Final datasheet
Short circuit rugged 1200 V TRENCHSTOP™ IGBT 7 technology

Features

- V_{CE} = 1200 V
- I_C = 8 A
- Low saturation voltage V_{CEsat} = 2 V at T_{vj} = 150°C
- Short circuit ruggedness 8 µs
- Wide range of dv/dt controllability
- Complete product spectrum and PSpice Models: http://www.infineon.com/igbt/

Potential applications

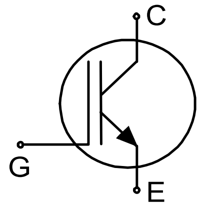
- Industrial drives

Product validation

- Qualified for industrial applications according to the relevant tests of JEDEC47/20/22
- Encapsulation for the application required

Halogen-free
Lead-free
Green
RoHS

Description



Type	Package	Marking
IGD08N120S7	PG-TO252-3	G08MS7

Table of contents

1 Package

Table 1 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Internal emitter inductance measured 5 mm (0.197 in.) from case	L_E			3		nH
Storage temperature	T_{stg}		-55		150	°C
Soldering temperature	T_{sold}	reflow soldering (MSL1 according to JEDEC J-STA-020)			260	°C
Thermal resistance, 6 cm^2 Cu on PCB junction to ambient	$R_{th(j-a)}$				50	K/W
IGBT thermal resistance, junction-case	$R_{th(j-c)}$			0.87	1.17	K/W

2 IGBT

Table 2 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CE}	$T_{vj} \geq 25$ °C		1200	V
DC collector current, limited by T_{vjmax}	I_C		$T_c = 25$ °C	24[1)]	A
			$T_c = 100$ °C	15	
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpulse}			24	A
Turn-off safe operating area		$V_{CE} \leq 1200$ V, $T_{vj} \leq 150$ °C		24	A
Gate-emitter voltage	V_{GE}			±20	V
Transient gate-emitter voltage	V_{GE}	$t_p \leq 0.5$ µs, $D < 0.001$		±25	V
Short-circuit withstand time	t_{SC}	$V_{CC} \leq 600$ V, $V_{GE} = 15$ V, Allowed number of short circuits < 1000, Time between short circuits ≥ 1.0 s, $T_{vj} = 150$ °C		8	µs
Power dissipation	P_{tot}		$T_c = 25$ °C	106	W
			$T_c = 100$ °C	43	

1) Limited by bondwire

Table 3 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	V_{CEsat}	I_C = 8 A, V_{GE} = 15 V	T_{vj} = 25 °C		1.65	2	V
			T_{vj} = 150 °C		2		
Gate-emitter threshold voltage	V_{GEth}	I_C = 0.16 mA, V_{CE} = V_{GE}		5.15	5.7	6.45	V
Zero gate-voltage collector current	I_{CES}	V_{CE} = 1200 V, V_{GE} = 0 V	T_{vj} = 25 °C			20	µA
			T_{vj} = 150 °C		130		
Gate-emitter leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V				100	nA
Transconductance	g_{fs}	I_C = 8 A, V_{CE} = 20 V, T_{vj} = 150 °C			3.6		S
Short-circuit collector current	I_{SC}	V_{CC} ≤ 600 V, V_{GE} = 15 V, t_{SC} ≤ 8 µs, Allowed number of short circuits < 1000, Time between short circuits ≥ 1.0 s, T_{vj} = 150 °C			38		A
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 100 kHz			1.3		nF
Output capacitance	C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 100 kHz			24		pF
Reverse transfer capacitance	C_{res}	V_{CE} = 25 V, V_{GE} = 0 V, f = 100 kHz			17		pF
Gate charge	Q_G	V_{CC} = 960 V, I_C = 8 A, V_{GE} = 15 V			55		nC
Turn-on delay time	$t_{d(on)}$	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 20 Ω, $R_{G(off)}$ = 20 Ω	T_{vj} = 25 °C, I_C = 8 A		15		ns
			T_{vj} = 150 °C, I_C = 8 A		14		
Rise time (inductive load)	t_r	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 20 Ω, $R_{G(off)}$ = 20 Ω	T_{vj} = 25 °C, I_C = 8 A		15		ns
			T_{vj} = 150 °C, I_C = 8 A		18		
Turn-off delay time	$t_{d(off)}$	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 20 Ω, $R_{G(off)}$ = 20 Ω	T_{vj} = 25 °C, I_C = 8 A		149		ns
			T_{vj} = 150 °C, I_C = 8 A		225		
Fall time (inductive load)	t_f	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 20 Ω, $R_{G(off)}$ = 20 Ω	T_{vj} = 25 °C, I_C = 8 A		131		ns
			T_{vj} = 150 °C, I_C = 8 A		246		
Turn-on energy	E_{on}	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 20 Ω, $R_{G(off)}$ = 20 Ω	T_{vj} = 25 °C, I_C = 8 A		0.46		mJ
			T_{vj} = 150 °C, I_C = 8 A		0.67		
Turn-off energy	E_{off}	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 20 Ω, $R_{G(off)}$ = 20 Ω	T_{vj} = 25 °C, I_C = 8 A		0.41		mJ
			T_{vj} = 150 °C, I_C = 8 A		0.73		

(table continues...)

Table 3 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Total switching energy	E_{ts}	V_{CC} = 600 V, V_{GE} = 0/15 V, $R_{G(on)}$ = 20 Ω, $R_{G(off)}$ = 20 Ω	T_{vj} = 25 °C, I_C = 8 A		0.87		mJ
			T_{vj} = 150 °C, I_C = 8 A		1.4		
Operating junction temperature	T_{vj}			-40		150	°C

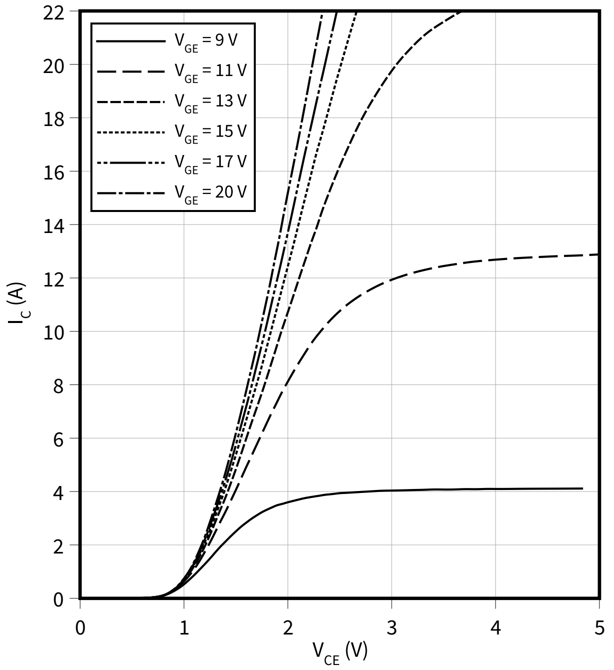
***Note**:* *For optimum lifetime and reliability, Infineon recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet.*

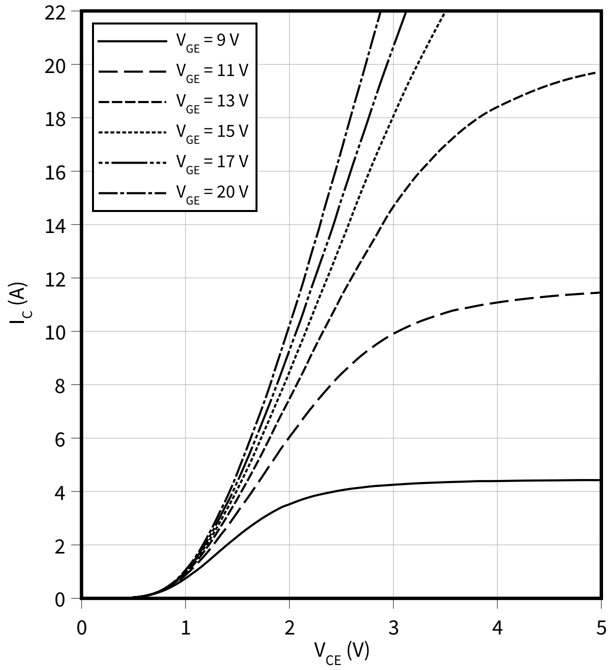
Electrical Characteristic at T_{vj} = 25°C, unless otherwise specified.

Dynamic test circuit, parasitic inductance L_σ = 45 nH, parasitic capacitor C_σ = 25 pF from Fig. E. Energy losses include “tail” and diode (IKW08N120CS7) reverse recovery.

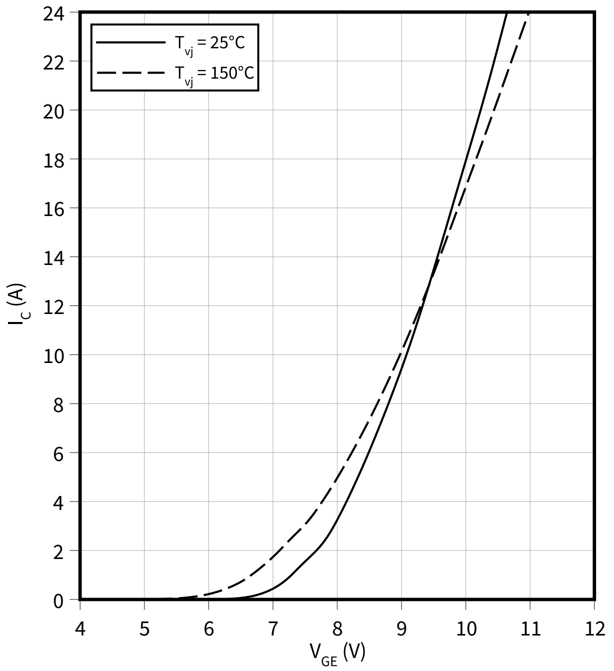
3 Characteristics diagrams

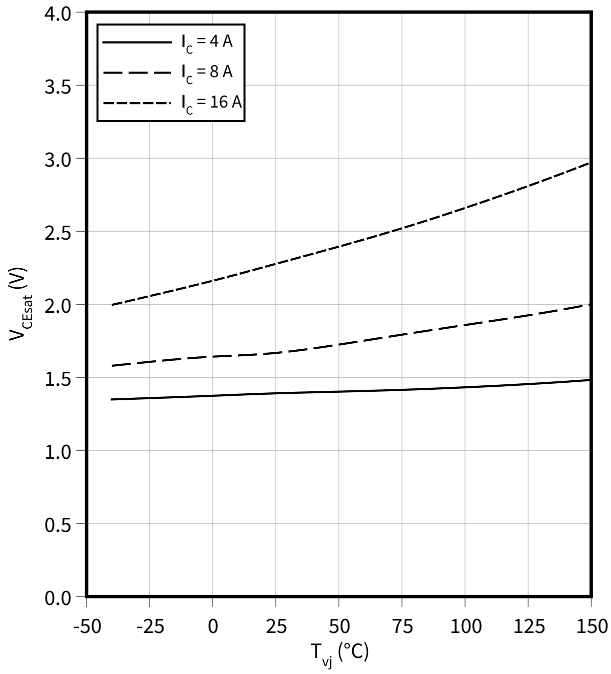
Typical output characteristic $I_C = f(V_{CE})$ $T_{vj} = 25$ °C	Typical output characteristic $I_C = f(V_{CE})$ $T_{vj} = 150$ °C



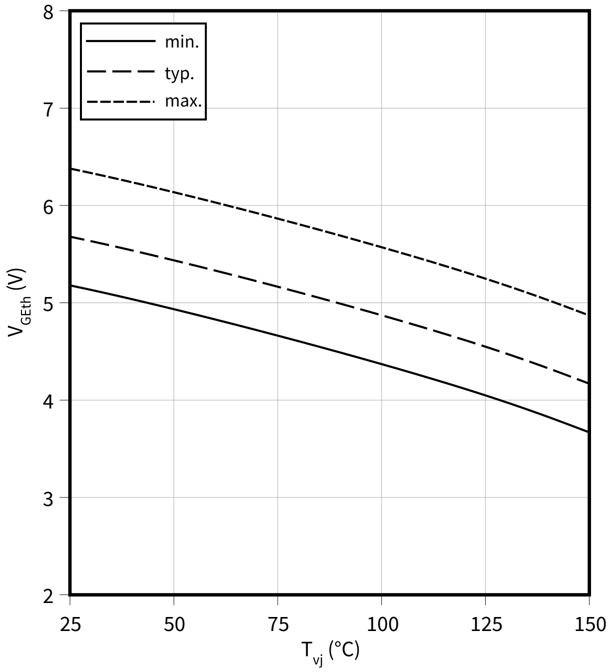


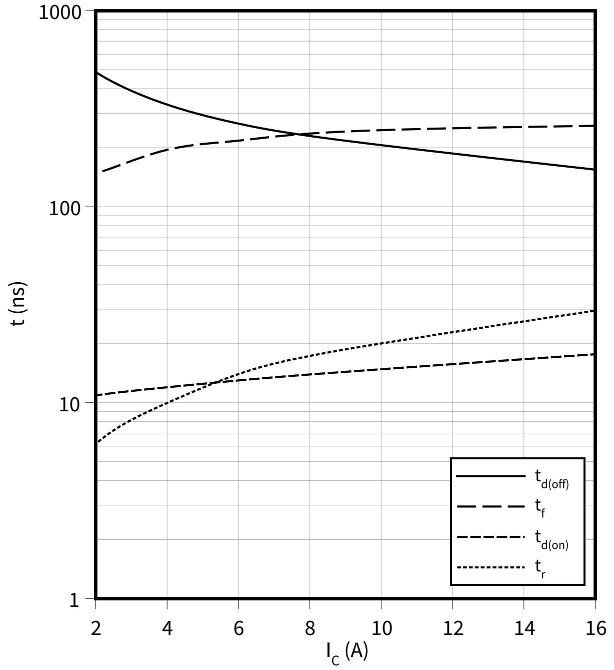
Typical transfer characteristic $I_C = f(V_{GE})$ $V_{CE} = 20$ V	Typical collector-emitter saturation voltage as a function of junction temperature $V_{CEsat} = f(T_{vj})$ $V_{GE} = 15$ V



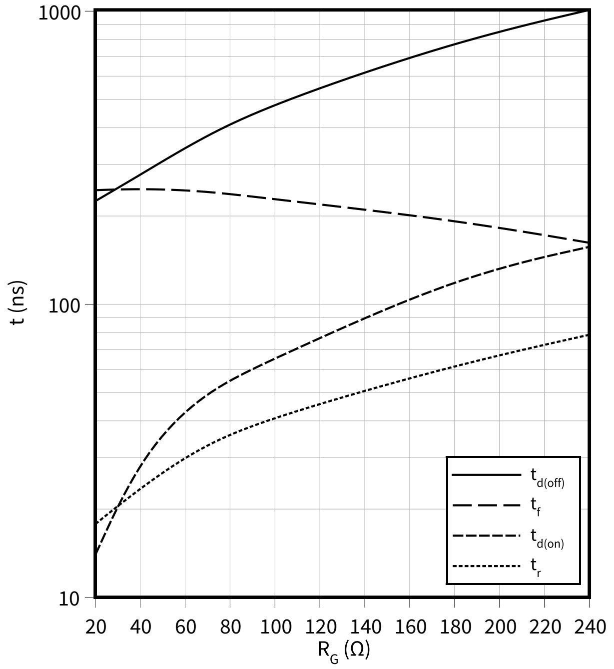


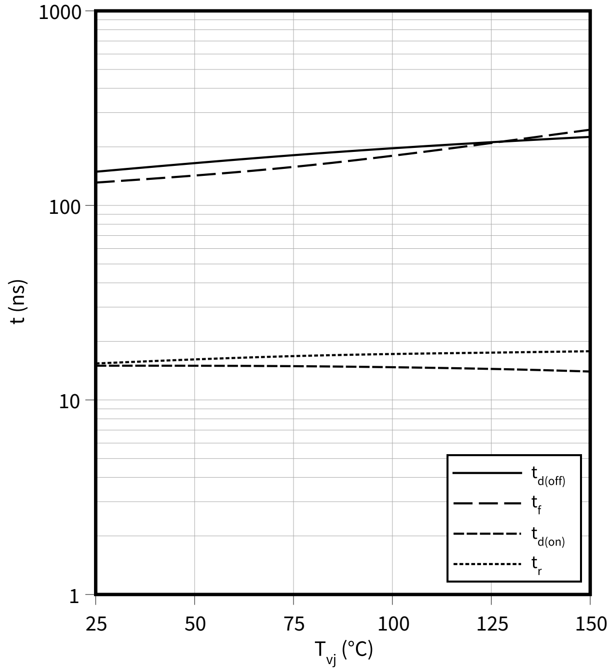
Gate-emitter threshold voltage as a function of junction temperature $V_{GEth} = f(T_{vj})$ I_C = 0.16 mA	Typical switching times as a function of collector current $t = f(I_C)$ V_{CC} = 600 V, T_{vj} = 150 °C, V_{GE} = 0/15 V, R_G = 20 Ω





Typical switching times as a function of gate resistor $t = f(R_G)$ I_C = 8 A, V_{CC} = 600 V, T_{vj} = 150 °C, V_{GE} = 0/15 V	Typical switching times as a function of junction temperature $t = f(T_{vj})$ I_C = 8 A, V_{CC} = 600 V, V_{GE} = 0/15 V, R_G = 20 Ω

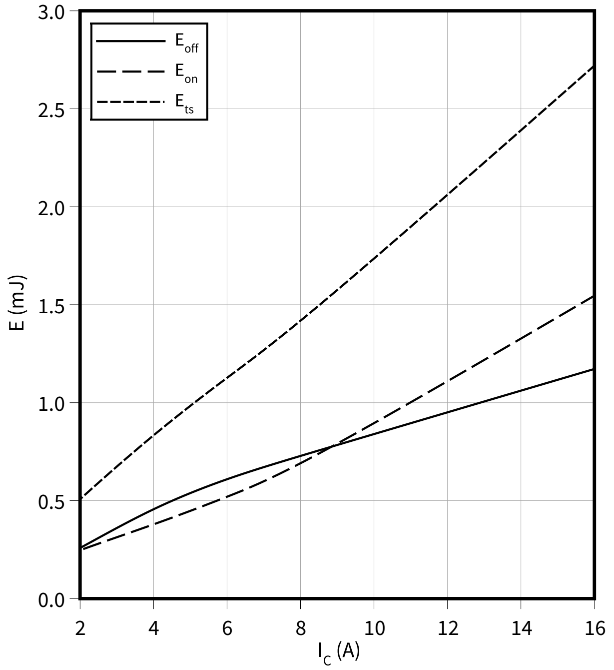




Typical switching energy losses as a function of collector current

$E = f(I_C)$

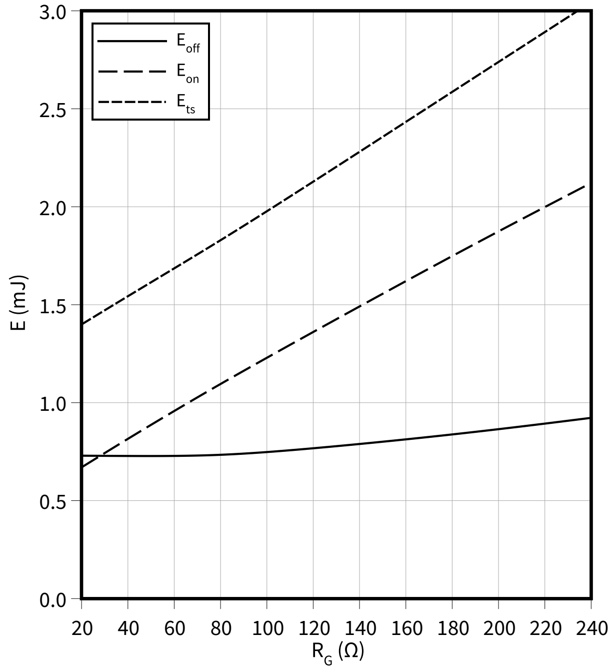
$V_{CC} = 600$ V, $T_{vj} = 150$ °C, $V_{GE} = 0/15$ V, $R_G = 20$ Ω



Typical switching energy losses as a function of gate resistor

$E = f(R_G)$

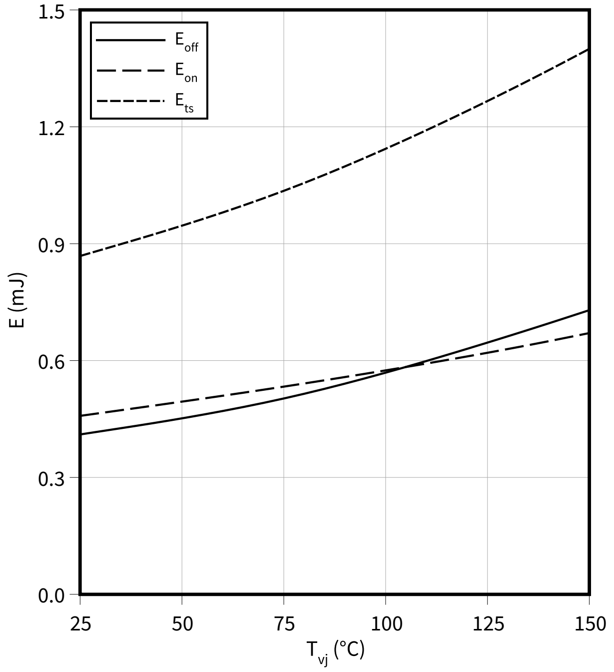
$I_C = 8$ A, $V_{CC} = 600$ V, $T_{vj} = 150$ °C, $V_{GE} = 0/15$ V



Typical switching energy losses as a function of junction temperature

$E = f(T_{vj})$

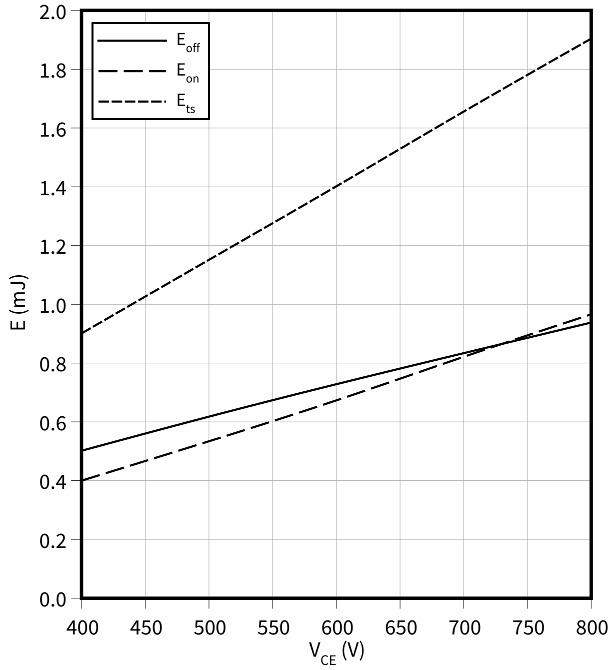
$I_C = 8$ A, $V_{CC} = 600$ V, $V_{GE} = 0/15$ V, $R_G = 20$ Ω

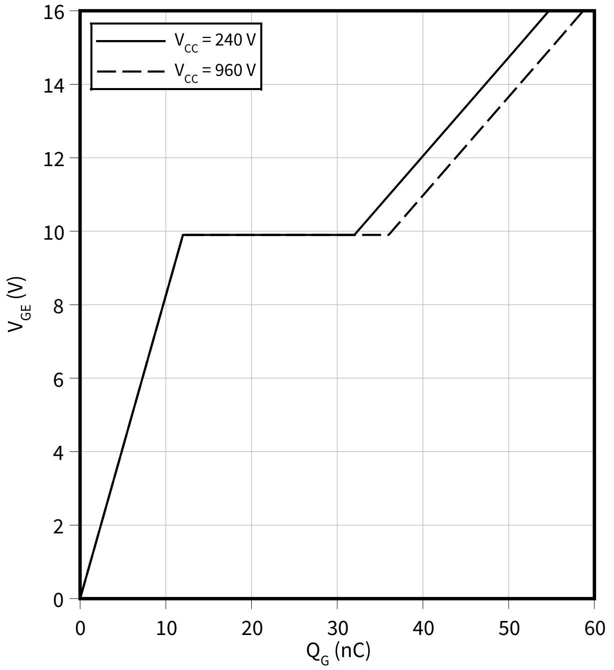
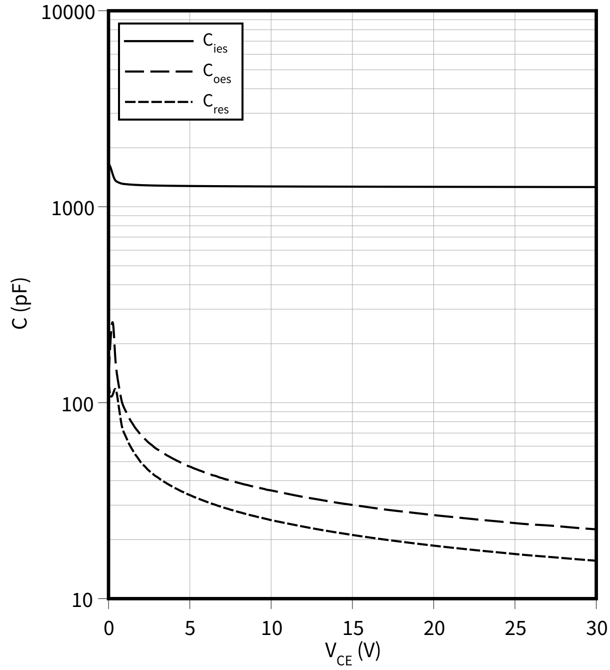
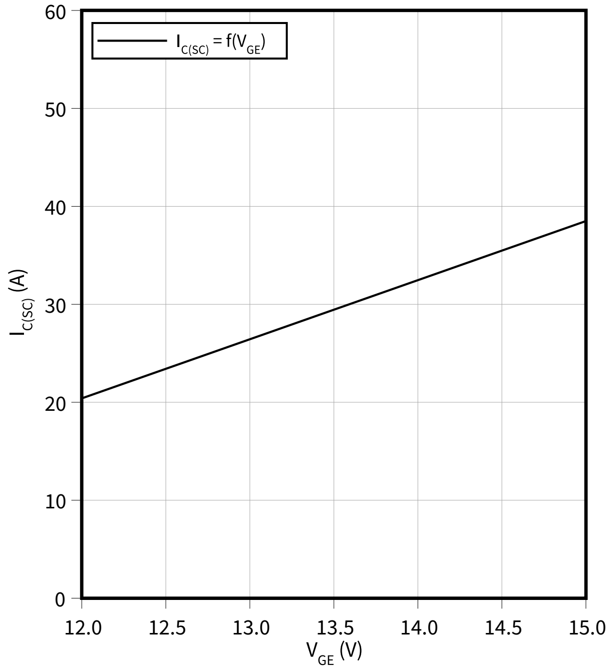
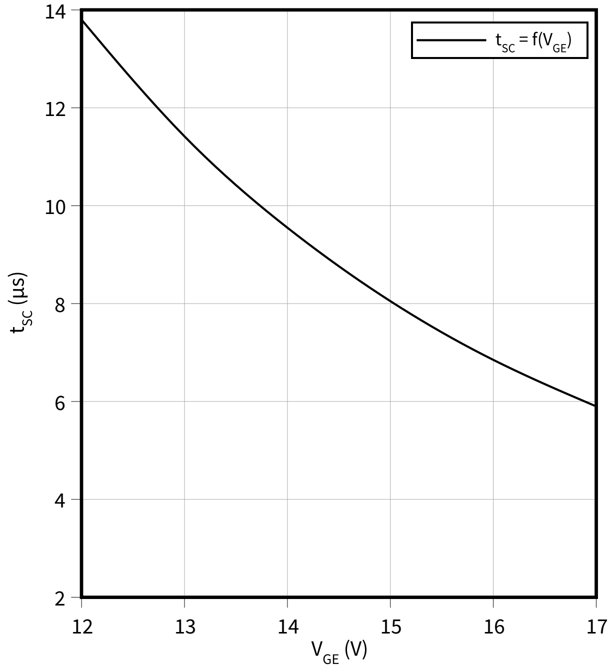


Typical switching energy losses as a function of collector emitter voltage

$E = f(V_{CE})$

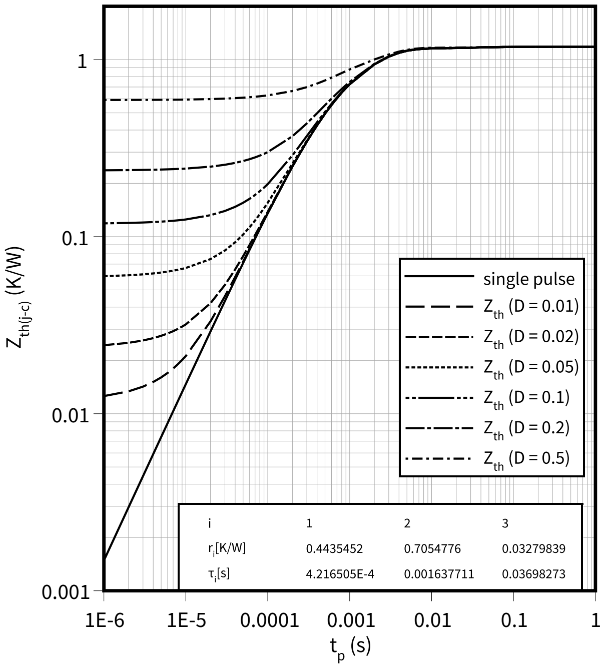
$I_C = 8$ A, $T_{vj} = 150$ °C, $V_{GE} = 0/15$ V, $R_G = 20$ Ω



Typical gate charge $V_{GE} = f(Q_G)$ $I_C = 8$ A	**Typical capacitance as a function of collector-emitter voltage** $C = f(V_{CE})$ $f = 100$ kHz, $V_{GE} = 0$ V
	
Typical short circuit collector current as a function of gate-emitter voltage $I_{C(SC)} = f(V_{GE})$ $T_{vj} = 150$ °C, $V_{CC} = 600$ V	**Short circuit withstand time as a function of gate-emitter voltage** $t_{SC} = f(V_{GE})$ $T_{vj} = 150$ °C, $V_{CC} = 600$ V
	

IGBT transient thermal impedance as a function of pulse width

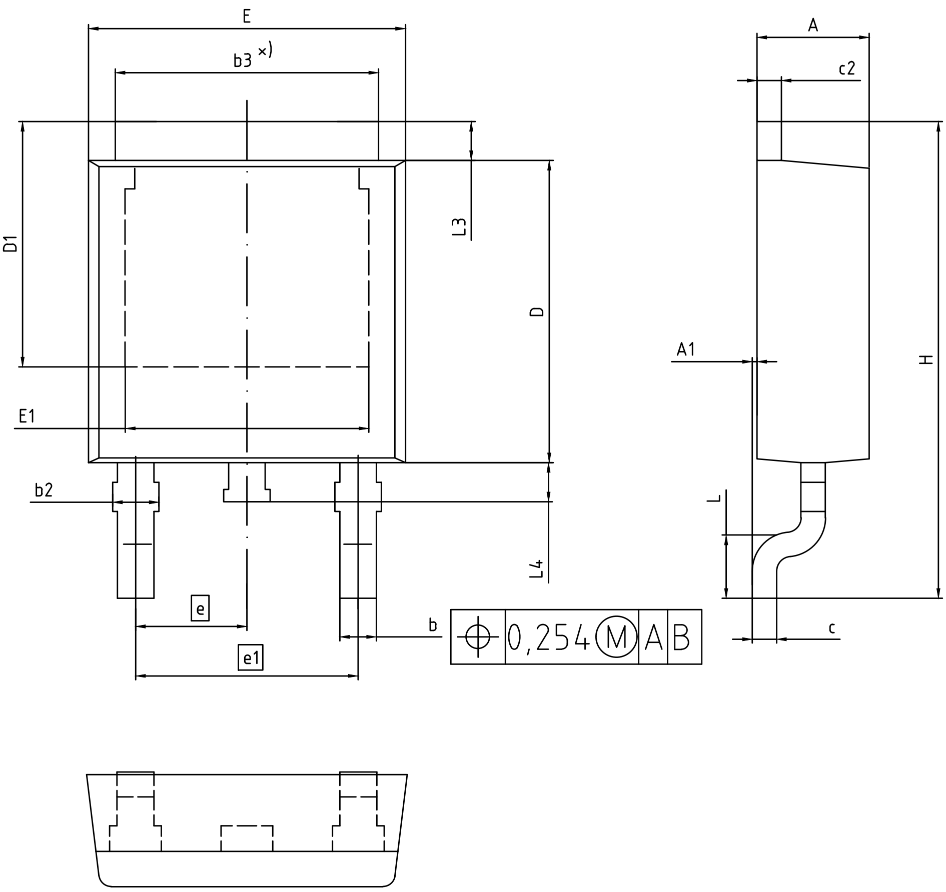
$Z_{th(j-c)} = f(t_p)$
$D = t_p/T$



i	1	2	3
r_i[K/W]	0.4435452	0.7054776	0.03279839
τ_i[s]	4.216505E-4	0.001637711	0.03698273

4 Package outlines

Package Drawing PG-TO252-3



NOTES:
1. ALL DIMENSIONS REFER TO JEDEC STANDARD TO-252 DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

DIM	MILLIMETERS	
	MIN	MAX
A	2.16	2.41
A1	0.00	0.15
b	0.64	0.89
b2	0.65	1.15
b3	4,95	5.50
c	0.46	0.61
c2	0.40	0.98
D	5.97	6.22
D1	5.02	5.84
E	6.35	6.73
E1	4.32	5.21
e	2.29 (BSC)	
e1	4.57 (BSC)	
N	3	
H	9.40	10.48
L	1.18	1.78
L3	0.89	1.27
L4	0.51	1.02

DOCUMENT NO.
Z8B00003328

SCALE
0 2.5 5mm

EUROPEAN PROJECTION

ISSUE DATE
05-02-2016

REVISION
06

Figure 1

5 Testing conditions

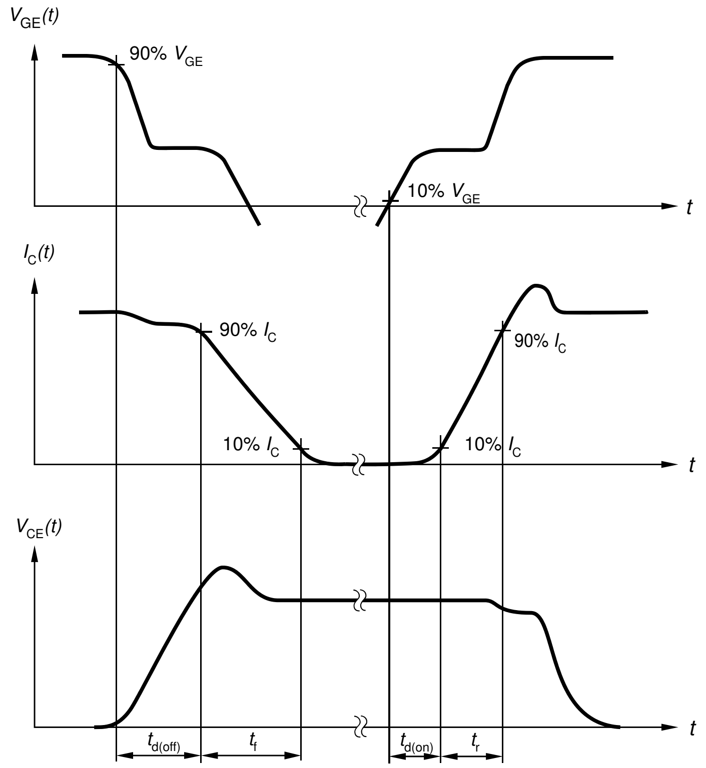


Figure A. **Definition of switching times**

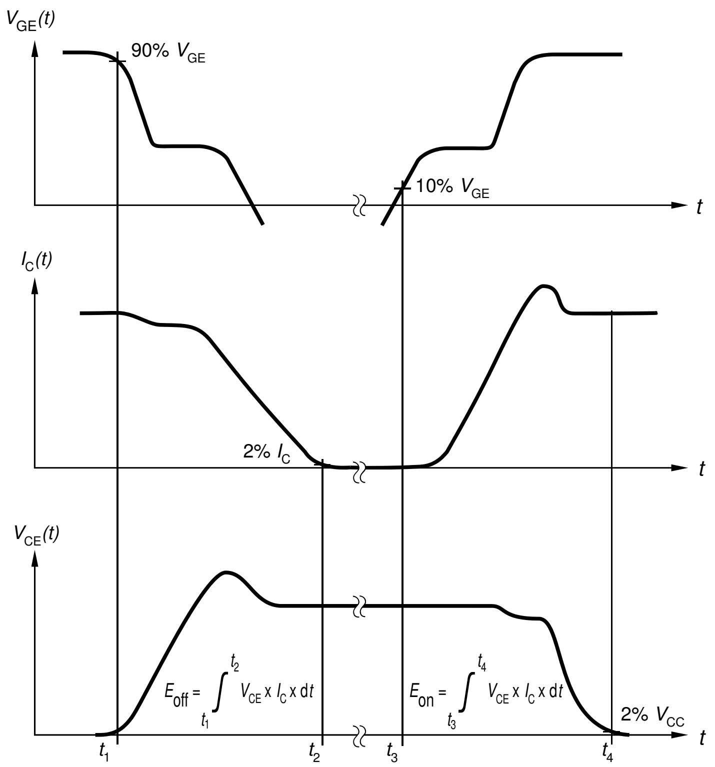


Figure B. **Definition of switching losses**

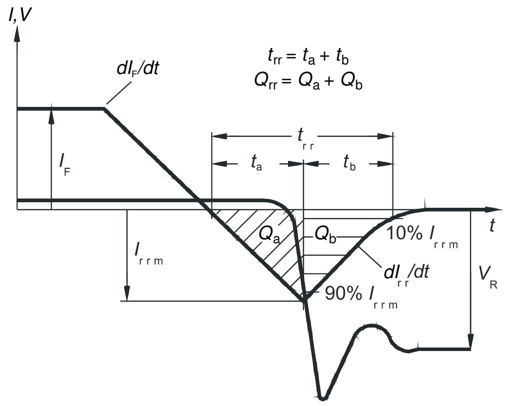


Figure C. **Definition of diode switching characteristics**

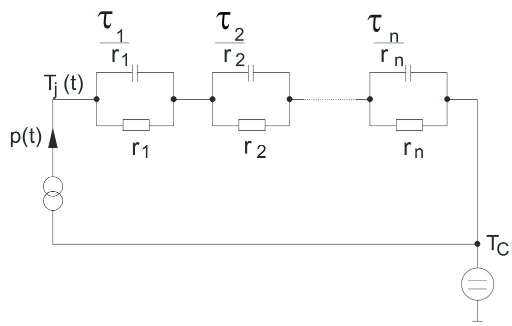


Figure D. **Thermal equivalent circuit**

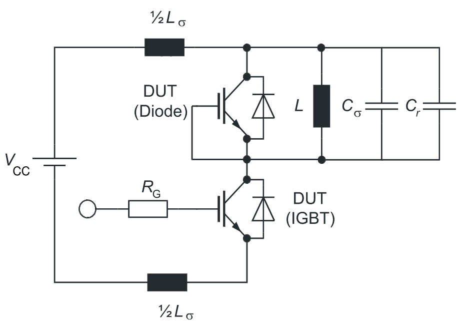


Figure E. **Dynamic test circuit**
Parasitic inductance L_σ,
parasitic capacitor C_σ,
relief capacitor C_r,
(only for ZVT switching)

Figure 2

Revision history

Document revision	Date of release	Description of changes
1.00	2024-03-11	Final datasheet

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