

Final datasheet

Short circuit rugged 1200 V TRENCHSTOP™ IGBT 7 technology

Features

- $V_{CE} = 1200\text{ V}$
- $I_C = 15\text{ A}$
- Very low $V_{CEsat} = 1.65\text{ V (typ.)}$ at $I_{Cnom} = 15\text{ A}$, 25°C
- Short circuit robust $t_{sc} = 4\text{ }\mu\text{s}$ at $V_{CE} = 800\text{ V}$, $V_{GE} = 15\text{ V}$
- Smooth switching characteristics
- Wide range of dv/dt controllability
- TO263-7 package with high creepage distance $> 5.8\text{ mm}$, $400 \leq CTI < 600$
- High reliability and operating lifetime

Potential applications

- xEV auxiliary drives
- Automotive HV heaters

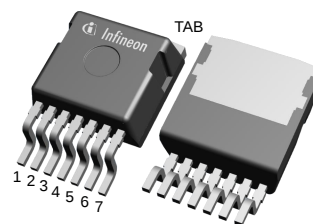
Product validation

- Qualified according to AEC-Q101 for automotive applications
- Qualified Reflow device according to JEDEC J-STD-020 MSL1

Description

Pin definition:

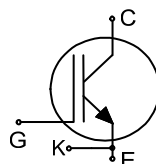
- Pin 1 (G) - Gate
- Pin 2 (K) - Kelvin Emitter
- Pin 3...7 (E) - Emitter
- Tab (C) - Collector



Halogen-free



RoHS



Type	Package	Marking
AIGBG15N120S7	PG-TO263-7-U01	AGBG15S7



Table of contents

	Description	1
	Features	1
	Potential applications	1
	Product validation	1
	Table of contents	2
1	Package	3
2	IGBT	3
3	Characteristics diagrams	6
4	Package outlines	11
5	Testing conditions	12
	Revision history	13
	Disclaimer	14

1 Package

Table 1 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Storage temperature	T_{stg}		-55		150	°C
Soldering temperature	T_{sold}	reflow soldering (MSL1 according to JEDEC J-STD-020)			260	°C
IGBT thermal resistance, junction-case	$R_{th(j-c)}$			0.65	0.85	K/W

2 IGBT

Table 2 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage ¹⁾	V_{CE}	$T_{vj} = -40...175\text{ °C}$		1200	V
DC collector current, limited by T_{vjmax}	I_C		$T_c = 25\text{ °C}$	33	A
			$T_c = 100\text{ °C}$	23	
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpulse}			45	A
Turn-off safe operating area		$V_{CE} \leq 1200\text{ V}$, $t_p \leq 1\text{ }\mu\text{s}$, $T_{vj} \leq 175\text{ °C}$		45	A
Gate-emitter voltage	V_{GE}			± 20	V
Transient gate-emitter voltage	V_{GE}	$t_p \leq 0.5\text{ }\mu\text{s}$, $D < 0.01$		± 25	V
Short-circuit withstand time	t_{SC}	$V_{CC} \leq 800\text{ V}$, $V_{GE} = 15\text{ V}$, Allowed number of short circuits < 1000, Time between short circuits $\geq 1.0\text{ s}$, $T_{vj} = 175\text{ °C}$		4	μs
Power dissipation	P_{tot}		$T_c = 25\text{ °C}$	176	W
			$T_c = 100\text{ °C}$	88	

1) Tested at $T_{vj}=25\text{ °C}$, verified by design/characterization over full temperature range

Table 3 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Collector-emitter saturation voltage	V_{CEsat}	$I_C = 15\text{ A}$, $V_{GE} = 15\text{ V}$		$T_{vj} = 25\text{ °C}$	1.65	V
				$T_{vj} = 175\text{ °C}$	2	
Gate-emitter threshold voltage	V_{GEth}	$I_C = 0.3\text{ mA}$, $V_{CE} = V_{GE}$	5.15	5.7	6.45	V

(table continues...)

Table 3 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Zero gate-voltage collector current	I_{CES}	$V_{CE} = 1200 \text{ V}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$			40	μA
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$		1000		
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = 20 \text{ V}$				100	nA
Transconductance	g_{fs}	$I_C = 15 \text{ A}, V_{CE} = 20 \text{ V}, T_{vj} = 175 \text{ }^{\circ}\text{C}$			5.9		S
Short-circuit collector current	I_{SC}	$V_{CC} \leq 800 \text{ V}, V_{GE} = 15 \text{ V}, t_{SC} \leq 4 \text{ } \mu\text{s}$, Allowed number of short circuits < 1000, Time between short circuits $\geq 1.0 \text{ s}$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$		94.5		A
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$		77.1		
Input capacitance	C_{ies}	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 100 \text{ kHz}$			2.2		nF
Output capacitance	C_{oes}	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 100 \text{ kHz}$			37		pF
Reverse transfer capacitance	C_{res}	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 100 \text{ kHz}$			10		pF
Gate charge	Q_G	$V_{CC} = 960 \text{ V}, I_C = 15 \text{ A}, V_{GE} = 0/15 \text{ V}$			93		nC
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 800 \text{ V}, V_{GE} = 15 \text{ V}, R_{G(on)} = 4.5 \text{ } \Omega, R_{G(off)} = 4.5 \text{ } \Omega$	$T_{vj} = 25 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		10.1		ns
			$T_{vj} = 175 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		11		
Rise time (inductive load)	t_r	$V_{CC} = 800 \text{ V}, V_{GE} = 15 \text{ V}, R_{G(on)} = 4.5 \text{ } \Omega, R_{G(off)} = 4.5 \text{ } \Omega$	$T_{vj} = 25 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		4.8		ns
			$T_{vj} = 175 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		5.9		
Turn-off delay time	$t_{d(off)}$	$V_{CC} = 800 \text{ V}, V_{GE} = 15 \text{ V}, R_{G(on)} = 4.5 \text{ } \Omega, R_{G(off)} = 4.5 \text{ } \Omega$	$T_{vj} = 25 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		108.6		ns
			$T_{vj} = 175 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		176		
Fall time (inductive load)	t_f	$V_{CC} = 800 \text{ V}, V_{GE} = 15 \text{ V}, R_{G(on)} = 4.5 \text{ } \Omega, R_{G(off)} = 4.5 \text{ } \Omega$	$T_{vj} = 25 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		104.2		ns
			$T_{vj} = 175 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		160.7		
Turn-on energy	E_{on}	$V_{CC} = 800 \text{ V}, V_{GE} = 15 \text{ V}, R_{G(on)} = 4.5 \text{ } \Omega, R_{G(off)} = 4.5 \text{ } \Omega$	$T_{vj} = 25 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		0.19		mJ
			$T_{vj} = 175 \text{ }^{\circ}\text{C}, I_C = 15 \text{ A}$		0.24		

(table continues...)

Table 3 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Turn-off energy	E_{off}	$V_{CC} = 800 \text{ V}$, $V_{GE} = 15 \text{ V}$, $R_{G(on)} = 4.5 \Omega$, $R_{G(off)} = 4.5 \Omega$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_C = 15 \text{ A}$		0.9		mJ
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_C = 15 \text{ A}$		1.49		
Total switching energy	E_{ts}	$V_{CC} = 800 \text{ V}$, $V_{GE} = 15 \text{ V}$, $R_{G(on)} = 4.5 \Omega$, $R_{G(off)} = 4.5 \Omega$	$T_{vj} = 25 \text{ }^{\circ}\text{C}$, $I_C = 15 \text{ A}$		1.09		mJ
			$T_{vj} = 175 \text{ }^{\circ}\text{C}$, $I_C = 15 \text{ A}$		1.73		
Operating junction temperature	T_{vj}			-40		175	$^{\circ}\text{C}$

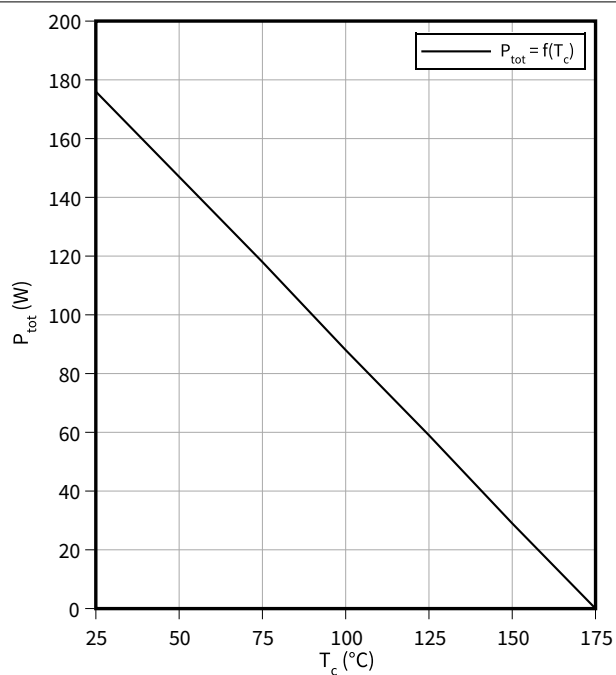
Note: Electrical Characteristic at $T_{vj} = 25^{\circ}\text{C}$, unless otherwise specified.

3 Characteristics diagrams

Power dissipation as a function of case temperature

$$P_{\text{tot}} = f(T_c)$$

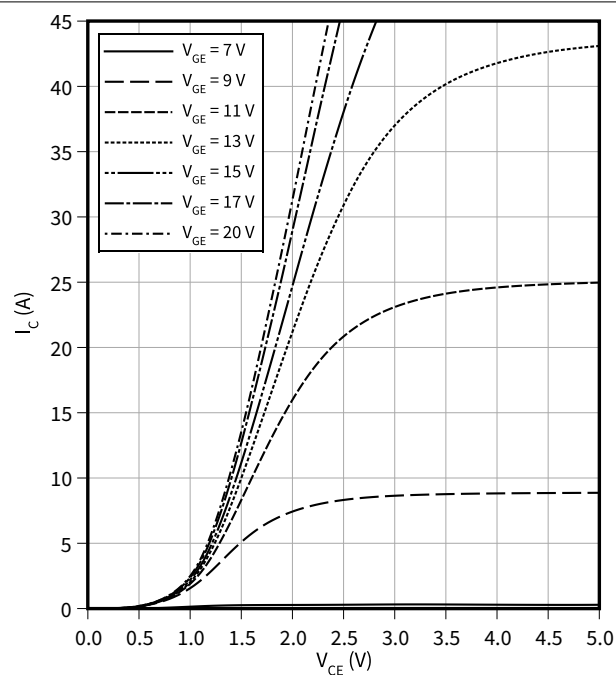
$$T_{vj} \leq 175^\circ\text{C}$$



Typical output characteristic

$$I_C = f(V_{CE})$$

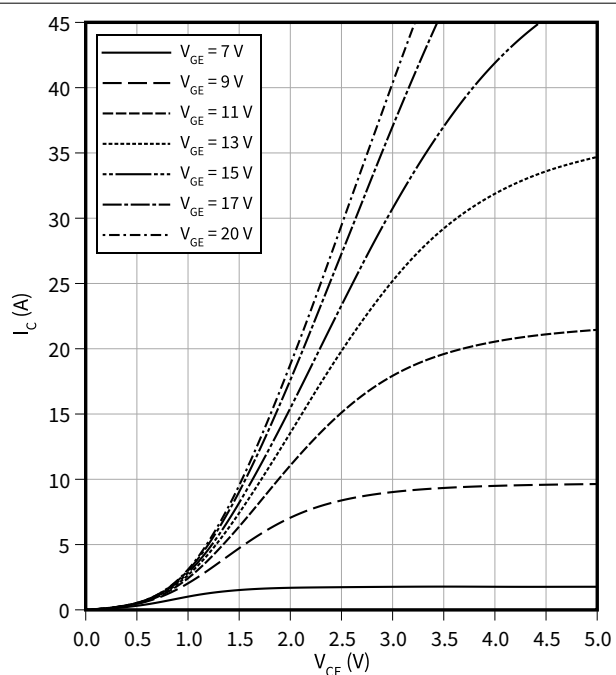
$$T_{vj} = 25^\circ\text{C}$$



Typical output characteristic

$$I_C = f(V_{CE})$$

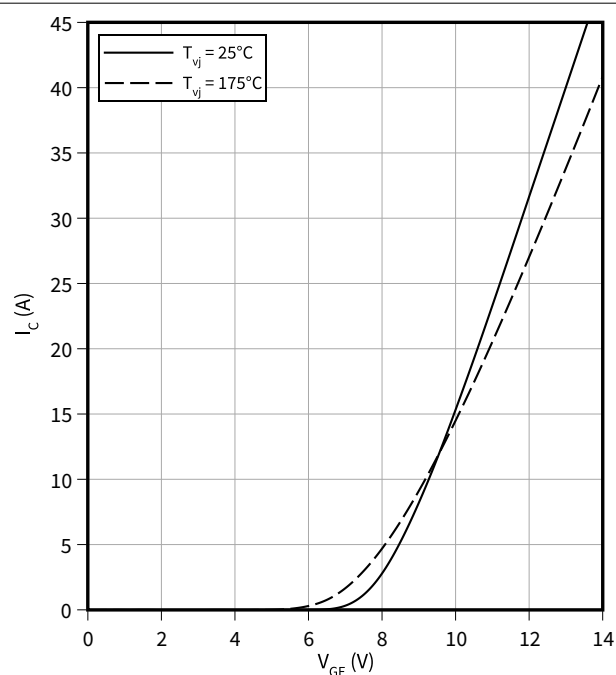
$$T_{vj} = 175^\circ\text{C}$$



Typical transfer characteristic

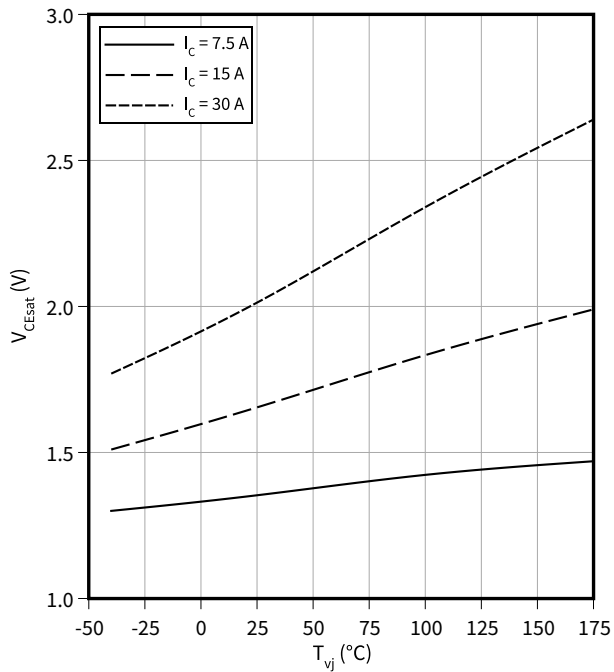
$$I_C = f(V_{GE})$$

$$V_{CE} = 20\text{ V}$$



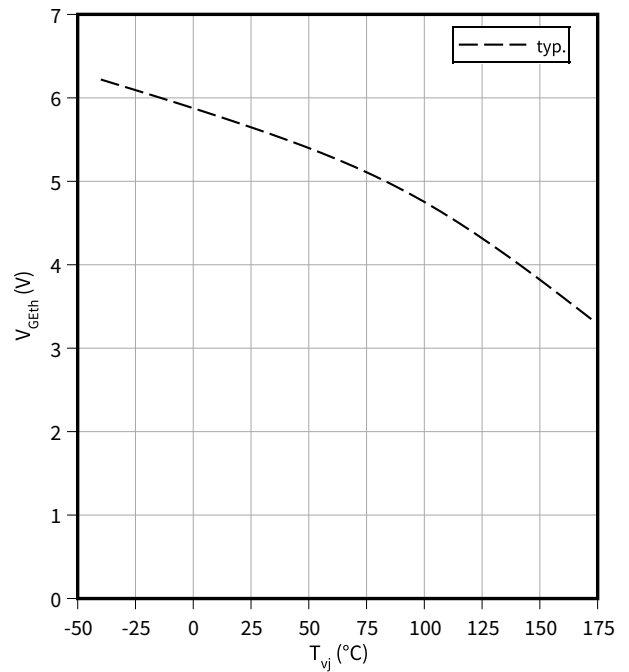
3 Characteristics diagrams
Typical collector-emitter saturation voltage as a function of junction temperature

$$V_{CEsat} = f(T_{vj})$$


Gate-emitter threshold voltage as a function of junction temperature

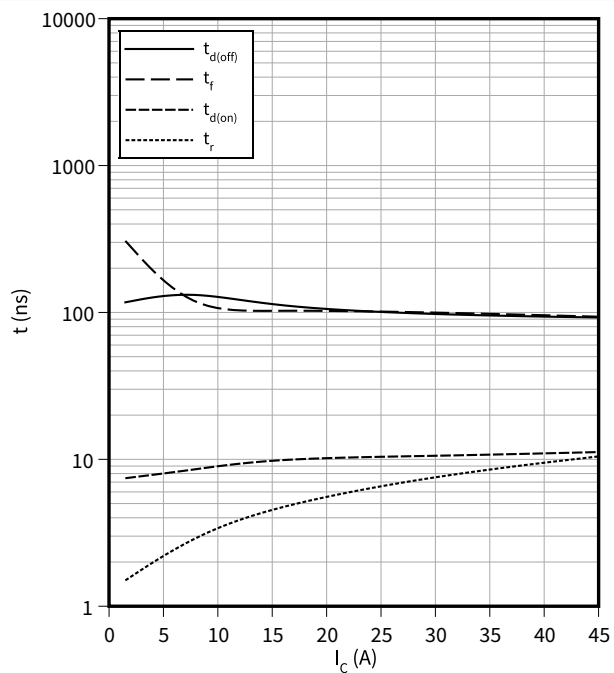
$$V_{GEth} = f(T_{vj})$$

$$I_C = 0.3 \text{ mA}$$


Typical switching times as a function of collector current

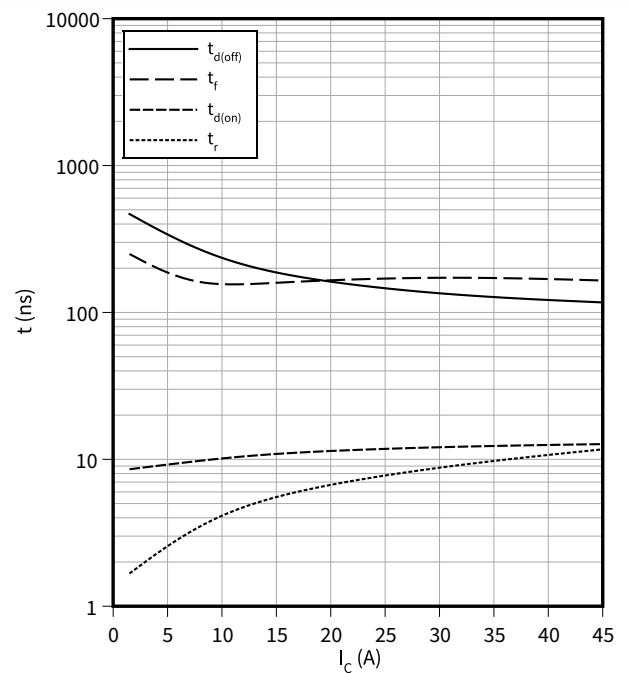
$$t = f(I_C)$$

$$V_{CC} = 800 \text{ V}, T_{vj} = 25 \text{ °C}, R_G = 4.5 \text{ } \Omega$$


Typical switching times as a function of collector current

$$t = f(I_C)$$

$$R_G = 4.5 \text{ } \Omega, V_{CC} = 800 \text{ V}, T_{vj} = 175 \text{ °C}$$

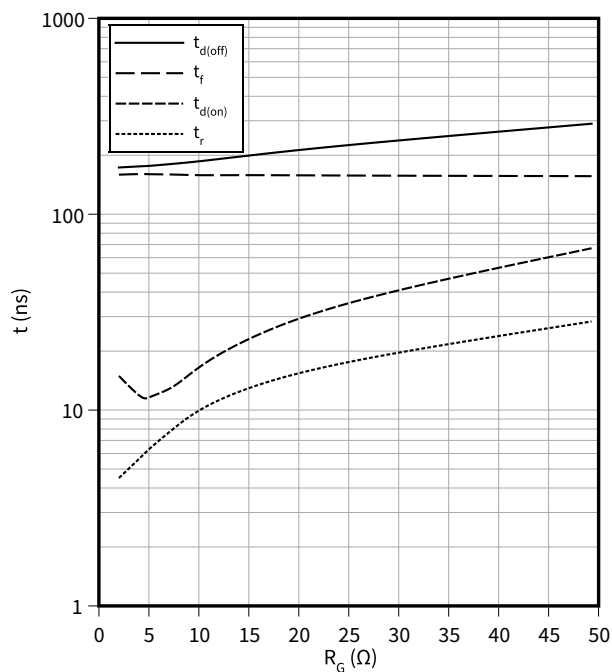


3 Characteristics diagrams

Typical switching times as a function of gate resistor

$t = f(R_G)$

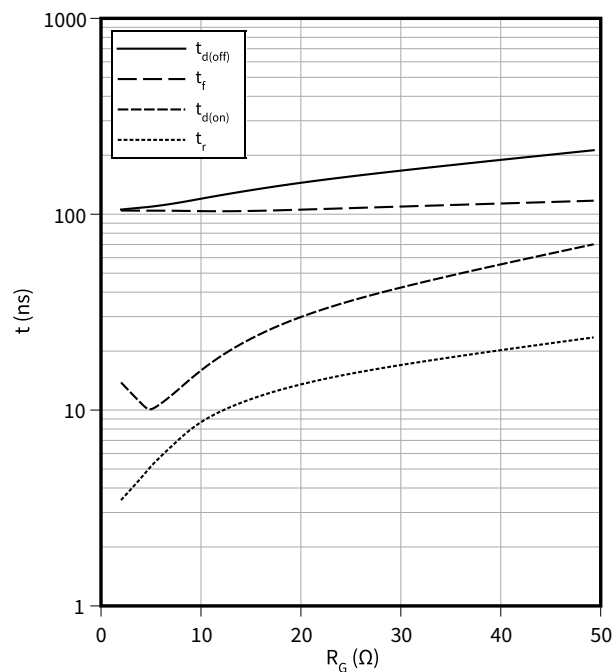
$I_C = 15 \text{ A}$, $V_{CC} = 800 \text{ V}$, $T_{vj} = 175 \text{ °C}$



Typical switching times as a function of gate resistor

$t = f(R_G)$

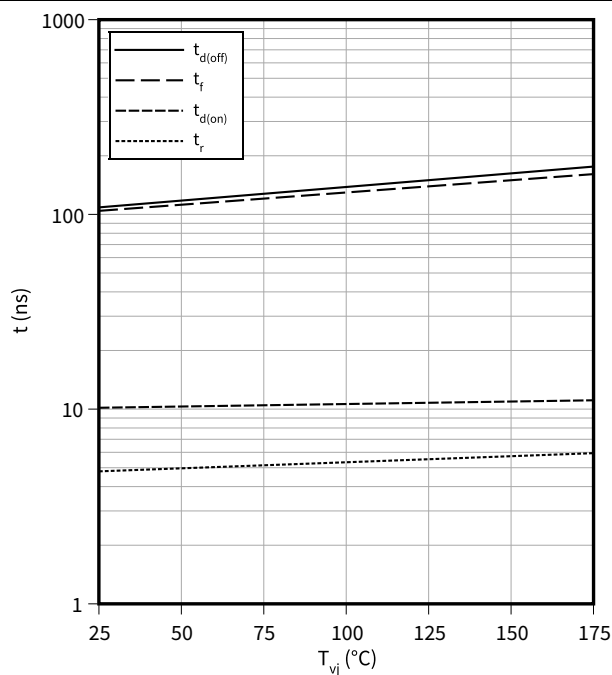
$I_C = 15 \text{ A}$, $V_{CC} = 800 \text{ V}$, $T_{vj} = 25 \text{ °C}$



Typical switching times as a function of junction temperature

$t = f(T_{vj})$

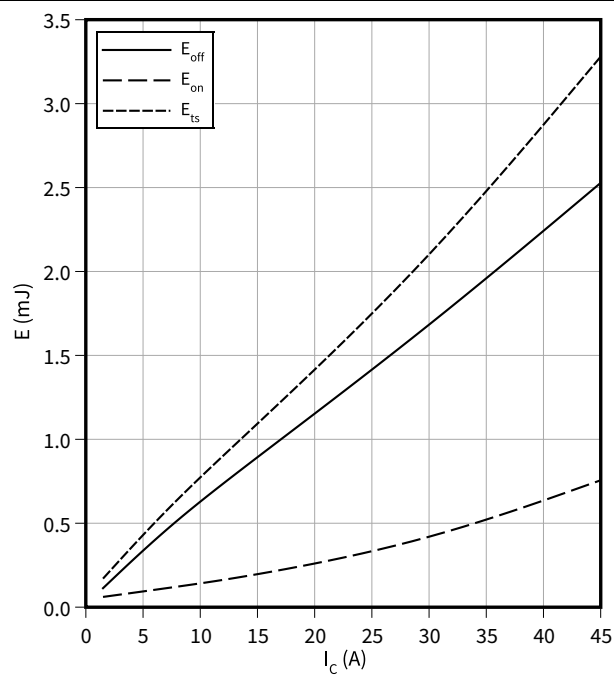
$I_C = 15 \text{ A}$, $V_{CC} = 800 \text{ V}$, $R_G = 4.5 \Omega$



Typical switching energy losses as a function of collector current

$E = f(I_C)$

$V_{CC} = 800 \text{ V}$, $T_{vj} = 25 \text{ °C}$, $R_G = 4.5 \Omega$

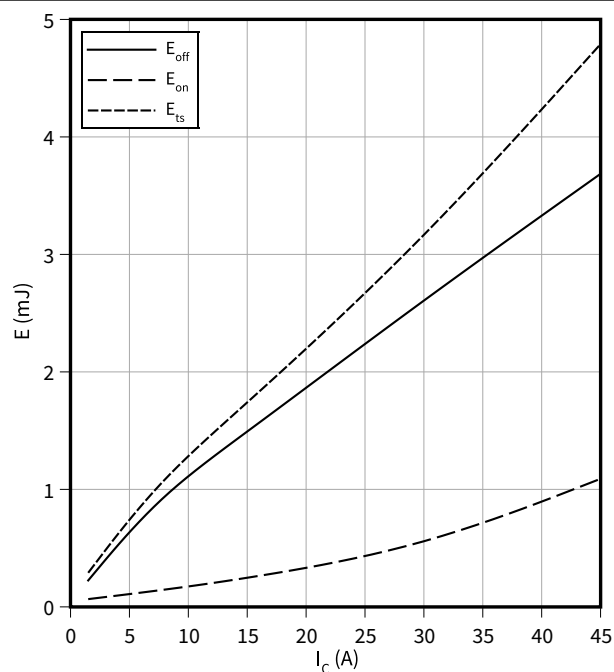


3 Characteristics diagrams

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$

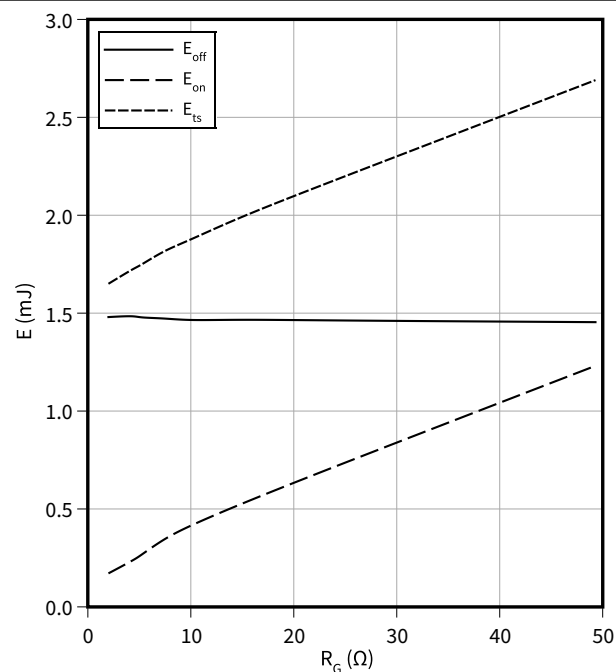
$V_{CC} = 800 \text{ V}$, $T_{vj} = 175 \text{ °C}$, $R_G = 4.5 \text{ } \Omega$



Typical switching energy losses as a function of gate resistor

$$E = f(R_G)$$

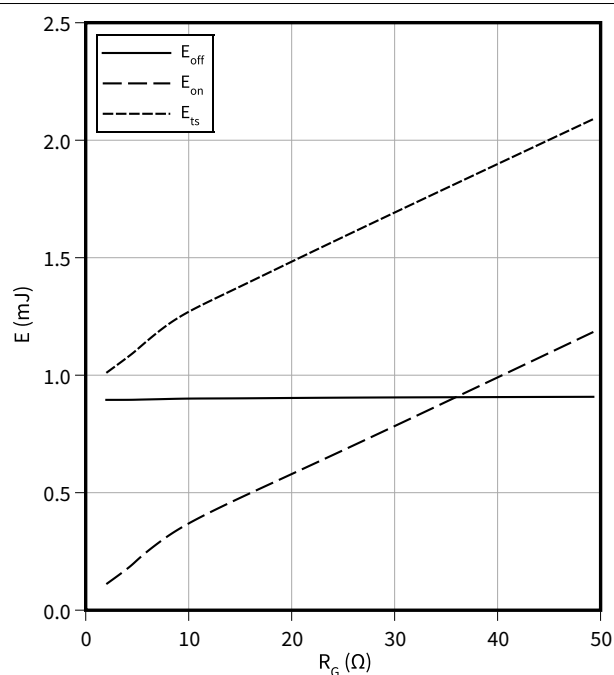
$I_C = 15 \text{ A}$, $V_{CC} = 800 \text{ V}$, $T_{vj} = 175 \text{ °C}$



Typical switching energy losses as a function of gate resistor

$$E = f(R_G)$$

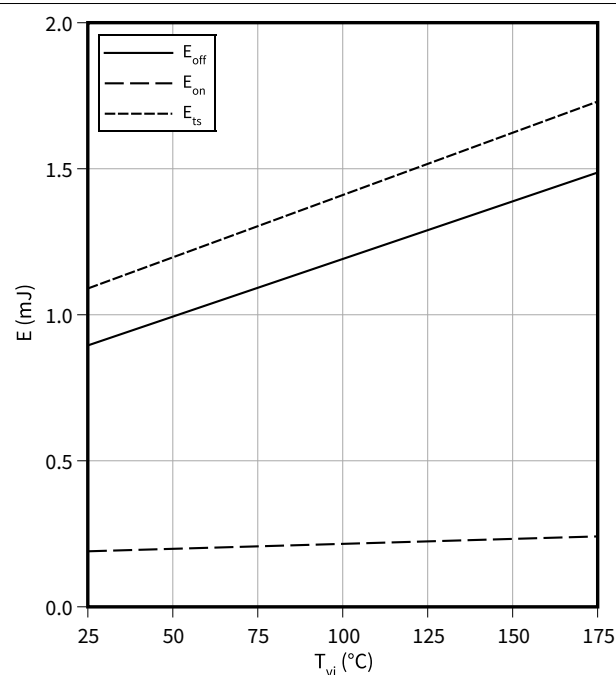
$I_C = 15 \text{ A}$, $V_{CC} = 800 \text{ V}$, $T_{vj} = 25 \text{ °C}$



Typical switching energy losses as a function of junction temperature

$$E = f(T_{vj})$$

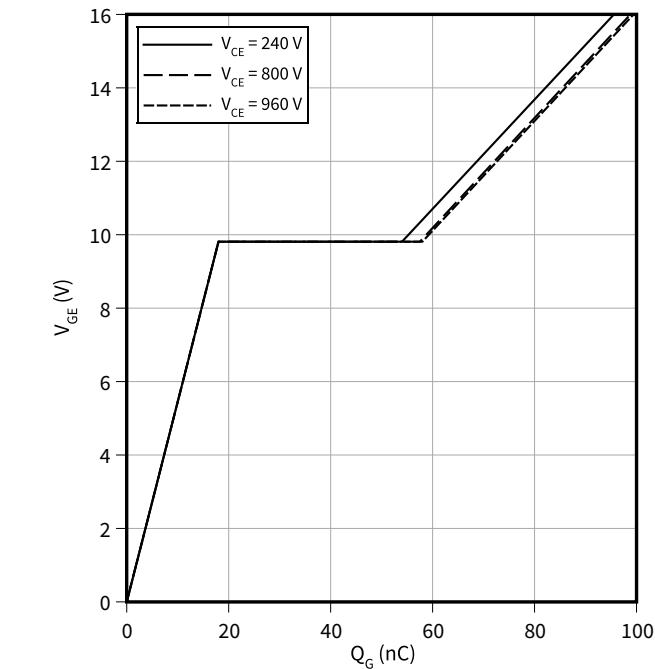
$I_C = 15 \text{ A}$, $V_{CC} = 800 \text{ V}$, $R_G = 4.5 \text{ } \Omega$



3 Characteristics diagrams

Typical gate charge

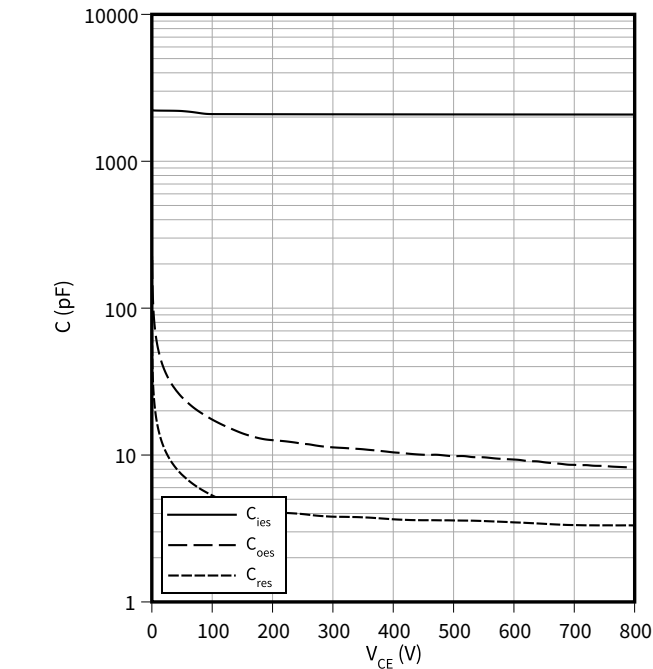
$V_{GE} = f(Q_G)$



Typical capacitance as a function of collector-emitter voltage

$C = f(V_{CE})$

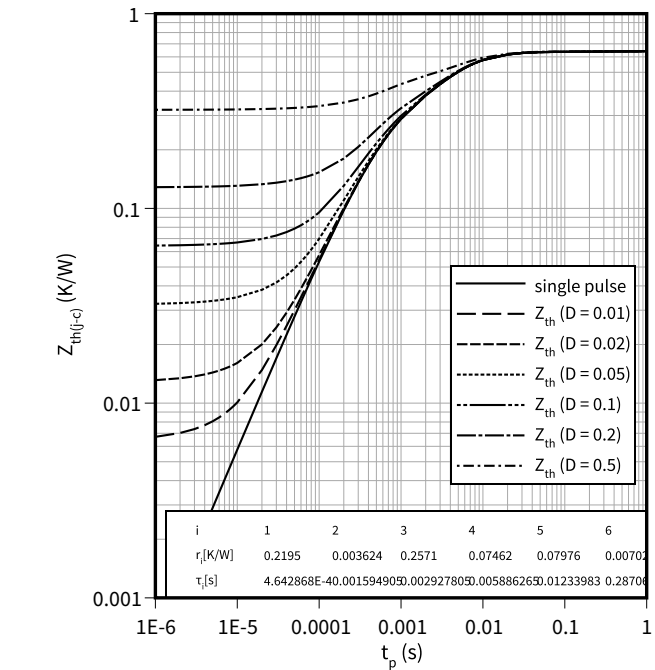
$f = 100\text{ kHz}, V_{GE} = 0\text{ V}$



IGBT typical transient thermal impedance as a function of pulse width

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

$D = t_p/T$



4 Package outlines

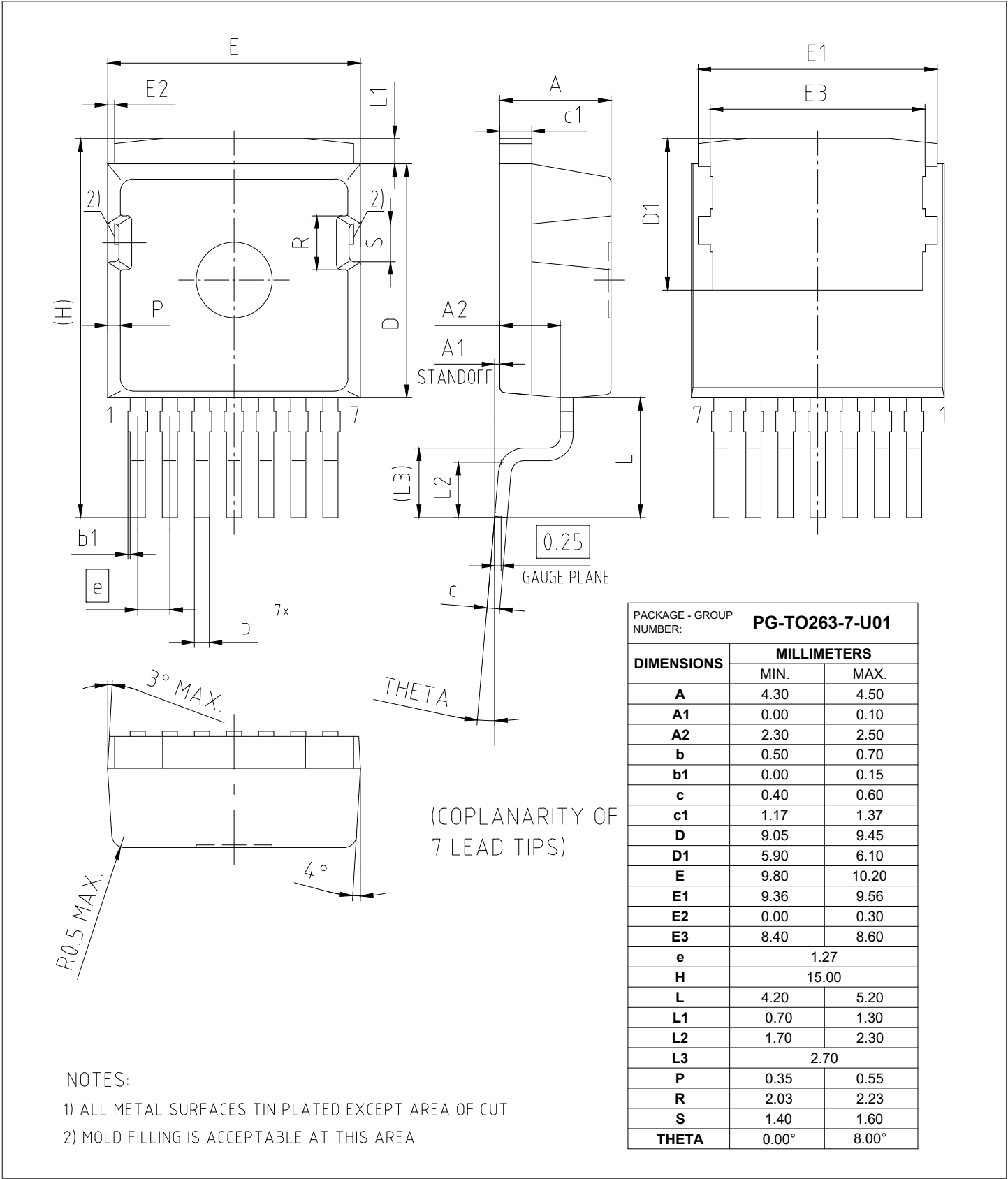


Figure 1

5 Testing conditions

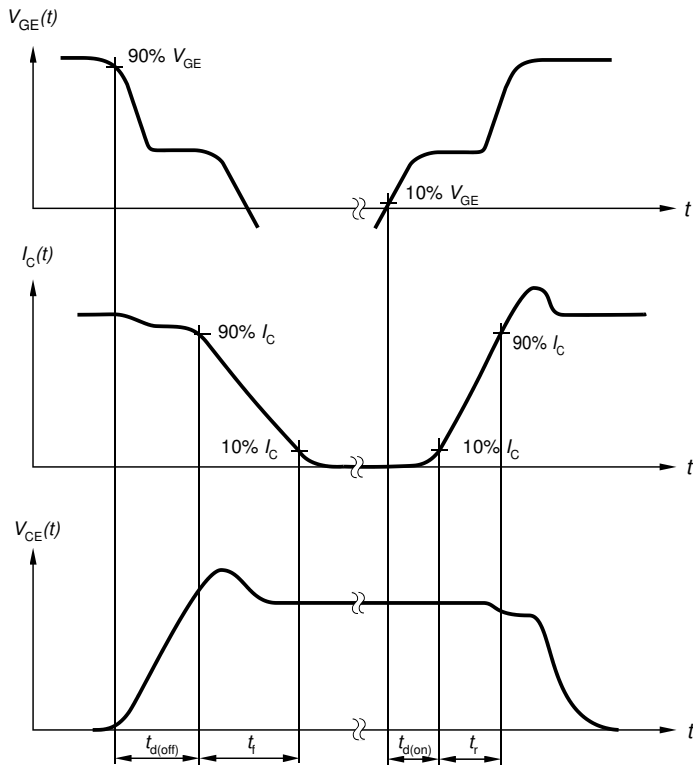


Figure A. Definition of switching times

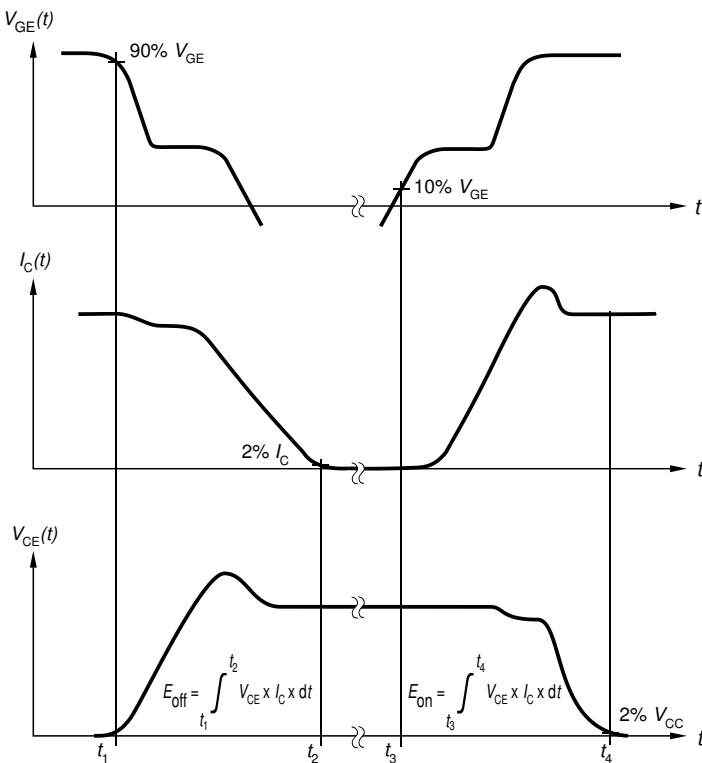


Figure B. Definition of switching losses

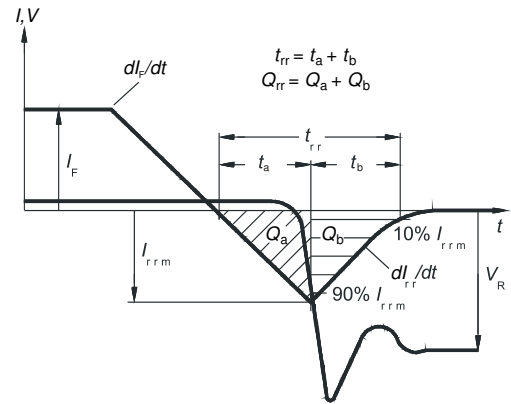


Figure C. Definition of diode switching characteristics

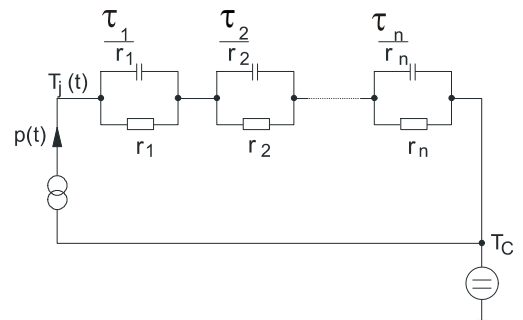


Figure D. Thermal equivalent circuit

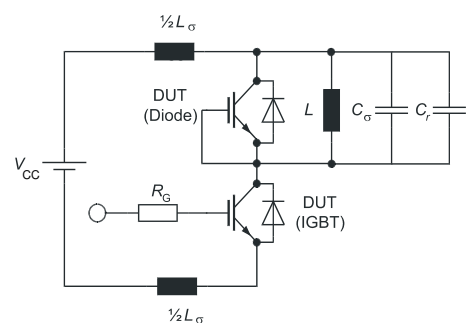


Figure E. **Dynamic test circuit**
 Parasitic inductance L_σ ,
 parasitic capacitor C_σ ,
 relief capacitor C_r ,
 (only for ZVT switching)



Revision history

Revision history

Document revision	Date of release	Description of changes
0.10	2024-03-14	Target datasheet
0.20	2025-04-29	Preliminary datasheet
1.00	2025-09-18	Final datasheet

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2025-09-18

Published by

Infineon Technologies AG
81726 Munich, Germany

© 2025 Infineon Technologies AG
All Rights Reserved.

Do you have a question about any aspect of this document?

Email: erratum@infineon.com

Document reference
IFX-ABJ890-003

Important notice

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

Warnings

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

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.