Diode

Rapid Switching Emitter Controlled Diode

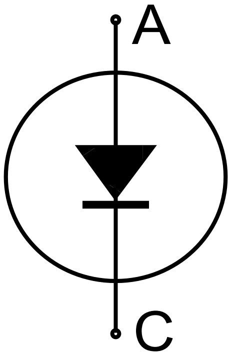
IDV30E65D2

Emitter Controlled Diode

Data sheet

Industrial Power Control

Rapid Switching Emitter Controlled Diode

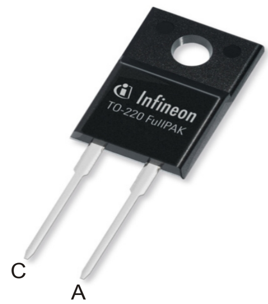


Features:

- Qualified according to JEDEC for target applications
- 650 V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage and stable over temperature
- 175 °C junction operating temperature
- Easy paralleling
- Pb-free lead plating; RoHS compliant

Applications:

- Boost diode in CCM PFC



Key Performance and Package Parameters

Type	V_{rrm}	I_f	V_f, T_{vj}=25°C	T_{vjmax}	Marking	Package
IDV30E65D2	650V	30A	1.6V	175°C	E30ED2	PG-TO220-2-22 FP

Table of Contents

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
Repetitive peak reverse voltage, $T_{vj} \geq 25°C$	V_{RRM}	650	V
Diode forward current, limited by T_{vjmax} $T_C = 25°C$ $T_C = 100°C$	I_F	 30.0 17.5	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	90.0	A
Diode surge non repetitive forward current $T_C = 25°C$, $t_p = 8.3ms$, sine halfwave	I_{FSM}	 180.0	A
Power dissipation $T_C = 25°C$	P_{tot}	47.0	W
Operating junction temperature	T_{vj}	-40...+175	°C
Storage temperature	T_{stg}	-55...+150	°C
Soldering temperature, wave soldering 1.6 mm (0.063 in.) 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				
Diode thermal resistance,[1] junction - case	$R_{th(j-c)}$		3.20	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		65	K/W

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

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Diode forward voltage	V_F	$I_F = 30.0A$ $T_{vj} = 25°C$ $T_{vj} = 175°C$	 - -	 1.60 1.65	 2.20 -	V
Reverse leakage current	I_R	$V_R = 650V$ $T_{vj} = 25°C$ $T_{vj} = 175°C$	 - -	 4.0 800.0	 40.0 -	µA

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

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Dynamic Characteristic						
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	7.0	-	nH

[1] Please be aware that in non standard load conditions, due to high Rth(j-c), Tvj close to Tvjmax can be reached.

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

Diode Characteristic, at T_{vj} = 25°C

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Diode reverse recovery time	t_{rr}	T_{vj} = 25°C, V_R = 400V, I_F = 30.0A, di_F/dt = 1000A/µs, $L\sigma$ = 30nH, $C\sigma$ = 40pF, switch IKW50N65H5	-	42	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.34	-	µC
Diode peak reverse recovery current	I_{rrm}		-	14.7	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-2100	-	A/µs
Diode reverse recovery time	t_{rr}	T_{vj} = 25°C, V_R = 400V, I_F = 30.0A, di_F/dt = 300A/µs, $L\sigma$ = 30nH, $C\sigma$ = 40pF, switch IKW50N65H5	-	70	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.25	-	µC
Diode peak reverse recovery current	I_{rrm}		-	5.7	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-700	-	A/µs

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

Diode Characteristic, at T_{vj} = 175°C/125°C

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Diode reverse recovery time	t_{rr}	T_{vj} = 175°C, V_R = 400V, I_F = 30.0A, di_F/dt = 1000A/µs, $L\sigma$ = 30nH, $C\sigma$ = 40pF, switch IKW50N65H5	-	56	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.61	-	µC
Diode peak reverse recovery current	I_{rrm}		-	18.0	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-2200	-	A/µs
Diode reverse recovery time	t_{rr}	T_{vj} = 125°C, V_R = 400V, I_F = 30.0A, di_F/dt = 300A/µs, $L\sigma$ = 30nH, $C\sigma$ = 40pF, switch IKW50N65H5	-	73	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.38	-	µC
Diode peak reverse recovery current	I_{rrm}		-	7.1	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-900	-	A/µs

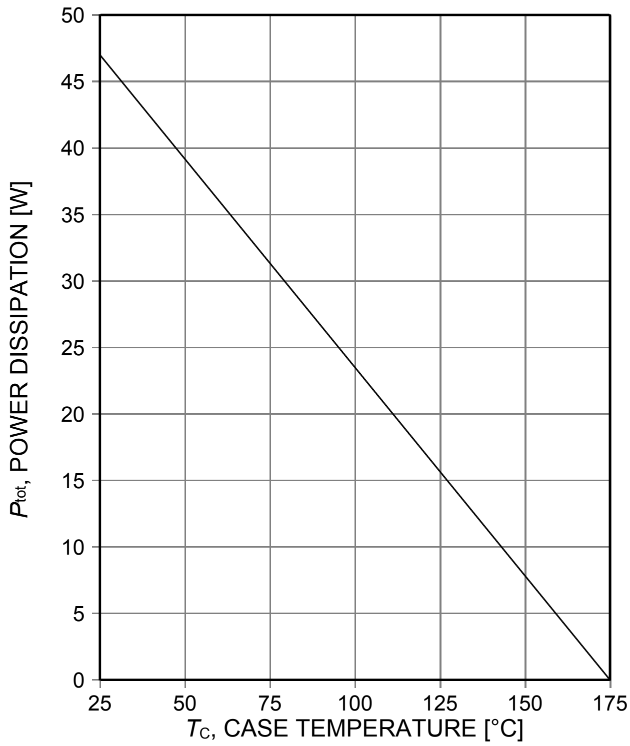


Figure 1. **Power dissipation as a function of case temperature**
(T_{vj}≤175°C)

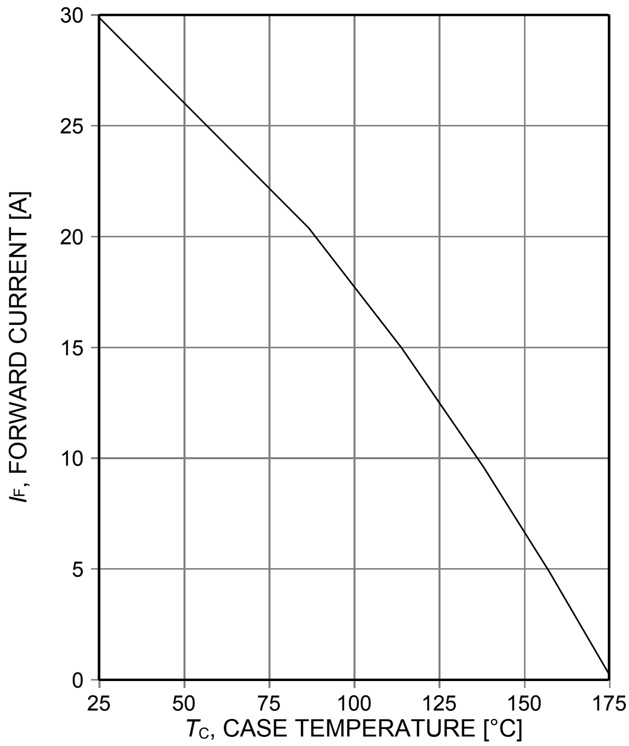
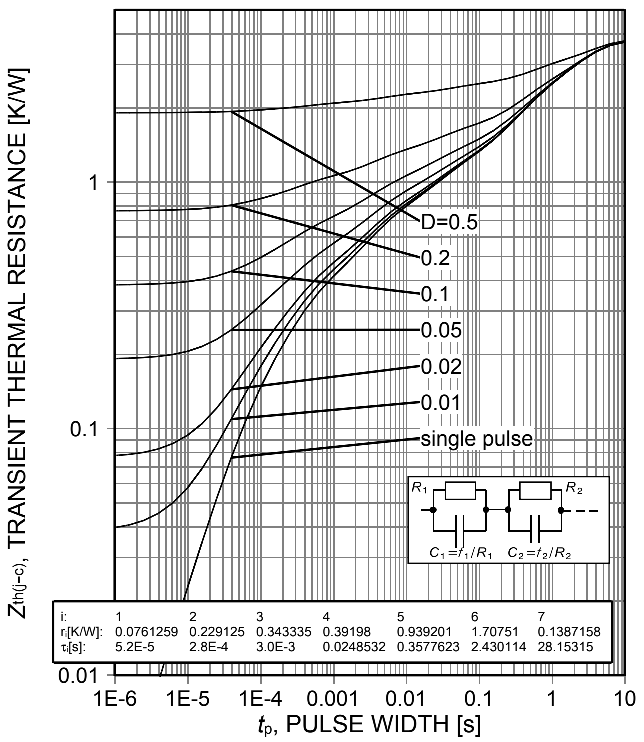


Figure 2. **Diode forward current as a function of case temperature**
(T_{vj}≤175°C)



i:	1	2	3	4	5	6	7
r_i[K/W]:	0.0761259	0.229125	0.343335	0.39198	0.939201	1.70751	0.1387158
τ_i[s]:	5.2E-5	2.8E-4	3.0E-3	0.0248532	0.3577623	2.430114	28.15315

Figure 3. **Diode transient thermal impedance as a function of pulse width**
($D=t_p$/T)

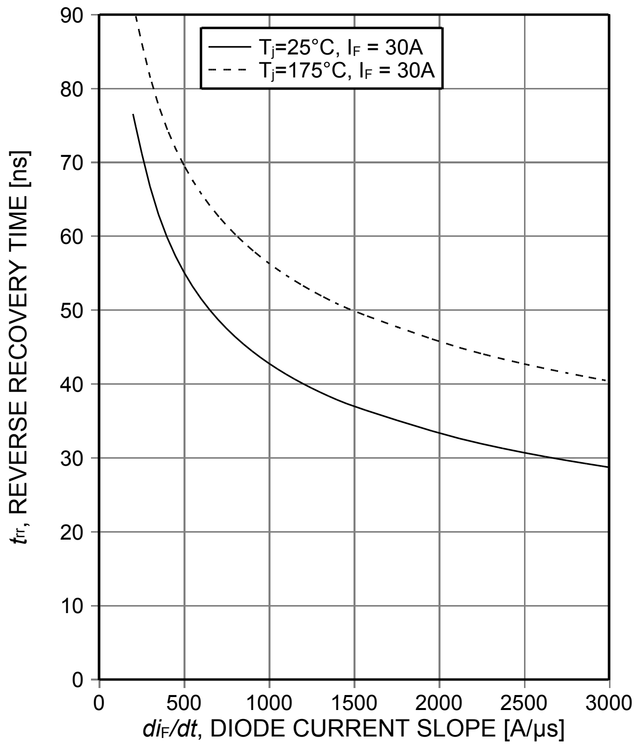


Figure 4. **Typical reverse recovery time as a function of diode current slope**
(V_R=400V)

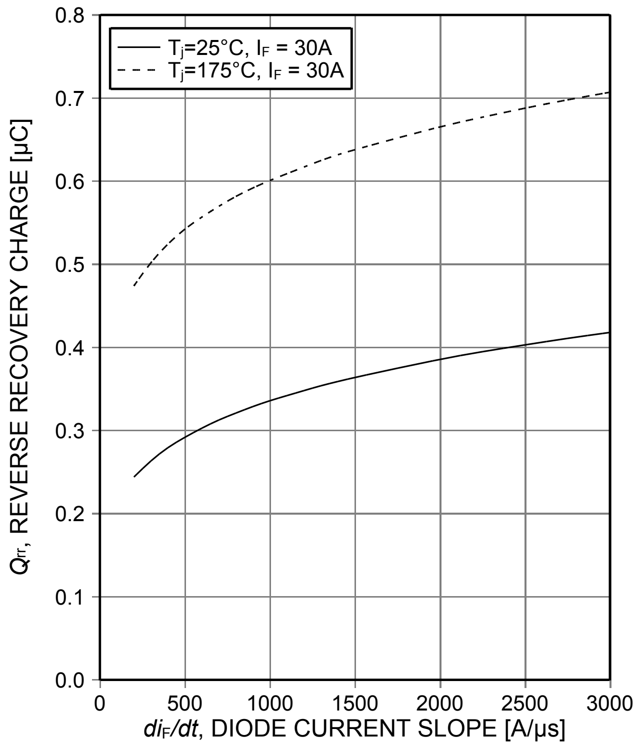


Figure 5. **Typical reverse recovery charge as a function of diode current slope**
(V_R=400V)

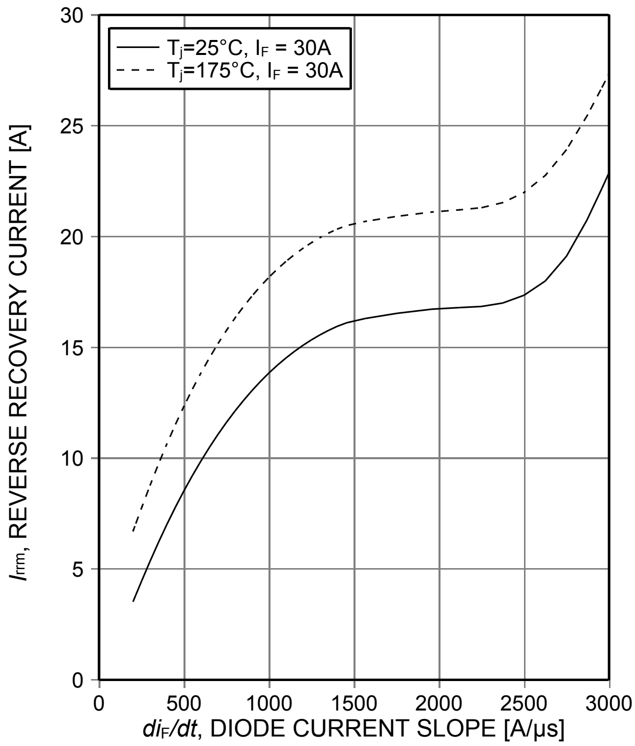


Figure 6. **Typical peak reverse recovery current as a function of diode current slope**
(V_R=400V)

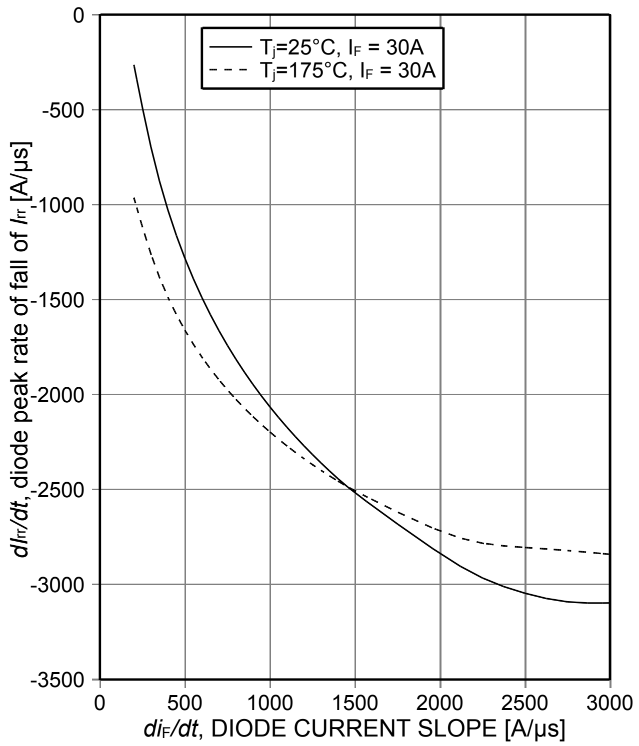


Figure 7. **Typical diode peak rate of fall of reverse recovery current as a function of diode current slope**
(V_R=400V)

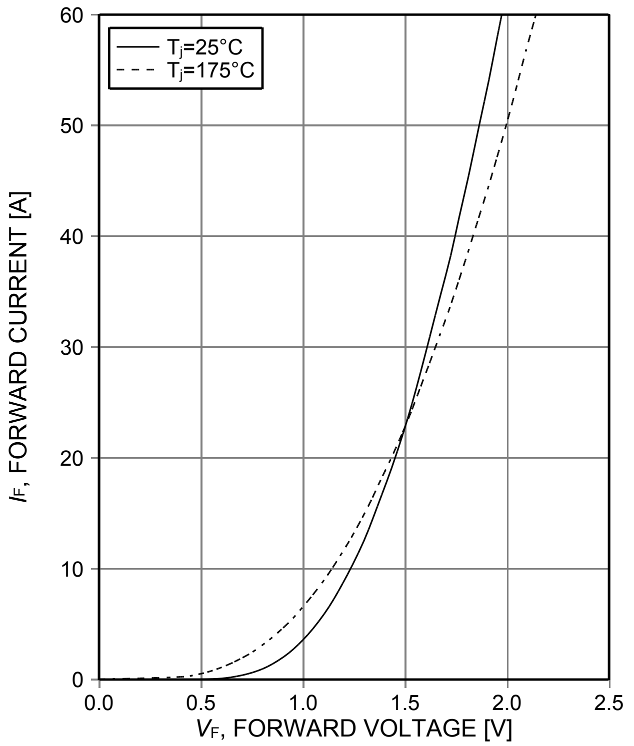


Figure 8. **Typical diode forward current as a function of forward voltage**

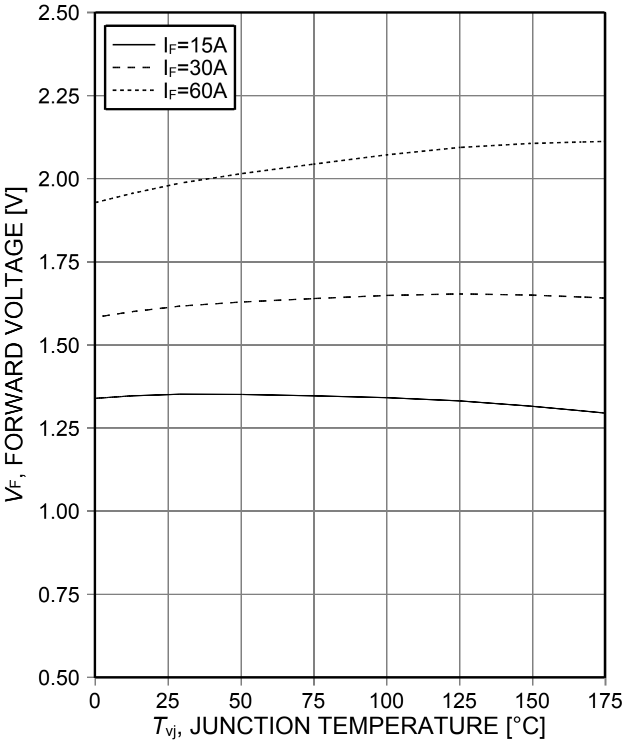
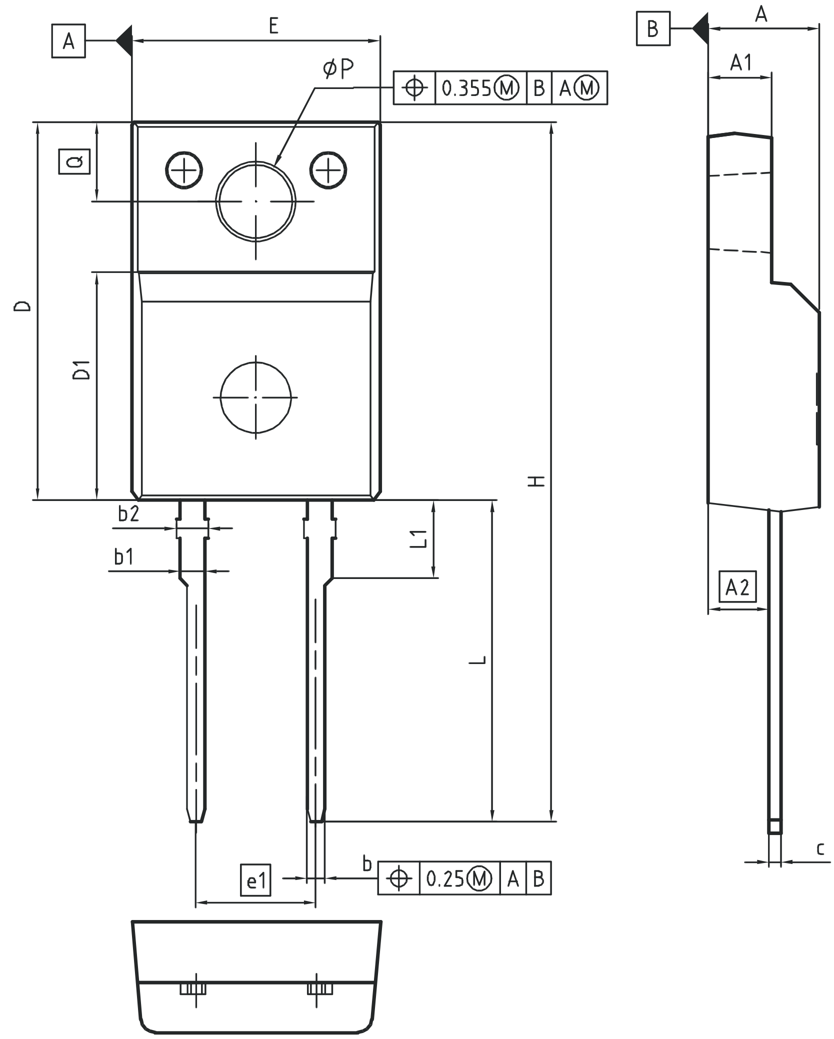


Figure 9. **Typical diode forward voltage as a function of junction temperature**

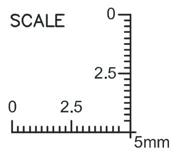
PG-TO220-2-22



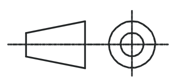
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.55	4.85	0.179	0.191
A1	2.55	2.85	0.100	0.112
A2	2.42	2.72	0.095	0.107
b	0.65	0.85	0.026	0.033
b1	0.95	1.15	0.037	0.045
b2	0.95	1.35	0.037	0.053
c	0.40	0.60	0.016	0.024
D	15.85	16.15	0.624	0.636
D1	9.53	9.83	0.375	0.387
E	10.35	10.65	0.407	0.419
e1	5.08		0.200	
N	2		2	
H	29.30	29.90	1.154	1.177
L	13.45	13.75	0.530	0.541
L1	3.15	3.45	0.124	0.136
øP	3.00	3.20	0.118	0.126
Q	3.20	3.50	0.126	0.138

DOCUMENT NO.
Z8B00155551

SCALE



EUROPEAN PROJECTION



ISSUE DATE
21-12-2009

REVISION
01

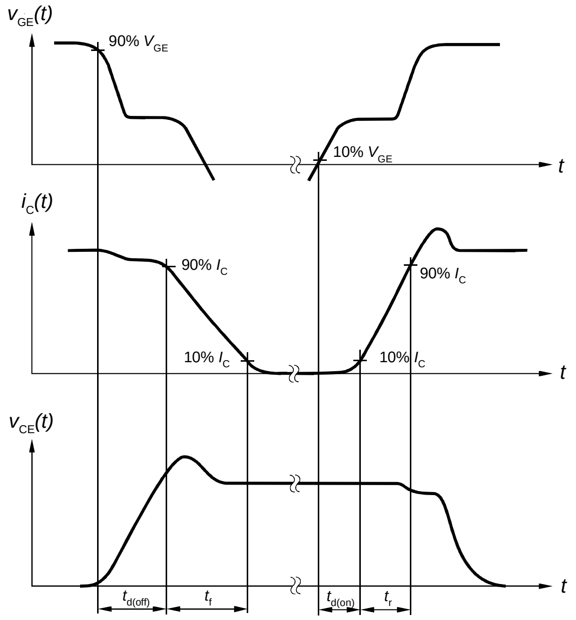


Figure A. Definition of switching times

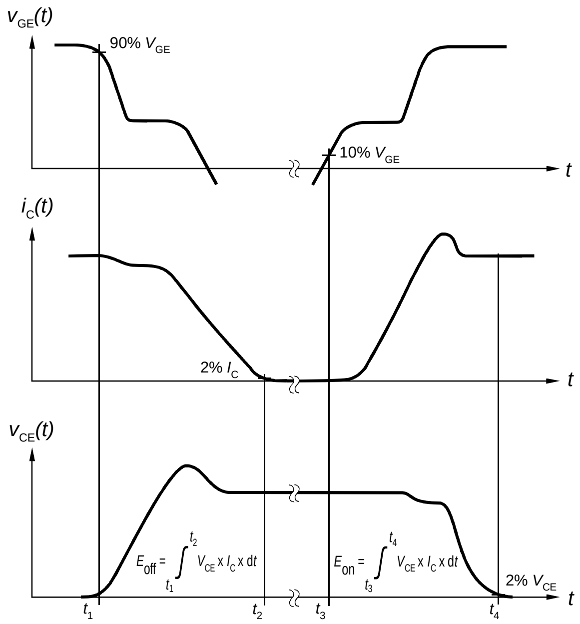


Figure B. Definition of switching losses

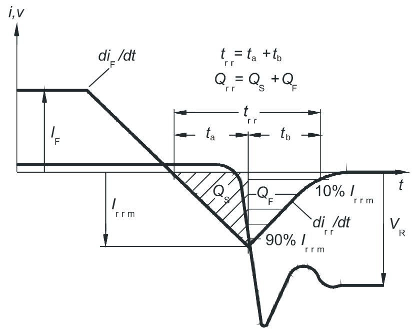


Figure C. Definition of diodes switching characteristics

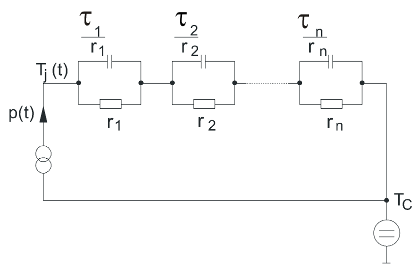


Figure D. Thermal equivalent circuit

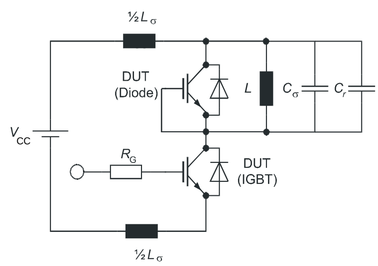


Figure E. Dynamic test circuit
Parasitic inductance L_σ,
Parasitic capacitor C_σ,
Relief capacitor C_r,
(only for ZVT switching)

Revision History

IDV30E65D2

Revision: 2014-09-18, Rev. 2.1

Previous Revision

Revision	Date	Subjects (major changes since last revision)
2.1	2014-09-18	Final data sheet

We Listen to Your Comments
Any information within this document that you feel is wrong, unclear or missing at all ?
Your feedback will help us to continuously improve the quality of this document.
Please send your proposal (including a reference to this document) to: erratum@infineon.com

Published by
Infineon Technologies AG
81726 Munich, Germany
81726 München, Germany

Legal Disclaimer
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, 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.

Information
For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings
Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.
The Infineon Technologies component described in this Data Sheet may be used in life-support devices or systems and/or automotive, aviation and aerospace applications or systems only 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, automotive, aviation and aerospace 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.