High speed 5 IGBT in TRENCHSTOP™ 5 technology copacked with RAPID 1 fast and soft antiparallel diode

Features and Benefits:

High speed H5 technology offering
• Best-in-Class efficiency in hard switching and resonant topologies
• Plug and play replacement of previous generation IGBTs
• 650V breakdown voltage
• Low Q_G
• IGBT copacked with RAPID 1 fast and soft antiparallel diode
• Maximum junction temperature 175°C
• Qualified according to JEDEC for target applications
• Pb-free lead plating; RoHS compliant
• Complete product spectrum and PSpice Models: http://www.infineon.com/igbt/

Applications:

• Solar converters
• Uninterruptible power supplies
• Welding converters
• Mid to high range switching frequency converters

Key Performance and Package Parameters

Type	V_{CE}	I_C	V_{CEsat}, T_{vj}=25°C	T_{vjmax}	Marking	Package
IKP08N65H5	650V	8A	1.65V	175°C	K08EEH5	PG-TO220-3

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Maximum Ratings

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CE}	650	V
DC collector current, limited by T_{vjmax} T_C = 25°C T_C = 100°C	I_C	 18.0 11.0	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}	24.0	A
Turn off safe operating area $V_{CE} \le 650V$, $T_{vj} \le 175°C$	-	24.0	A
Diode forward current, limited by T_{vjmax} T_C = 25°C T_C = 100°C	I_F	 20.0 12.0	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	24.0	A
Gate-emitter voltage Transient Gate-emitter voltage ($t_p \le 10\mu s$, D < 0.010)	V_{GE}	±20 ±30	V
Power dissipation T_C = 25°C Power dissipation T_C = 100°C	P_{tot}	70.0 35.0	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
Mounting torque, M3 screw Maximum of mounting processes: 3	M	0.6	Nm

Thermal Resistance

Parameter	Symbol	Conditions	Max. Value	Unit
Characteristic				
IGBT thermal resistance, junction - case	$R_{th(j-c)}$		2.20	K/W
Diode thermal resistance, junction - case	$R_{th(j-c)}$		2.90	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		62	K/W

(OHFWULFDO &KDUDFWHULVWLFV RI WKH VHULHV VSHFLILHG

3DUDPHWHU	6\PERO	&RQGLWLRQV	9DOXH PLQ	W\S	PD[	8QLW
6WDWLF &KDUDFWHULVWLF						
$PMMFDUPS FNJUUFS [FSP HBUF WPMUBHF						7
$PMMFDUPS FNJUUFS TBUVSBUJPO WPMUBHF						7
%JPEF GPSXBSE WPMUBHF						7
(BUF FNJUUFS UISFTIPME WPMUBHF						7
;FSP HBUF WPMUBHF DPMMFDUPS DVSSFOU						‹"
(BUF FNJUUFS MFBLBHF DVSSFOU						O"
5SBOTDPOEVDUBODF						4

(OHFWULFDO &KDUDFWHULVWLF RI WKH VHULHV VSHFLILHG

3DUDPHWHU	6\PERO	&RQGLWLRQV	9DOXH PLQ	W\S	PD[	8QLW
'\QDPLF &KDUDFWHULVWLF						
*OQVU DBQBDJUBODF						
0VUQVU DBQBDJUBODF						Q'
3FWFSTF USBOTGFS DBQBDJUBODF						
(BUF DIBSHF						O$
*OUFSOBM FNJUUFS JOEVDUBODF NFBTVSFE NN JO DBTF						O)

6ZLWFKLQJ &KDUDFWHULVWLF ,QGXFWLYH /RDG

3DUDPHWHU	6\PERO	&RQGLWLRQV	9DOXH PLQ	W\S	PD[	8QLW
,*%7 &KDUDFWHULVWLF DW						
5VSO PO EFMBZ UJNF						OT
3JTF UJNF						OT
5VSO PGG EFMBZ UJNF						OT
'BMM UJNF						OT
5VSO PO FOFSHZ						N+
5VSO PGG FOFSHZ						N+
5PUBM TXJUDIJOH FOFSHZ						N+

&OFSHZ MPTTFT JODMVEF mUBJMn B OE EJPEF SFWFSTF SFDPWFSZ

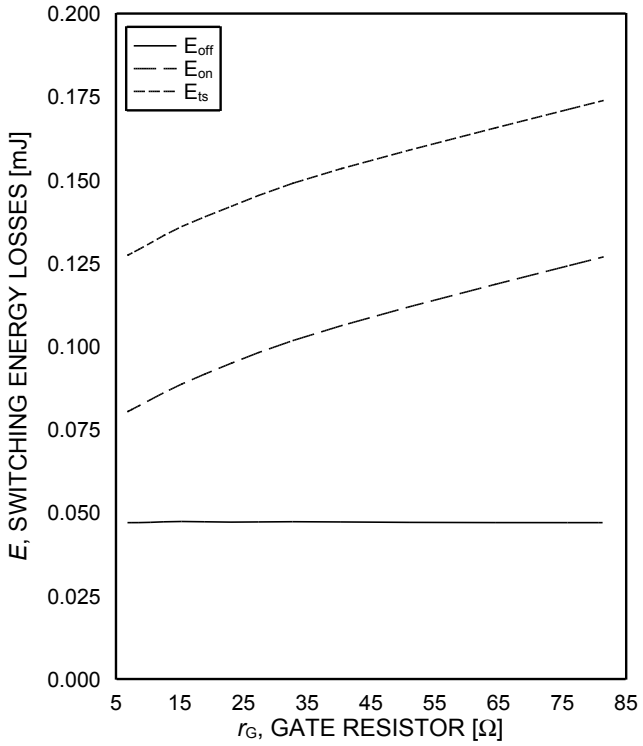


Figure 13. **Typical switching energy losses as a function of gate resistor**
(inductive load, T_{vj}=150°C, V_{CE}=400V, V_{GE}=15/0V, I_C=4A, Dynamic test circuit in Figure E)

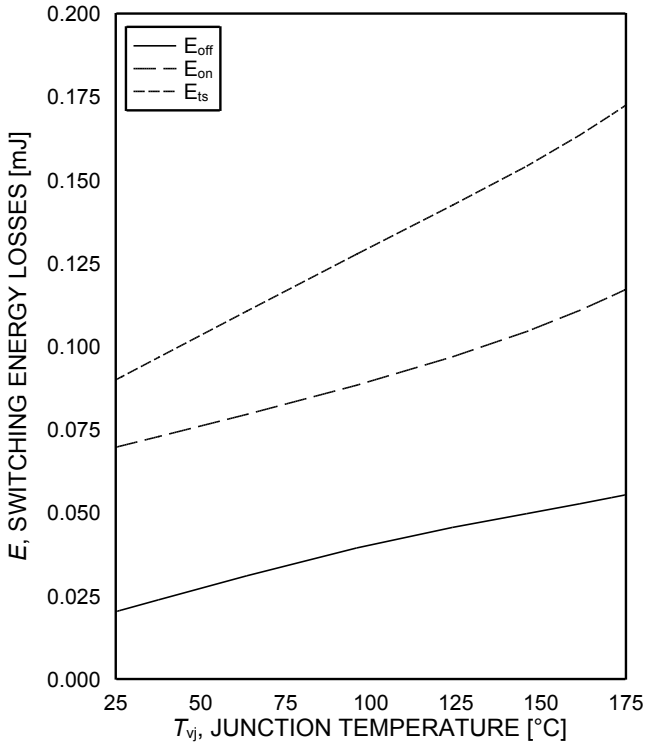


Figure 14. **Typical switching energy losses as a function of junction temperature**
(inductive load, V_{CE}=400V, V_{GE}=15/0V, I_C=4A, r_G=48Ω,Dynamic test circuit in Figure E)

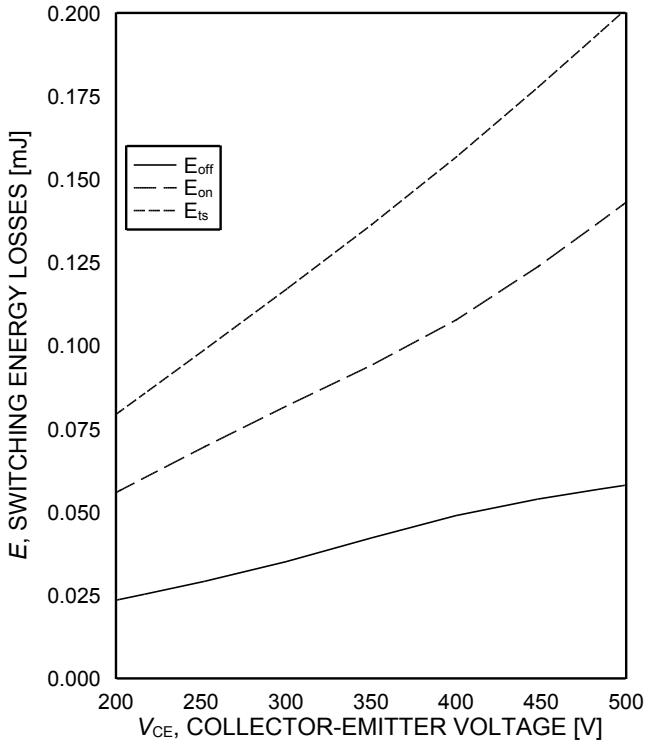


Figure 15. **Typical switching energy losses as a function of collector emitter voltage**
(inductive load, T_{vj}=150°C, V_{GE}=15/0V, I_C=4A, r_G=48Ω,Dynamic test circuit in Figure E)

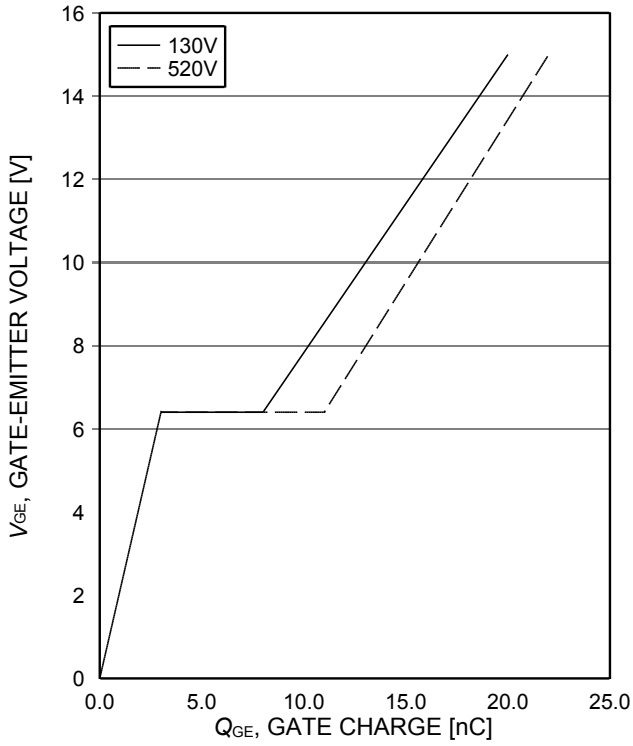


Figure 16. **Typical gate charge**
(I_C=8A)

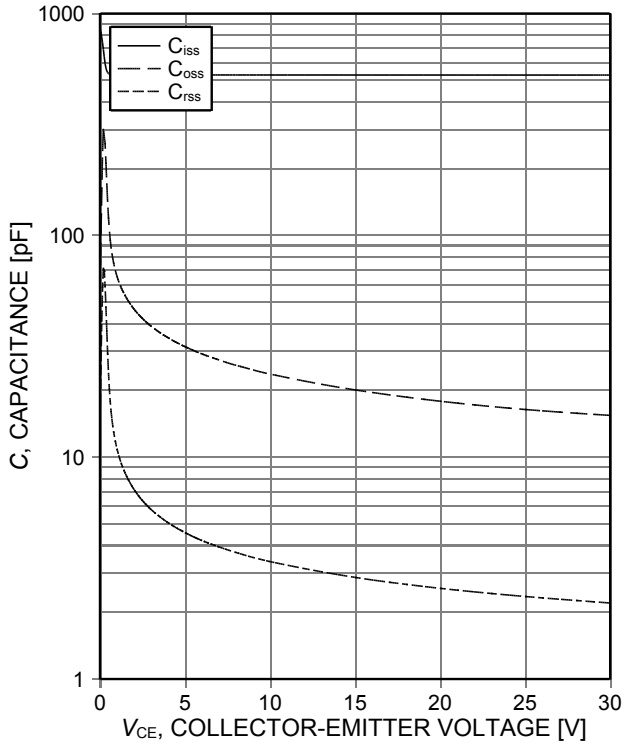


Figure 17. **Typical capacitance as a function of collector-emitter voltage**
(V_{GE}=0V, f=1MHz)

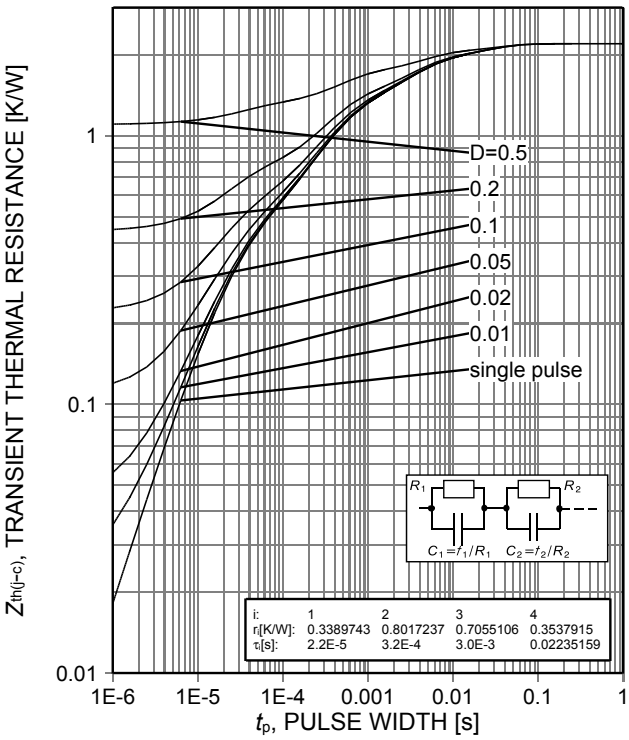


Figure 18. **IGBT transient thermal resistance**
($D=t_p/T$)

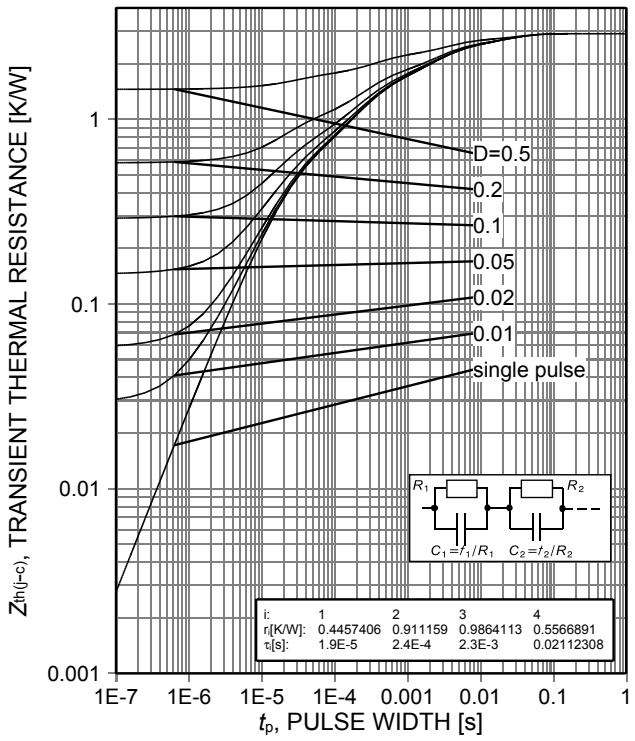


Figure 19. **Diode transient thermal impedance as a function of pulse width**
($D=t_p/T$)

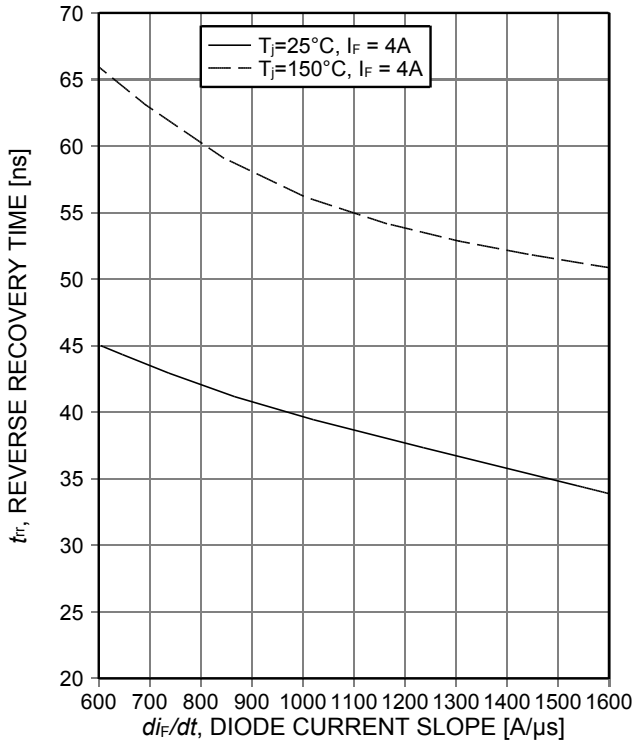


Figure 20. **Typical reverse recovery time as a function of diode current slope**
(V_R=400V)

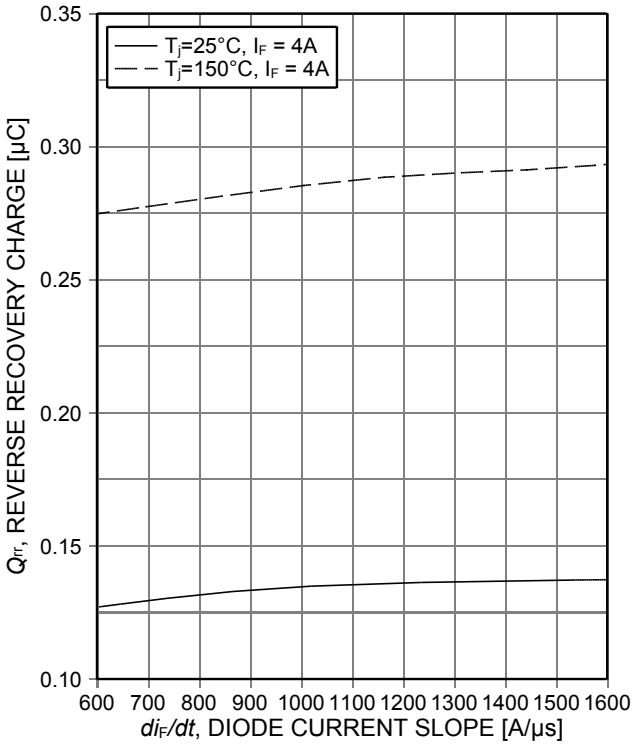


Figure 21. **Typical reverse recovery charge as a function of diode current slope** (V_R=400V)

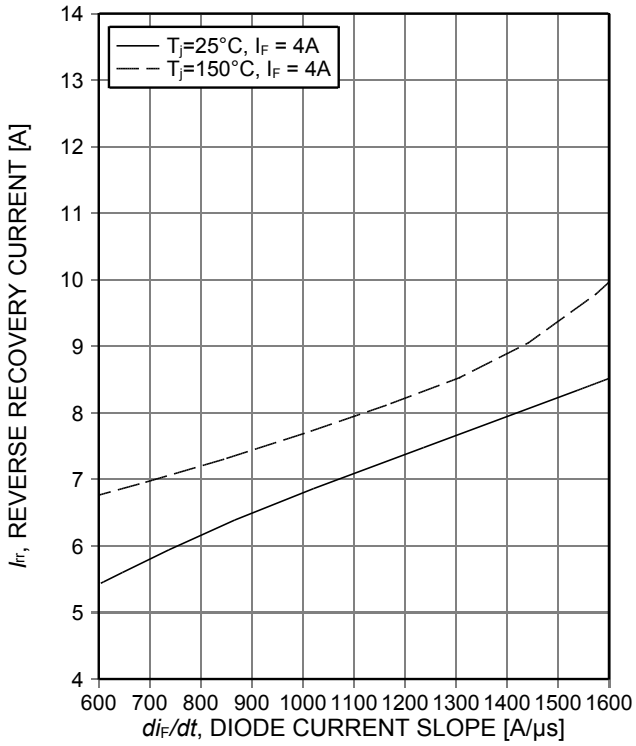


Figure 22. **Typical reverse recovery current as a function of diode current slope** (V_R=400V)

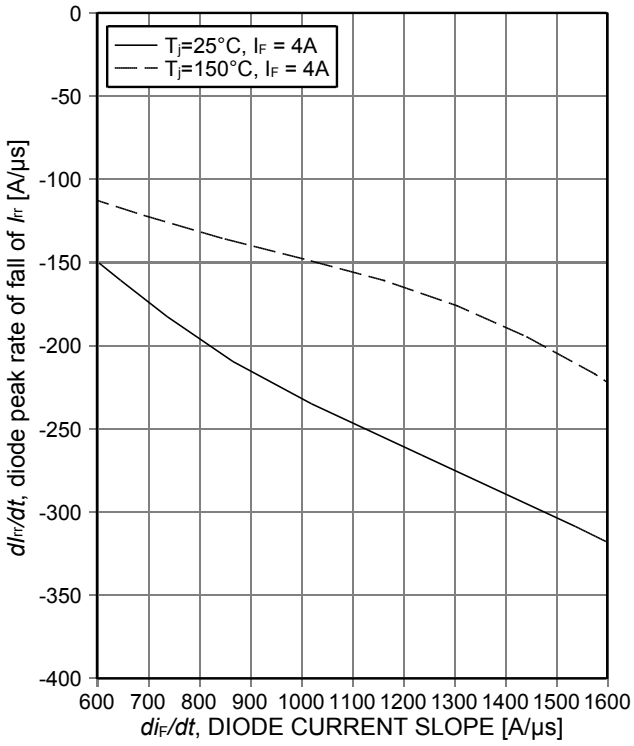


Figure 23. **Typical diode peak rate of fall of reverse recovery current as a function of diode current slope** (V_R=400V)

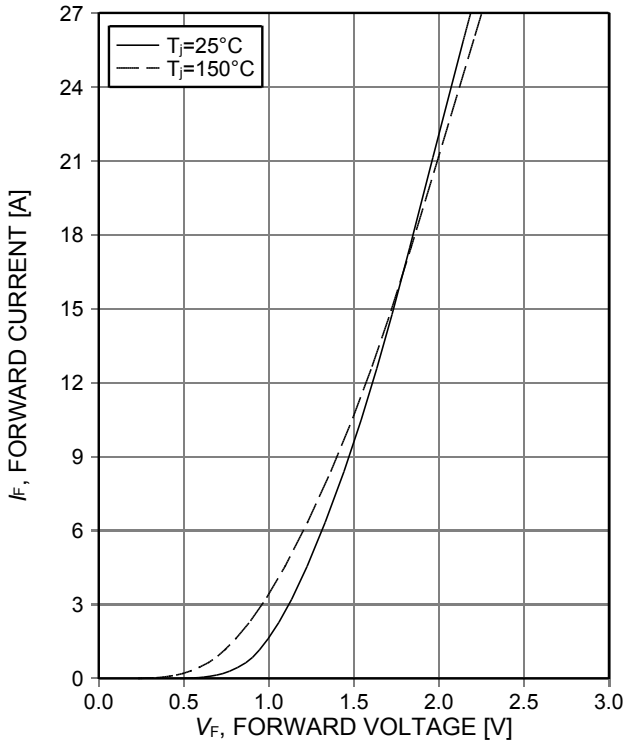


Figure 24. **Typical diode forward current as a function of forward voltage**

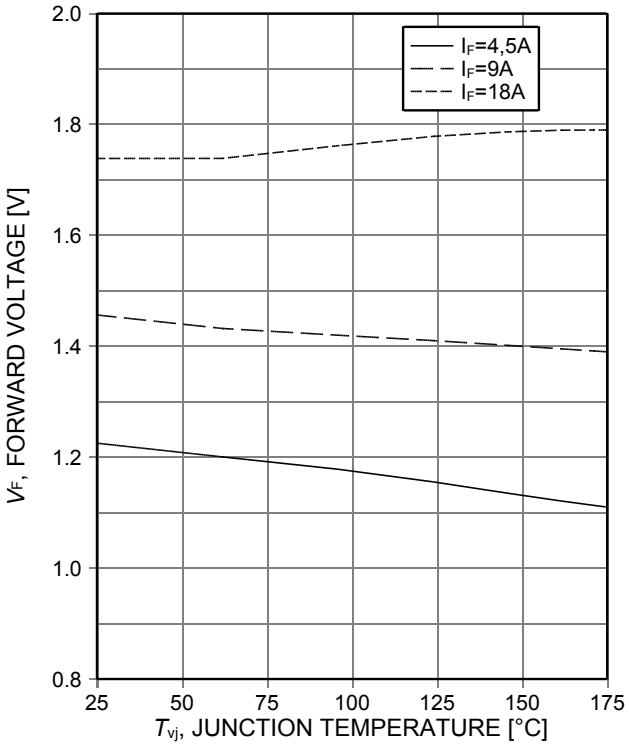
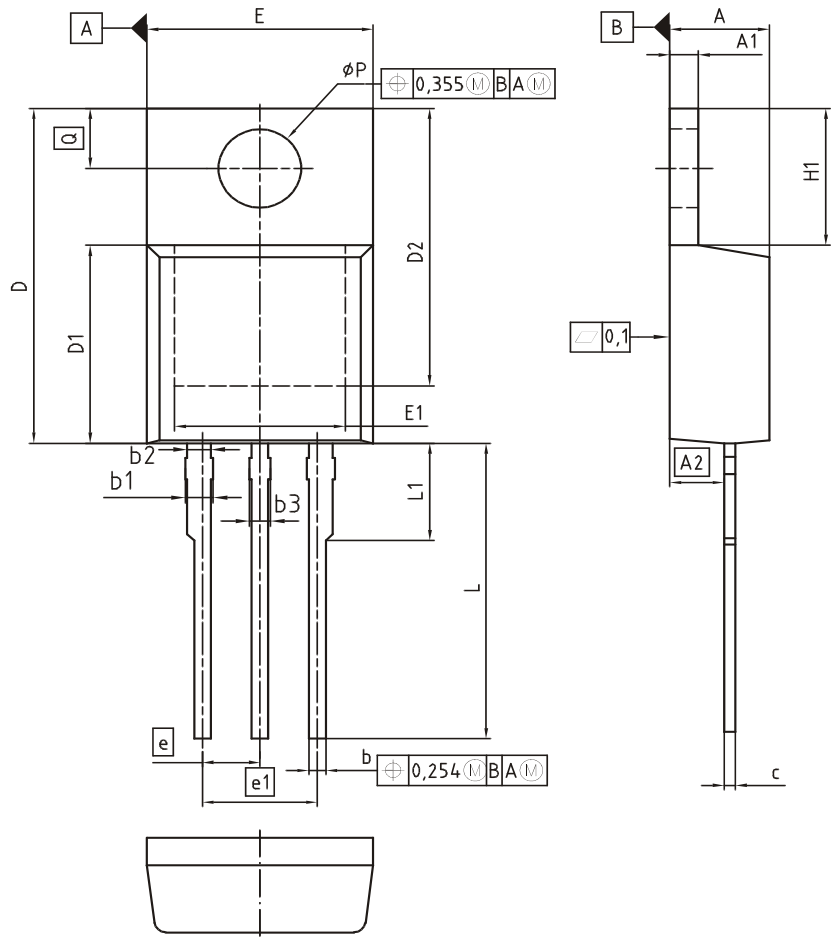


Figure 25. **Typical diode forward voltage as a function of junction temperature**

Package Drawing PG-TO220-3



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	1.17	1.40	0.046	0.055
A2	2.15	2.72	0.085	0.107
b	0.65	0.86	0.026	0.034
b1	0.95	1.40	0.037	0.055
b2	0.95	1.15	0.037	0.045
b3	0.65	1.15	0.026	0.045
c	0.33	0.60	0.013	0.024
D	14.81	15.95	0.583	0.628
D1	8.51	9.45	0.335	0.372
D2	12.19	13.10	0.480	0.516
E	9.70	10.36	0.382	0.408
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	3		3	
H1	5.90	6.90	0.232	0.272
L	13.00	14.00	0.512	0.551
L1	-	4.80	-	0.189
øP	3.60	3.89	0.142	0.153
Q	2.60	3.00	0.102	0.118

DOCUMENT NO.
Z8B00003318

SCALE 0 2.5 0 2.5 5mm

EUROPEAN PROJECTION

ISSUE DATE
30-07-2009

REVISION
06

Testing Conditions

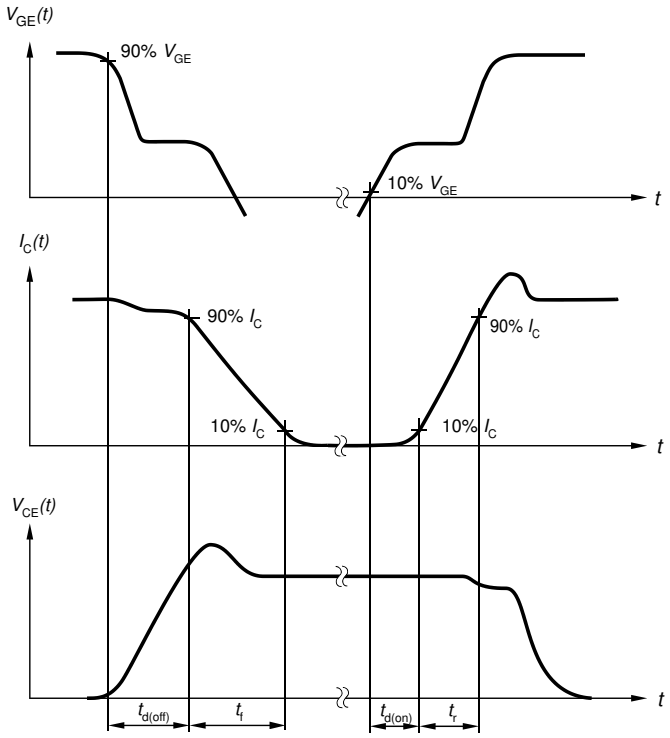


Figure A. **Definition of switching times**

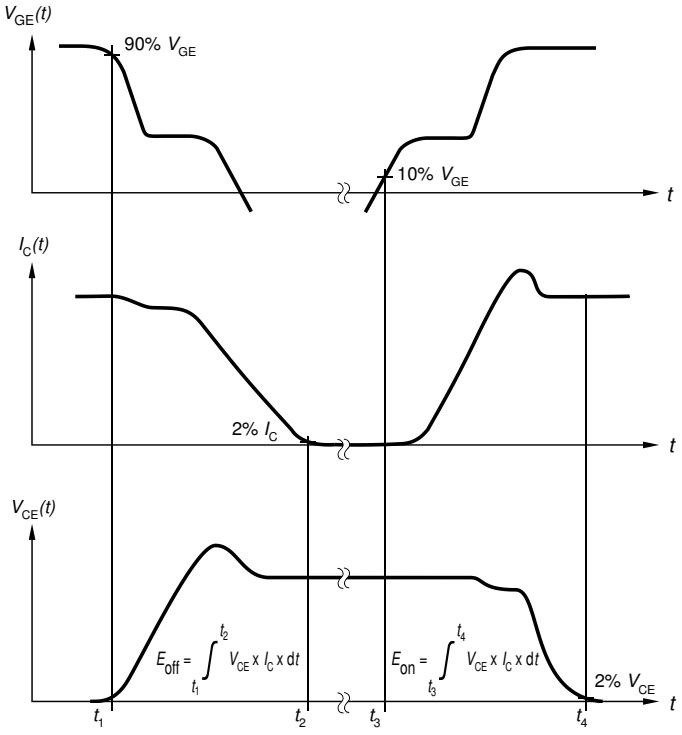


Figure B. **Definition of switching losses**

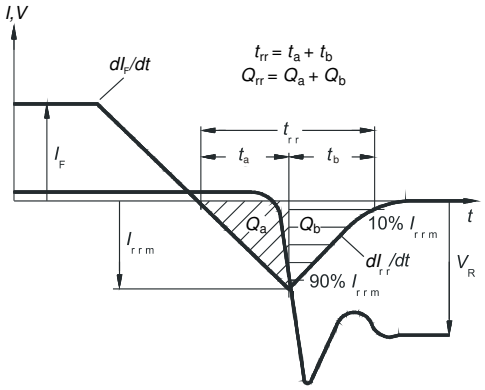


Figure C. **Definition of diode switching characteristics**

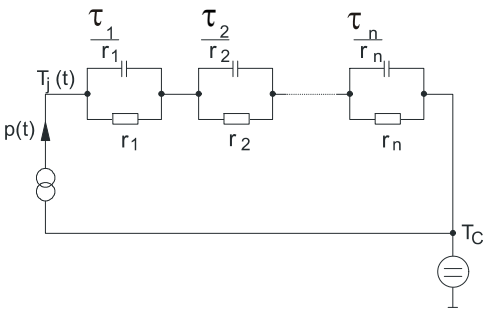


Figure D. **Thermal equivalent circuit**

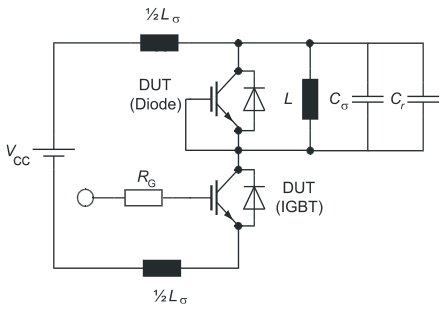


Figure E. **Dynamic test circuit**
Parasitic inductance L_σ,
parasitic capacitor C_σ,
relief capacitor C_r,
(only for ZVT switching)

Revision History

IKP08N65H5

Revision: 2015-05-05, Rev. 2.1

Previous Revision

Revision	Date	Subjects (major changes since last revision)
1.1	2012-11-09	Preliminary data sheet
1.2	2013-12-17	New Marking Pattern
2.1	2015-05-05	Final data sheet

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Please send your proposal (including a reference to this document) to: erratum@infineon.com

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