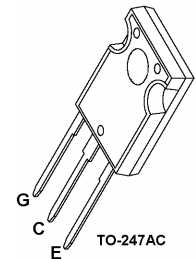
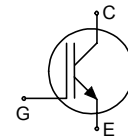


## Low Loss IGBT in Trench and Fieldstop technology

- Approx. 1.0V reduced  $V_{CE(sat)}$  compared to BUP305D
- Short circuit withstand time – 10 $\mu$ s
- Designed for :
  - Frequency Converters
  - Uninterrupted Power Supply
- Trench and Fieldstop technology for 1200 V applications offers :
  - very tight parameter distribution
  - high ruggedness, temperature stable behavior
- NPT technology offers easy parallel switching capability due to positive temperature coefficient in  $V_{CE(sat)}$
- Low EMI
- Low Gate Charge
- Complete product spectrum and PSpice Models : <http://www.infineon.com/igbt/>



Type	$V_{CE}$	$I_C$	$V_{CE(sat), T_j=25^\circ C}$	$T_{j,max}$	Package	Ordering Code
IGW08T120	1200V	8A	1.7V	150°C	TO-247AC	Q67040-S4513

### Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CE}$	1200	V
DC collector current	$I_C$	16	A
$T_C = 25^\circ C$		16	
$T_C = 100^\circ C$		8	
Pulsed collector current, $t_p$ limited by $T_{j,max}$	$I_{C,puls}$	24	
Turn off safe operating area	-	24	
$V_{CE} \leq 1200V, T_j \leq 150^\circ C$			
Diode forward current	$I_F$	16	
$T_C = 25^\circ C$		16	
$T_C = 100^\circ C$		8	
Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
Short circuit withstand time <sup>1)</sup>	$t_{SC}$	10	$\mu s$
$V_{GE} = 15V, V_{CC} \leq 1200V, T_j \leq 150^\circ C$			
Power dissipation	$P_{tot}$	70	W
$T_C = 25^\circ C$			
Operating junction temperature	$T_j$	-40...+150	$^\circ C$
Storage temperature	$T_{stg}$	-55...+150	
Soldering temperature, 1.6mm (0.063 in.) from case for 10s	-	260	

<sup>1)</sup> Allowed number of short circuits: <1000; time between short circuits: >1s.

**Thermal Resistance**

Parameter	Symbol	Conditions	Max. Value	Unit
<b>Characteristic</b>				
IGBT thermal resistance, junction – case	$R_{thJC}$		1.7	K/W
Thermal resistance, junction – ambient	$R_{thJA}$	TO-247AC	40	

**Electrical Characteristic, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>Static Characteristic</b>						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=0.5mA$	1200	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15V, I_C=8A$	-	1.7	2.2	
		$T_j=25^\circ\text{C}$	-	2.0	-	
		$T_j=150^\circ\text{C}$	-	2.2	-	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C=0.3mA, V_{CE}=V_{GE}$	5.0	5.8	6.5	
Zero gate voltage collector current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V$				mA
		$T_j=25^\circ\text{C}$	-	-	0.2	
		$T_j=150^\circ\text{C}$	-	-	2.0	
Gate-emitter leakage current	$I_{GES}$	$V_{CE}=0V, V_{GE}=20V$	-	-	100	nA
Transconductance	$g_{fs}$	$V_{CE}=20V, I_C=8A$	-	5	-	S
Integrated gate resistor	$R_{Gint}$		none			$\Omega$

**Dynamic Characteristic**

Input capacitance	$C_{iss}$	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=1MHz$	-	600	-	pF
Output capacitance	$C_{oss}$		-	36	-	
Reverse transfer capacitance	$C_{riss}$		-	28	-	
Gate charge	$Q_{Gate}$	$V_{CC}=960V, I_C=8A$ $V_{GE}=15V$	-	53	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	$L_E$	TO-247AC	-	-	13	nH
Short circuit collector current <sup>1)</sup>	$I_{C(SC)}$	$V_{GE}=15V, t_{SC} \leq 10\mu s$ $V_{CC} = 600V,$ $T_j = 25^\circ C$	-	48	-	A

**Switching Characteristic, Inductive Load, at  $T_j=25^\circ C$**

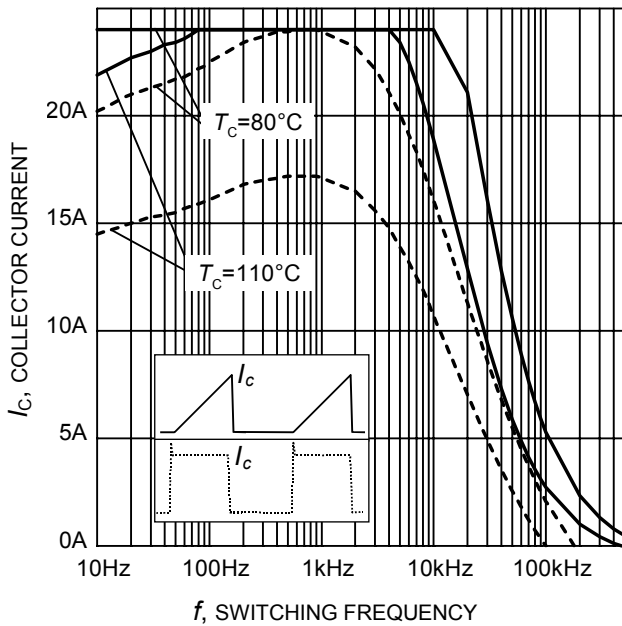
Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>IGBT Characteristic</b>						
Turn-on delay time	$t_{d(on)}$	$T_j=25^\circ C,$ $V_{CC}=600V, I_C=8A,$ $V_{GE}=-15/15V,$ $R_G=81\Omega,$ $L_{\sigma}^{2)}=180nH,$ $C_{\sigma}^{2)}=39pF$ Energy losses include "tail" and diode reverse recovery.	-	40	-	ns
Rise time	$t_r$		-	23	-	
Turn-off delay time	$t_{d(off)}$		-	450	-	
Fall time	$t_f$		-	70	-	
Turn-on energy	$E_{on}$		-	0.67	-	mJ
Turn-off energy	$E_{off}$		-	0.7	-	
Total switching energy	$E_{ts}$		-	1.37	-	

**Switching Characteristic, Inductive Load, at  $T_j=150^\circ C$**

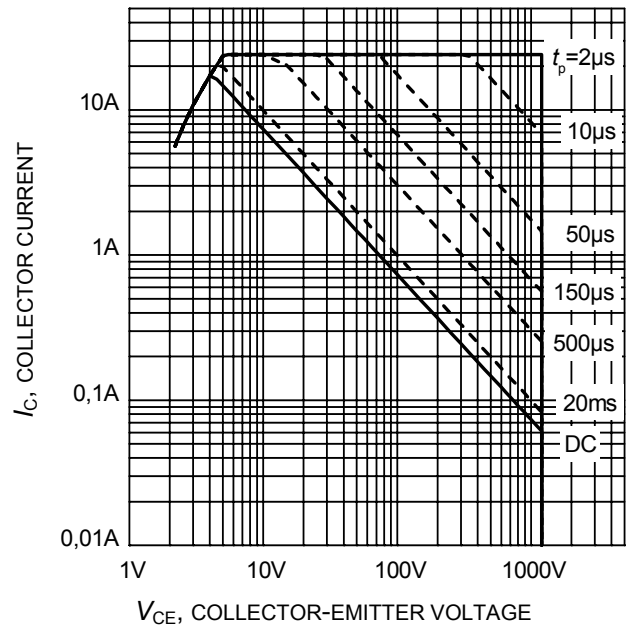
Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>IGBT Characteristic</b>						
Turn-on delay time	$t_{d(on)}$	$T_j=150^\circ C,$ $V_{CC}=600V, I_C=8A,$ $V_{GE}=-15/15V,$ $R_G=81\Omega,$ $L_{\sigma}^{2)}=180nH,$ $C_{\sigma}^{2)}=39pF$ Energy losses include "tail" and diode reverse recovery.	-	40	-	ns
Rise time	$t_r$		-	26	-	
Turn-off delay time	$t_{d(off)}$		-	570	-	
Fall time	$t_f$		-	140	-	
Turn-on energy	$E_{on}$		-	1.08	-	mJ
Turn-off energy	$E_{off}$		-	1.2	-	
Total switching energy	$E_{ts}$		-	2.28	-	

<sup>1)</sup> Allowed number of short circuits: <1000; time between short circuits: >1s.

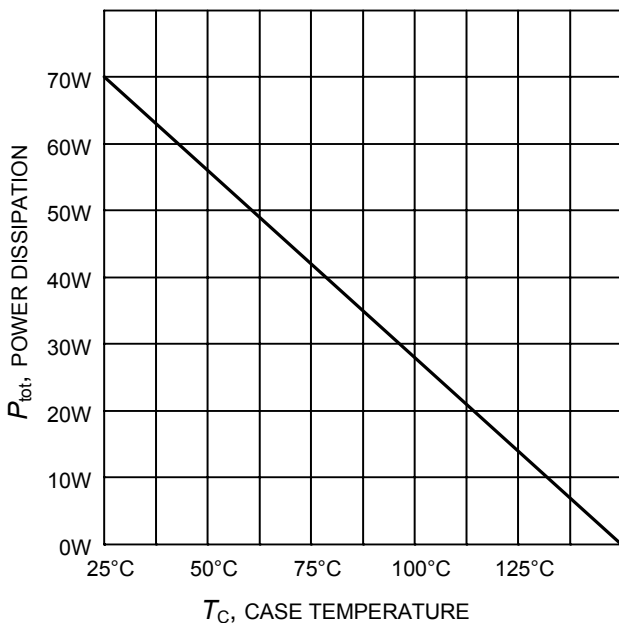
<sup>2)</sup> Leakage inductance  $L_{\sigma}$  and Stray capacity  $C_{\sigma}$  due to dynamic test circuit in Figure E.



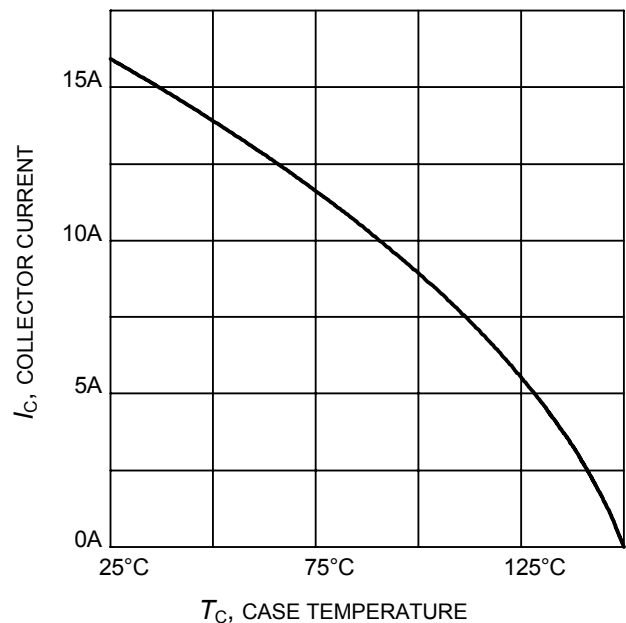
**Figure 1. Collector current as a function of switching frequency**  
 ( $T_j \leq 150^\circ\text{C}$ ,  $D = 0.5$ ,  $V_{CE} = 600\text{V}$ ,  
 $V_{GE} = 0/+15\text{V}$ ,  $R_G = 81\Omega$ )



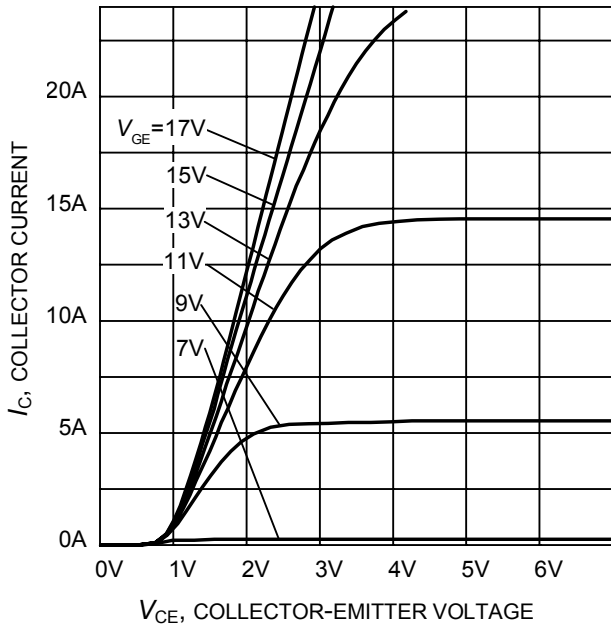
**Figure 2. Safe operating area**  
 ( $D = 0$ ,  $T_C = 25^\circ\text{C}$ ,  
 $T_j \leq 150^\circ\text{C}$ ;  $V_{GE} = 15\text{V}$ )



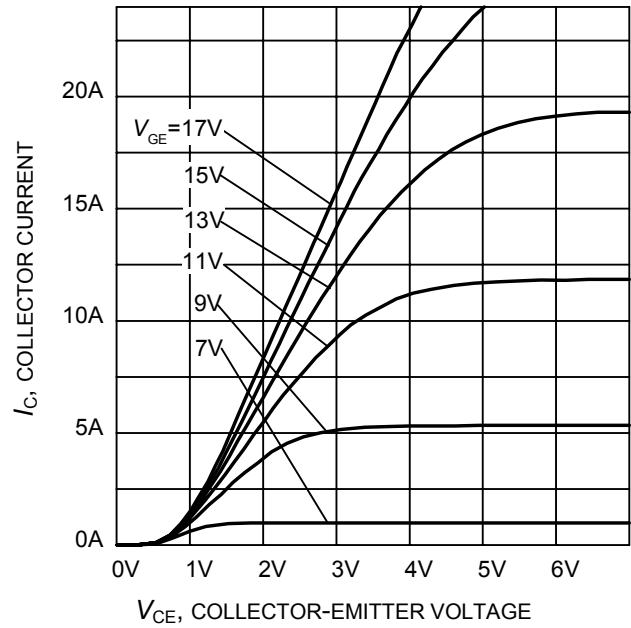
**Figure 3. Power dissipation as a function of case temperature**  
 ( $T_j \leq 150^\circ\text{C}$ )



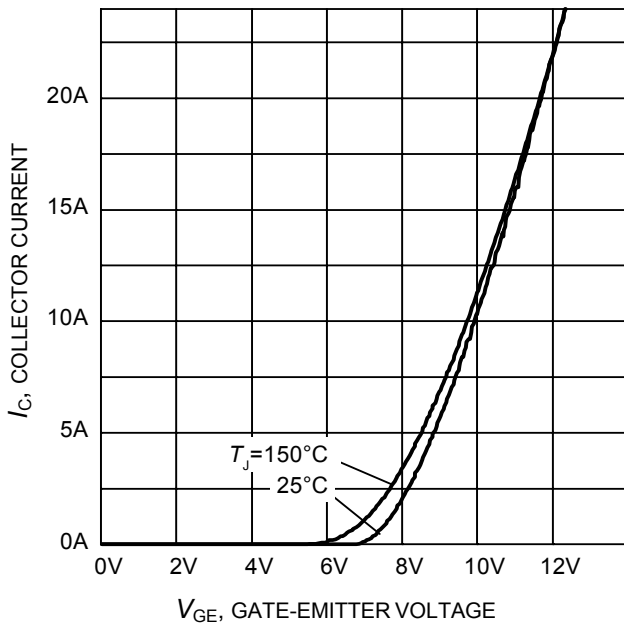
**Figure 4. Collector current as a function of case temperature**  
 ( $V_{GE} \geq 15\text{V}$ ,  $T_j \leq 150^\circ\text{C}$ )



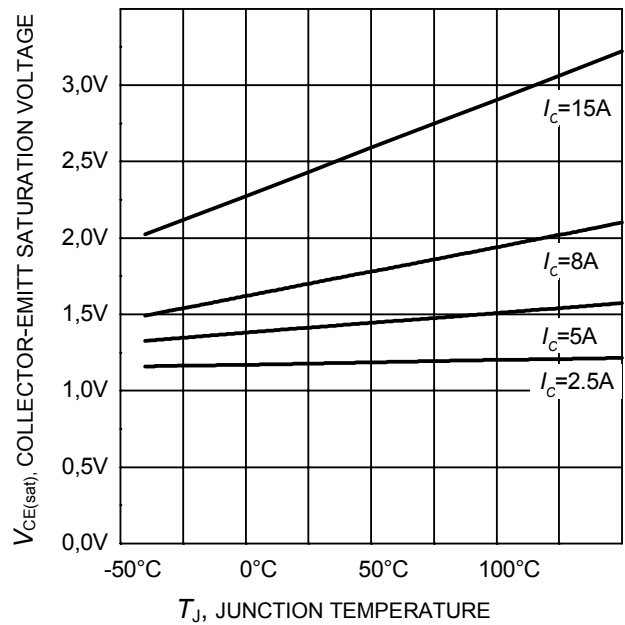
**Figure 5. Typical output characteristic**  
( $T_j = 25^\circ\text{C}$ )



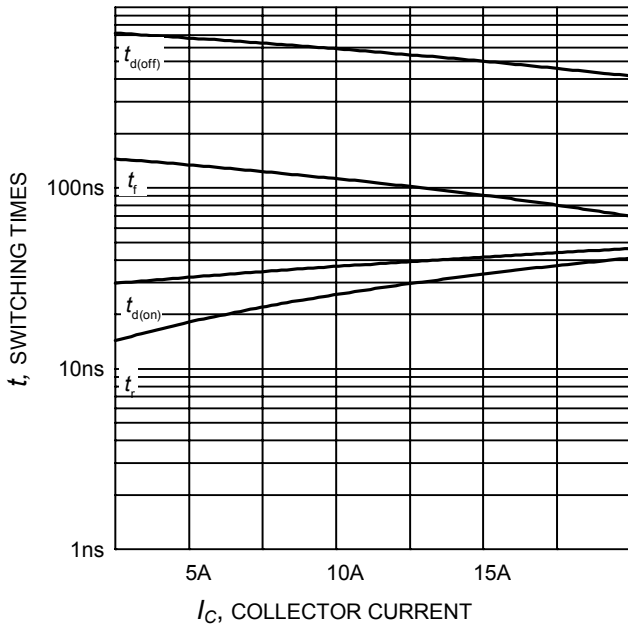
**Figure 6. Typical output characteristic**  
( $T_j = 150^\circ\text{C}$ )



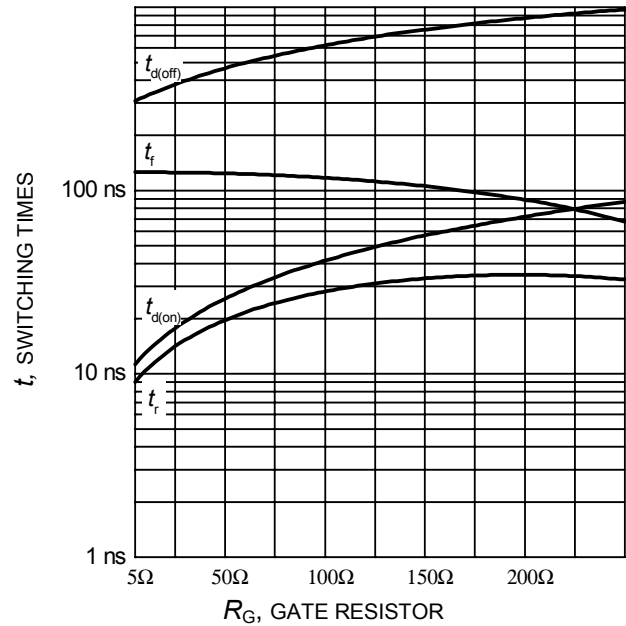
**Figure 7. Typical transfer characteristic**  
( $V_{CE} = 20\text{V}$ )



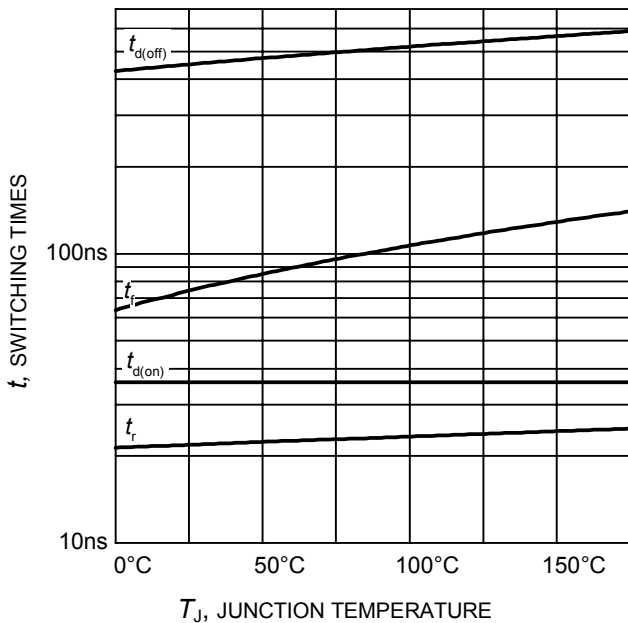
**Figure 8. Typical collector-emitter saturation voltage as a function of junction temperature**  
( $V_{GE} = 15\text{V}$ )



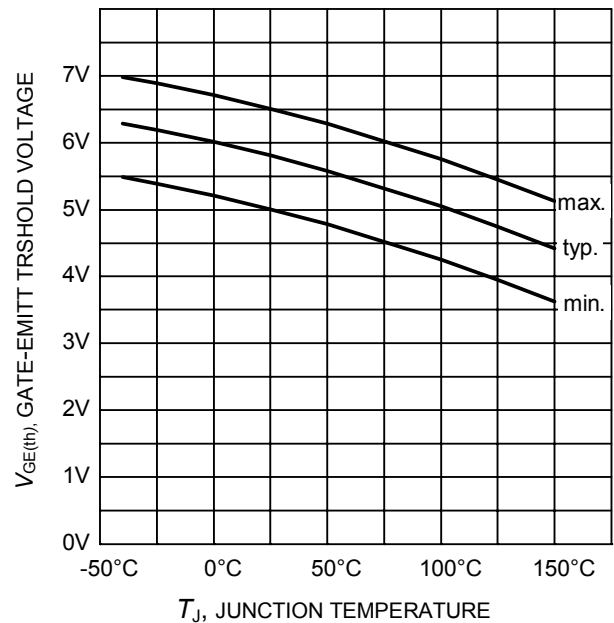
**Figure 9. Typical switching times as a function of collector current**  
 (inductive load,  $T_J=150^{\circ}\text{C}$ ,  $V_{CE}=600\text{V}$ ,  $V_{GE}=0/15\text{V}$ ,  $R_G=81\Omega$ , Dynamic test circuit in Figure E)



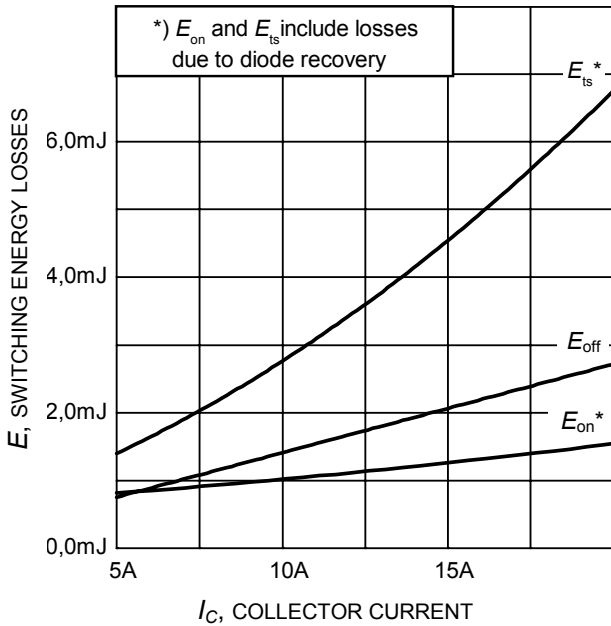
**Figure 10. Typical switching times as a function of gate resistor**  
 (inductive load,  $T_J=150^{\circ}\text{C}$ ,  $V_{CE}=600\text{V}$ ,  $V_{GE}=0/15\text{V}$ ,  $I_C=8\text{A}$ , Dynamic test circuit in Figure E)



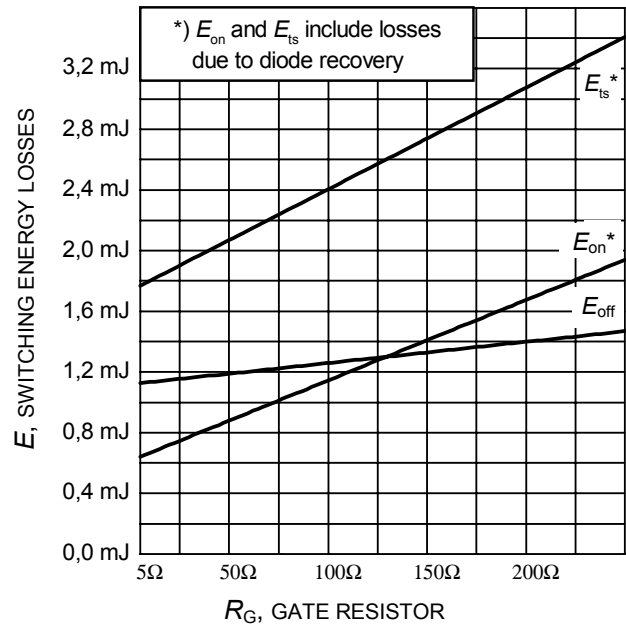
**Figure 11. Typical switching times as a function of junction temperature**  
 (inductive load,  $V_{CE}=600\text{V}$ ,  $V_{GE}=0/15\text{V}$ ,  $I_C=8\text{A}$ ,  $R_G=81\Omega$ , Dynamic test circuit in Figure E)



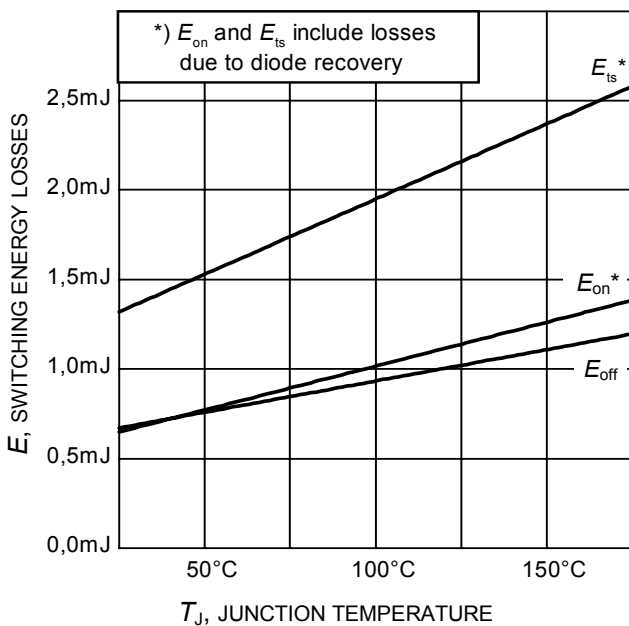
**Figure 12. Gate-emitter threshold voltage as a function of junction temperature**  
 ( $I_C = 0.3\text{mA}$ )



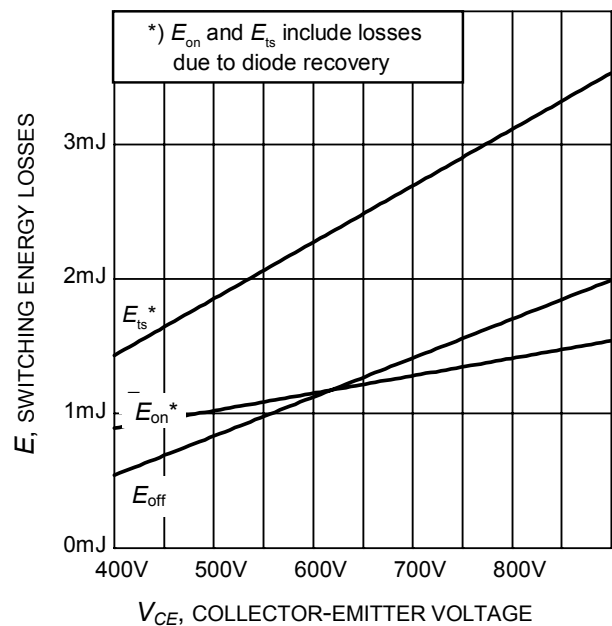
**Figure 13. Typical switching energy losses as a function of collector current**  
 (inductive load,  $T_J=150^\circ\text{C}$ ,  $V_{CE}=600\text{V}$ ,  $V_{GE}=0/15\text{V}$ ,  $R_G=81\Omega$ , Dynamic test circuit in Figure E)



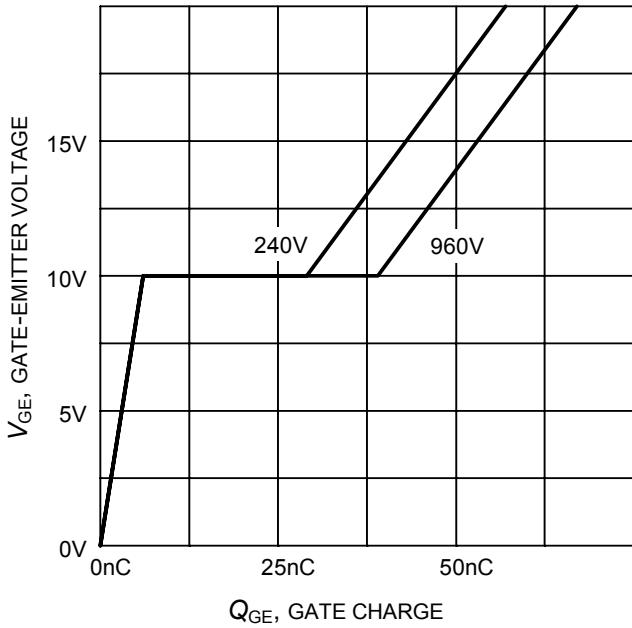
**Figure 14. Typical switching energy losses as a function of gate resistor**  
 (inductive load,  $T_J=150^\circ\text{C}$ ,  $V_{CE}=600\text{V}$ ,  $V_{GE}=0/15\text{V}$ ,  $I_C=8\text{A}$ , Dynamic test circuit in Figure E)



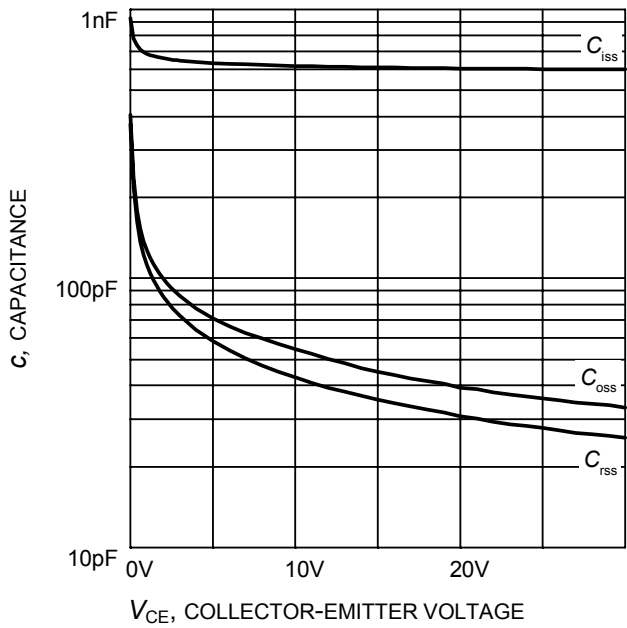
**Figure 15. Typical switching energy losses as a function of junction temperature**  
 (inductive load,  $V_{CE}=600\text{V}$ ,  $V_{GE}=0/15\text{V}$ ,  $I_C=8\text{A}$ ,  $R_G=81\Omega$ , Dynamic test circuit in Figure E)



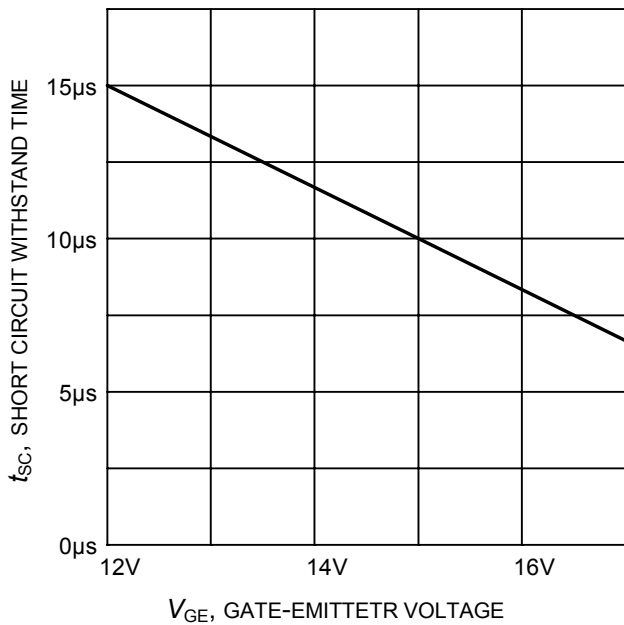
**Figure 16. Typical switching energy losses as a function of collector emitter voltage**  
 (inductive load,  $T_J=150^\circ\text{C}$ ,  $V_{GE}=0/15\text{V}$ ,  $I_C=25\text{A}$ ,  $R_G=22\Omega$ , Dynamic test circuit in Figure E)



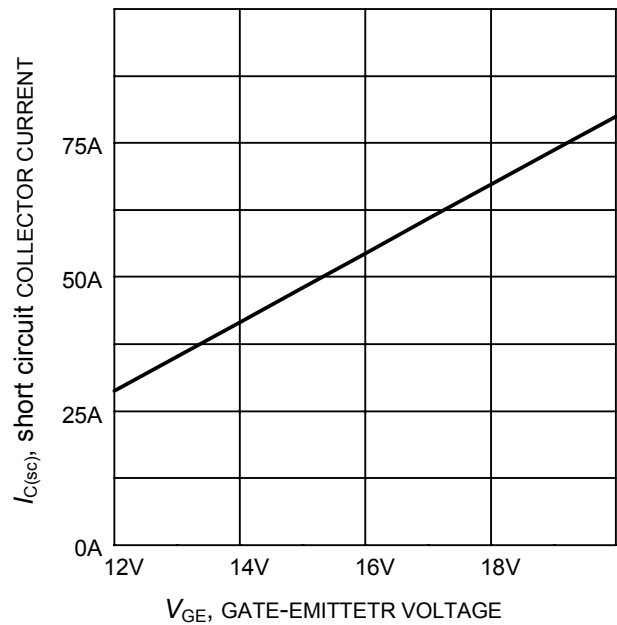
**Figure 17. Typical gate charge**  
( $I_C=8\text{ A}$ )



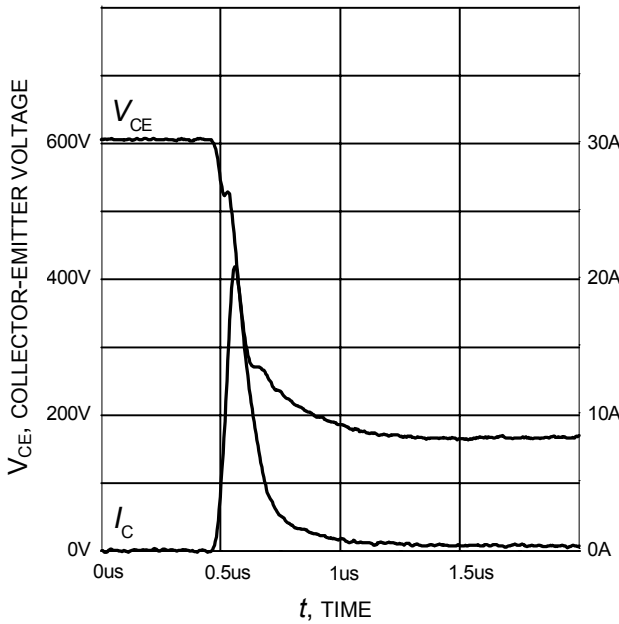
**Figure 18. Typical capacitance as a function of collector-emitter voltage**  
( $V_{GE}=0\text{V}$ ,  $f = 1\text{ MHz}$ )



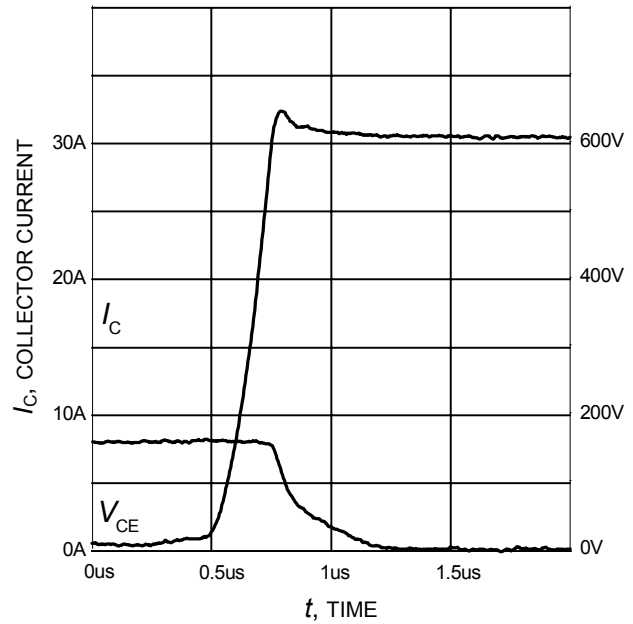
**Figure 19. Short circuit withstand time as a function of gate-emitter voltage**  
( $V_{CE}=600\text{V}$ , start at  $T_J=25^\circ\text{C}$ )



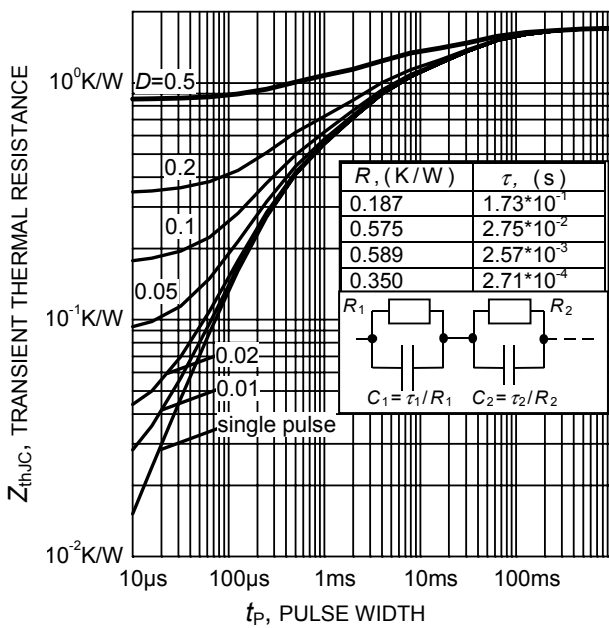
**Figure 20. Typical short circuit collector current as a function of gate-emitter voltage**  
( $V_{CE} \leq 600\text{V}$ ,  $T_J \leq 150^\circ\text{C}$ )



**Figure 21. Typical turn on behavior**  
 ( $V_{GE}=0/15V$ ,  $R_G=81\Omega$ ,  $T_j = 150^\circ C$ ,  
 Dynamic test circuit in Figure E)



**Figure 22. Typical turn off behavior**  
 ( $V_{GE}=15/0V$ ,  $R_G=81\Omega$ ,  $T_j = 150^\circ C$ ,  
 Dynamic test circuit in Figure E)



**Figure 23. IGBT transient thermal resistance**  
 ( $D = t_p / T$ )



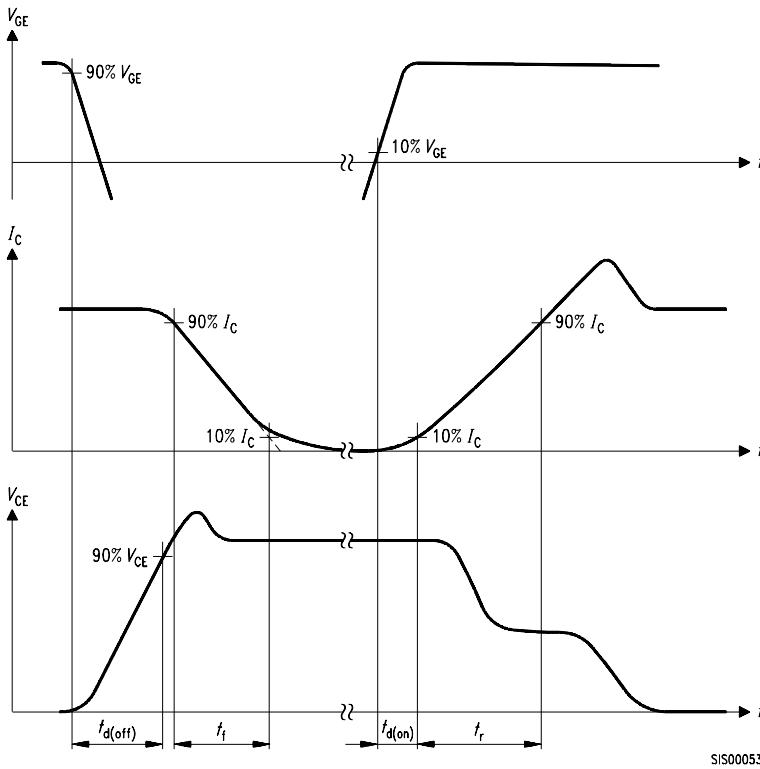


Figure A. Definition of switching times

SIS00053

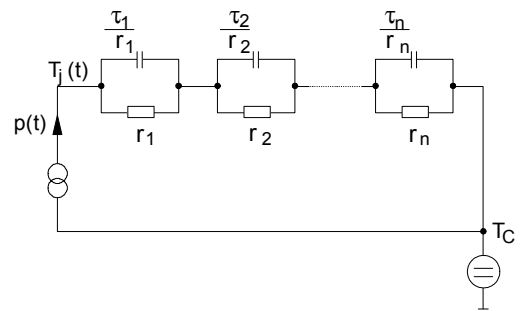


Figure D. Thermal equivalent circuit

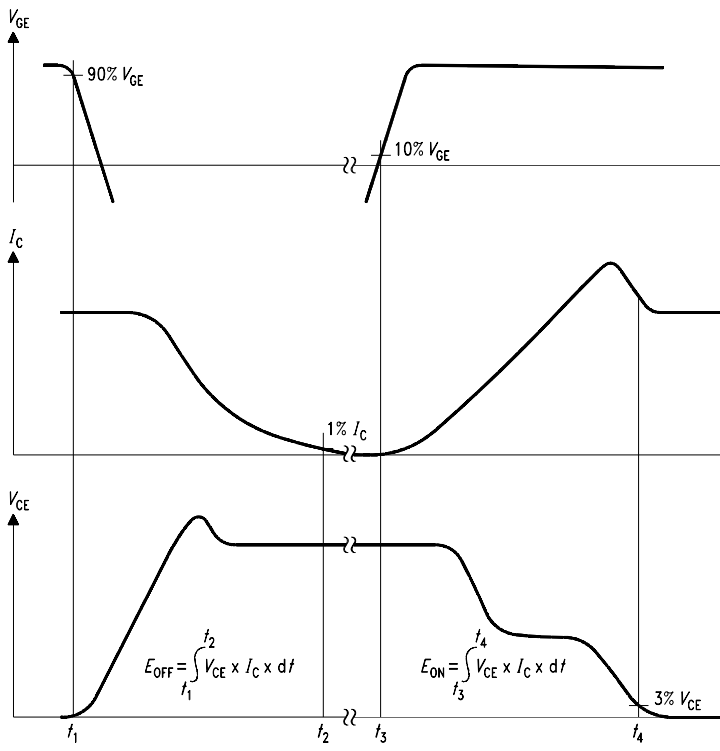


Figure B. Definition of switching losses

SIS

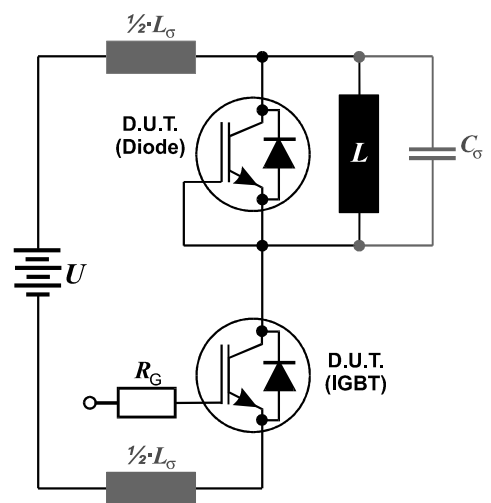


Figure E. Dynamic test circuit  
Leakage inductance  $L_{\sigma} = 180\text{nH}$   
and Stray capacity  $C_{\sigma} = 39\text{pF}$ .



Preliminary

TrenchStoP Series

IGW08T120

---

**Published by**  
**Infineon Technologies AG,**  
**Bereich Kommunikation**  
**St.-Martin-Strasse 53,**  
**D-81541 München**  
**© Infineon Technologies AG 2001**  
**All Rights Reserved.**

**Attention please!**

The information herein is given to describe certain components and shall not be considered as warranted characteristics.

Terms of delivery and rights to technical change reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

Infineon Technologies is an approved CECC manufacturer.

**Information**

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office in Germany or our Infineon Technologies Representatives worldwide (see address list).

**Warnings**

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

[LittleDiode.com](http://LittleDiode.com)

Looking forward to providing you with the best possible service.