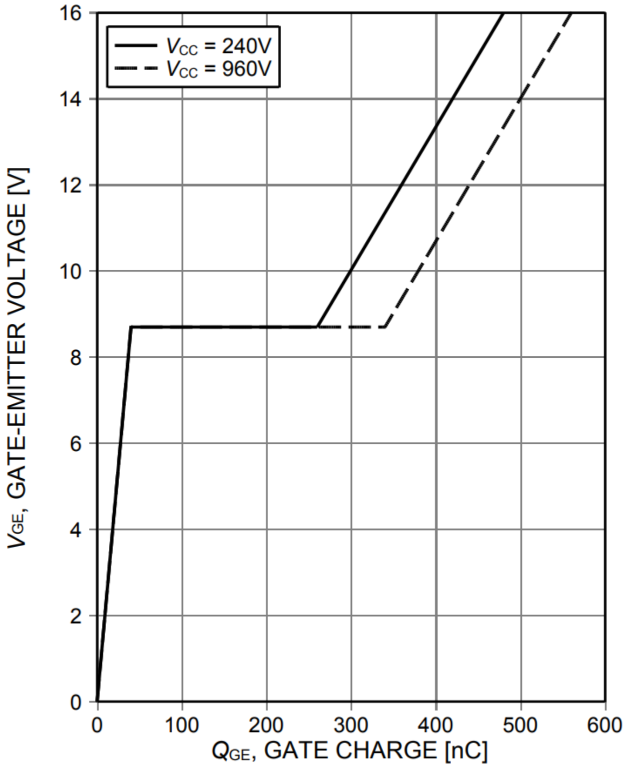


Figure 15. **Typical gate charge**
(I_C=75A)

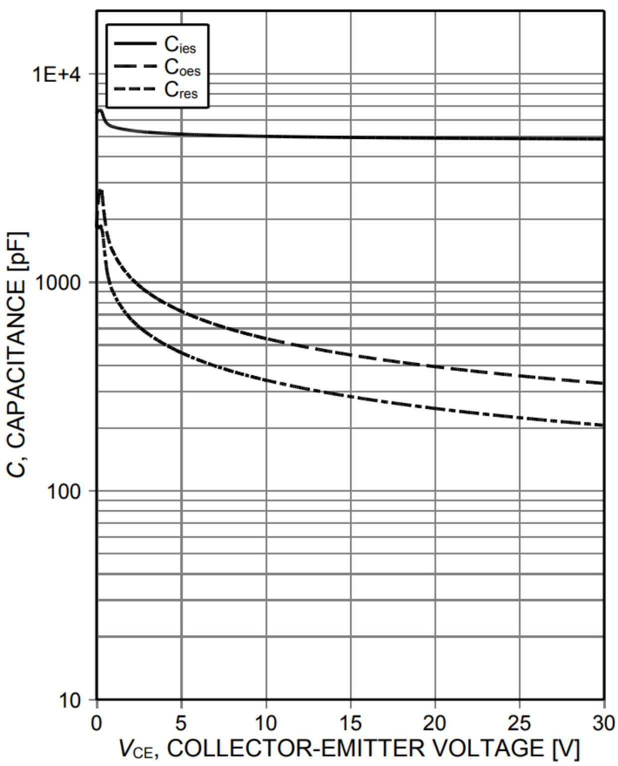
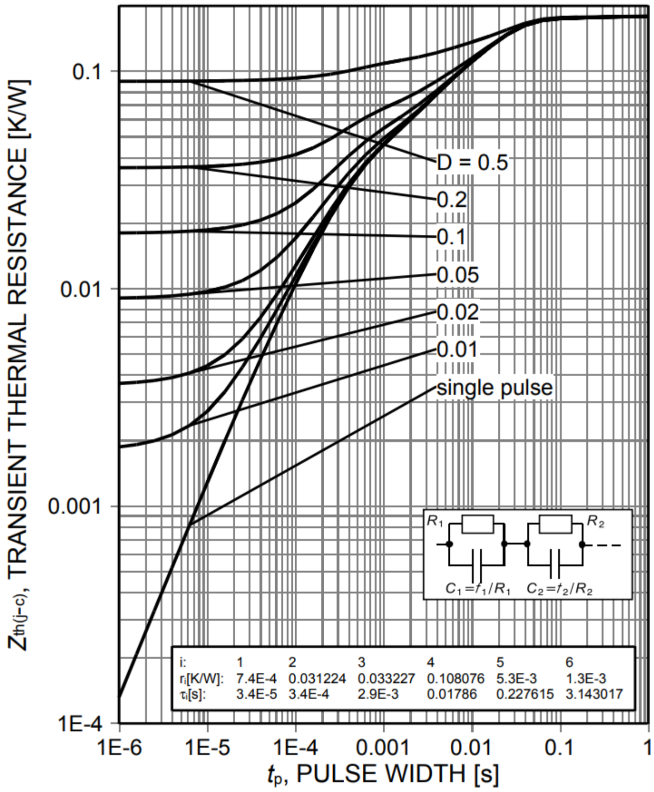
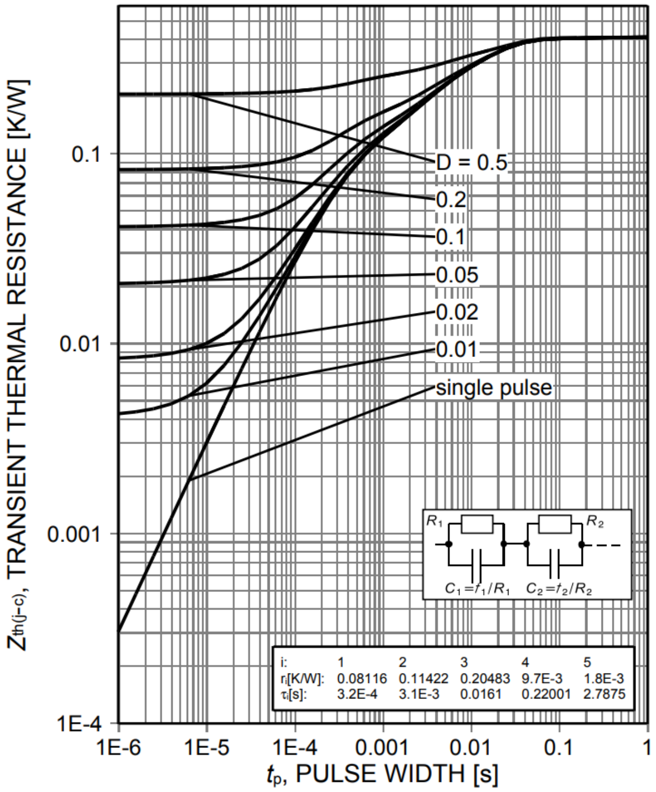


Figure 16. **Typical capacitance as a function of collector-emitter voltage**
(V_{GE}=0V, f=1MHz)



i:	1	2	3	4	5	6
r_i[K/W]:	7.4E-4	0.031224	0.033227	0.108076	5.3E-3	1.3E-3
τ_i[s]:	3.4E-5	3.4E-4	2.9E-3	0.01786	0.227615	3.143017

Figure 17. **IGBT transient thermal resistance**
(D=t_p/T)



i:	1	2	3	4	5
r_i[K/W]:	0.08116	0.11422	0.20483	9.7E-3	1.8E-3
τ_i[s]:	3.2E-4	3.1E-3	0.0161	0.22001	2.7875

Figure 18. **Diode transient thermal impedance as a function of pulse width**
(D=t_p/T)

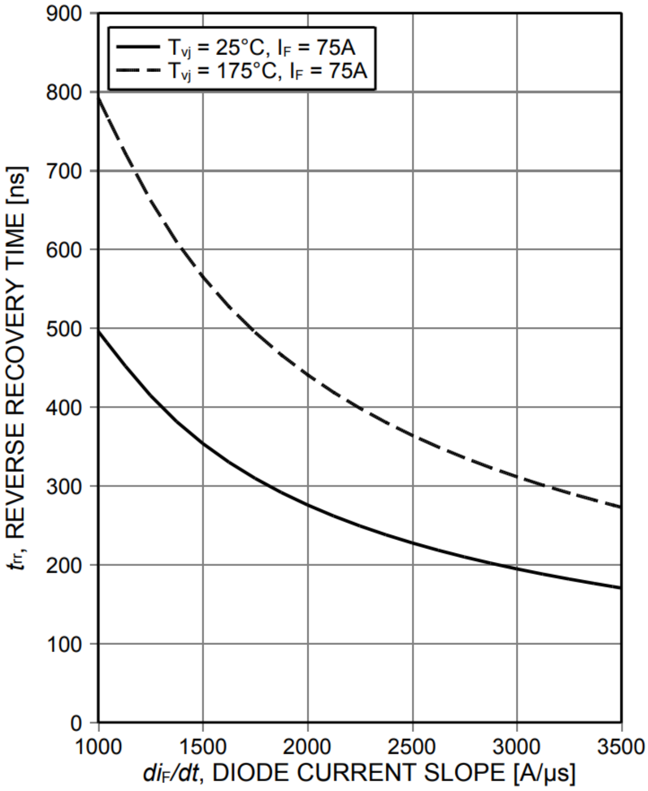


Figure 19. **Typical reverse recovery time as a function of diode current slope**
(V_R=600V)

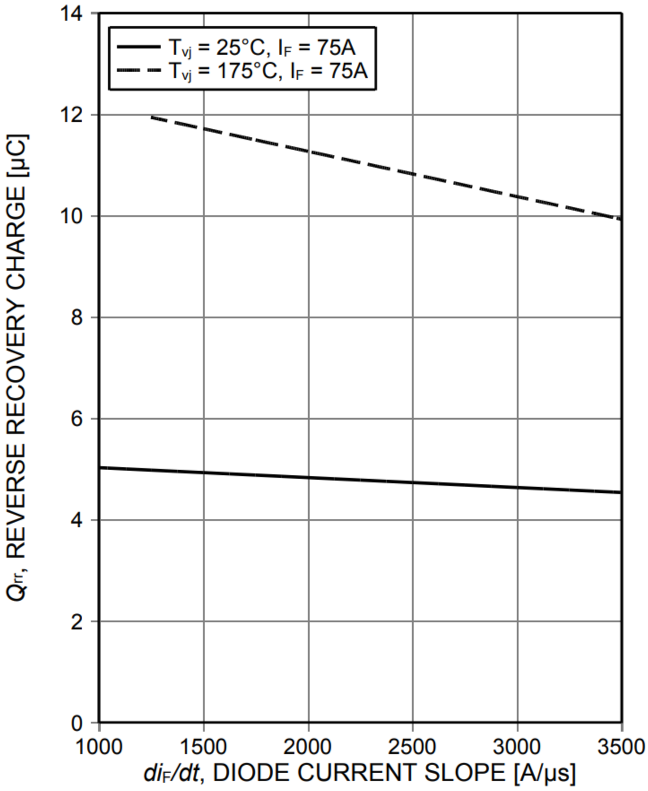


Figure 20. **Typical reverse recovery charge as a function of diode current slope**
(V_R=600V)

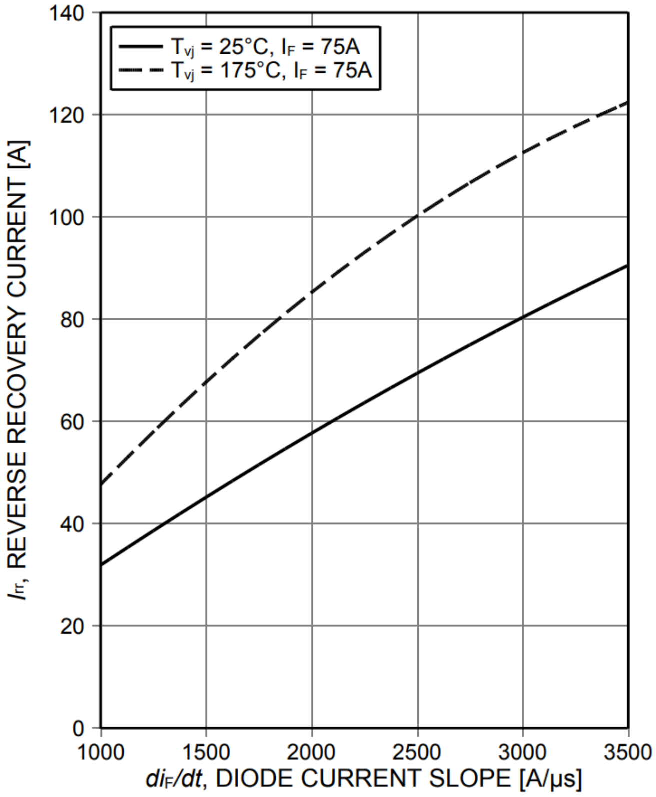


Figure 21. **Typical reverse recovery current as a function of diode current slope**
(V_R=600V)

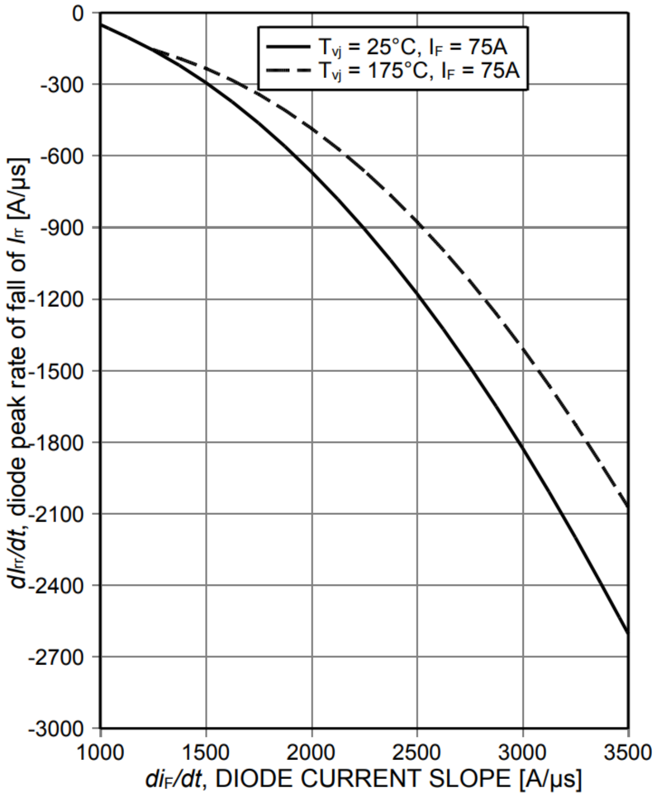


Figure 22. **Typical diode peak rate of fall of reverse recovery current as a function of diode current slope**
(V_R=600V)

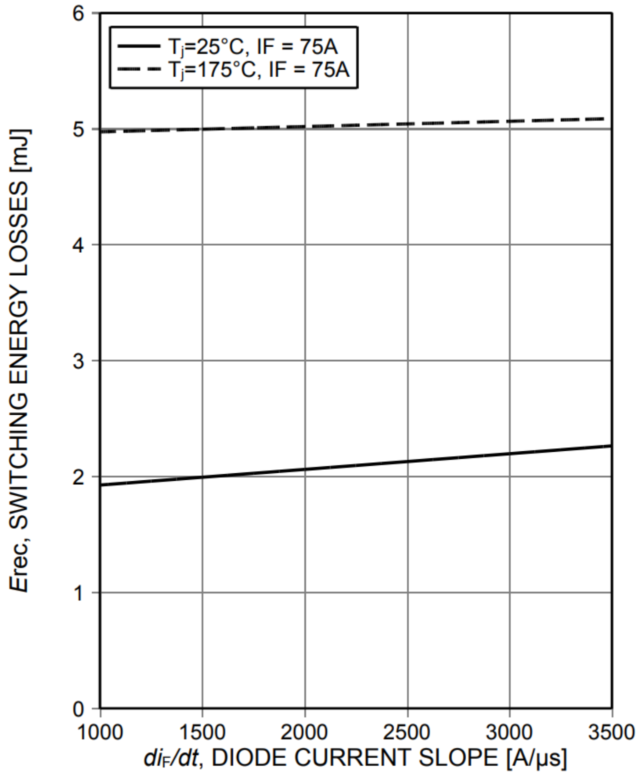


Figure 23. **Typical reverse energy losses as a function of diode current slope**
(V_R=600V)

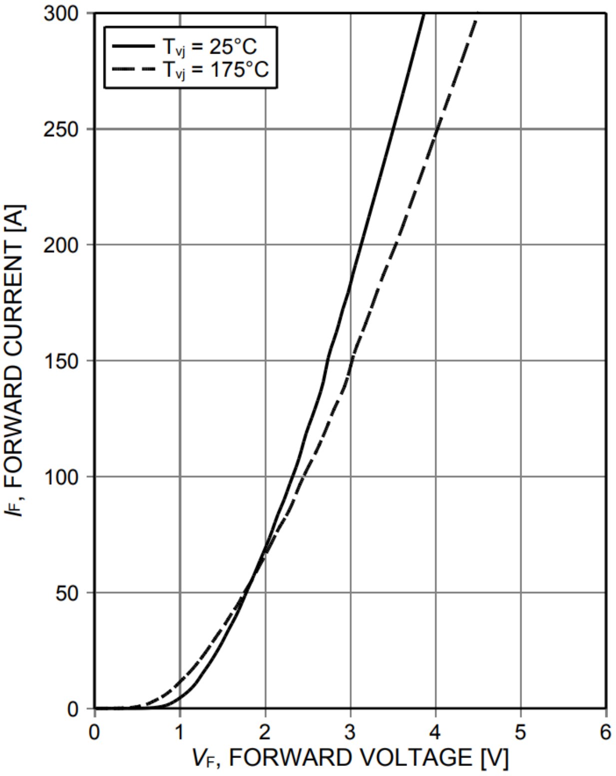


Figure 24. **Typical diode forward current as a function of forward voltage**

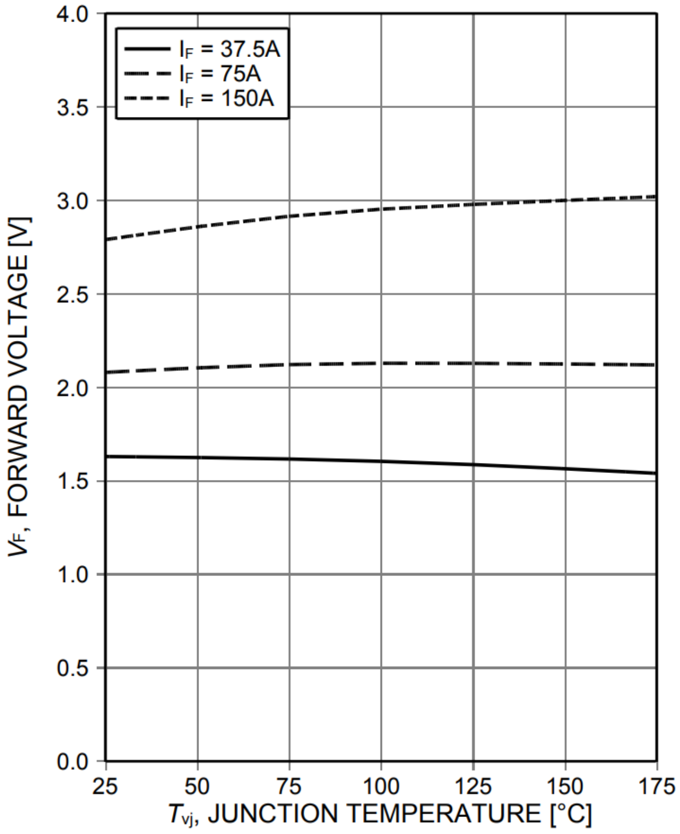
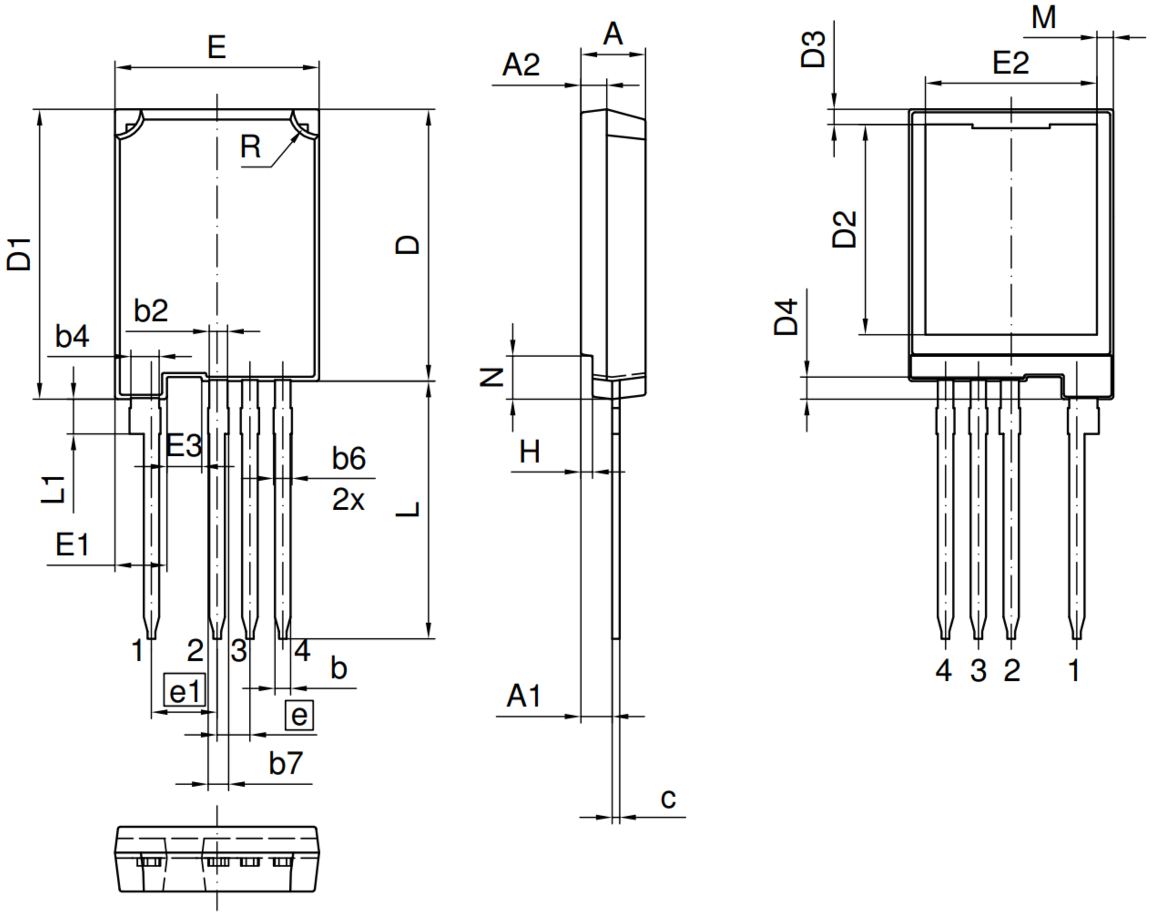


Figure 25. **Typical diode forward voltage as a function of junction temperature**

PG-TO247-4-2



NOTES:

PACKAGE SURFACE ROUTE BETWEEN PIN 1 & PIN 2 WILL BE 5.1mm MIN.

ALL b... AND c DIMENSIONS INCLUDING PLATING EXCEPT AREA OF CUTTING

DIMENSION	MILLIMETERS	
	MIN.	MAX.
A	4.9	5.1
A1	2.31	2.51
A2	1.9	2.1
b	1.16	1.29
b2	1.36	1.49
b4	2.16	2.29
b6	1.16	1.45
b7	1.16	1.65
c	0.59	0.66
D	20.9	21.1
D1	22.3	22.5
D2	15.95	16.55
D3	1	1.35
D4	1.6	1.8
E	15.7	15.9
E1	3.9	4.1
E2	13.1	13.5
E3	2.58	2.78
e	2.54	
e1	5.08	
H	0.8	1
L	19.8	20.1
L1	2.55	2.85
M	0.97	1.57
N	3.24	3.44
R	1.9	2.1

DOCUMENT NO.
Z8B00182798

REVISION
01

SCALE 2:1
0 5 10mm

EUROPEAN PROJECTION

ISSUE DATE
23.09.2016

测试条件

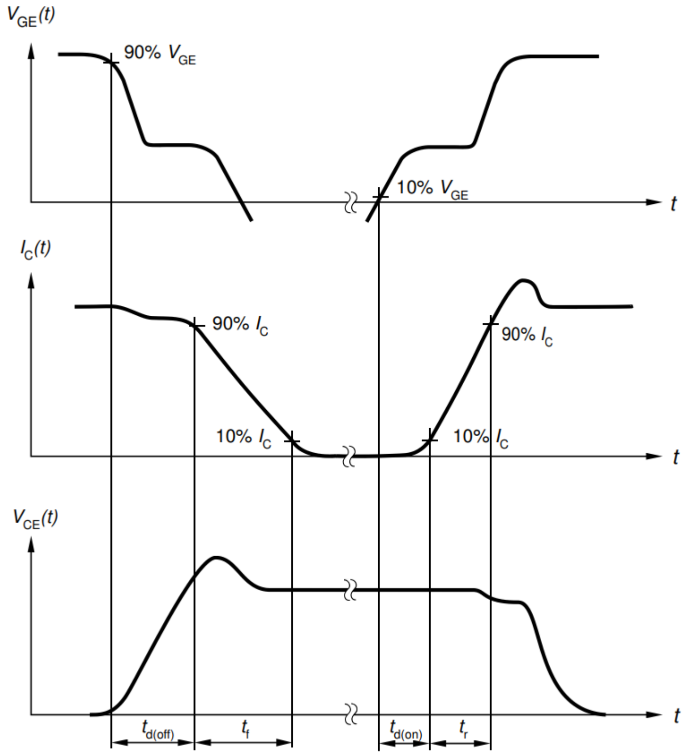


Figure A. **Definition of switching times**

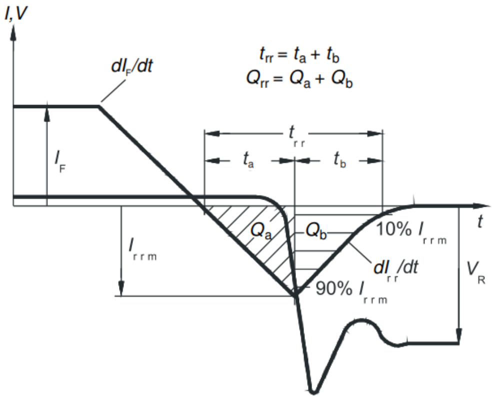


Figure C. **Definition of diode switching characteristics**

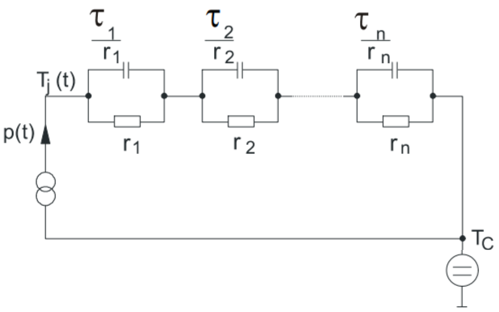


Figure D. **Thermal equivalent circuit**

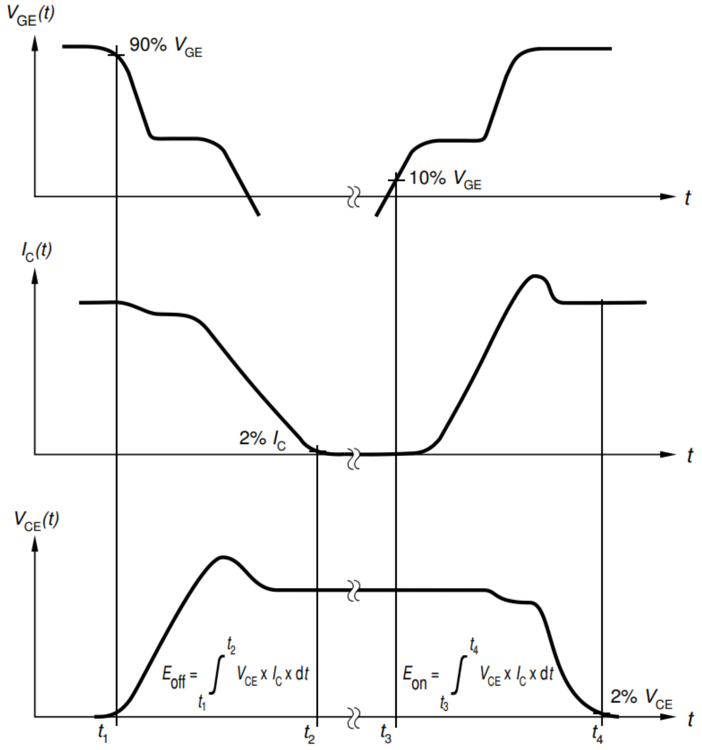


Figure B. **Definition of switching losses**

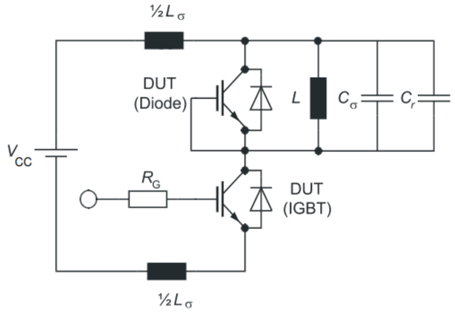


Figure E. **Dynamic test circuit**
Parasitic inductance L_σ,
parasitic capacitor C_σ,
relief capacitor C_r,
(only for ZVT switching)

修订记录

IKY75N120CS6

Revision: 2018-08-07, Rev. 2.2

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.1	2018-05-07	Final data sheet
2.2	2018-08-07	Fig.5 and Fig.25 legend correction

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版本 **2025-09-16**

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