Diode

Rapid Switching Emitter Controlled Diode

IDW75D65D1

Emitter Controlled Diode Rapid 1 Dual Anode Series

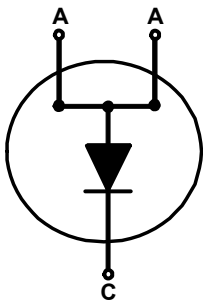
Data sheet

Industrial Power Control

Rapid Switching Emitter Controlled Diode

Features:

- Qualified according to JEDEC for target applications
- 650V Emitter Controlled technology
- Temperature stable behaviour of key parameters
- Low forward voltage (V_F)
- Ultra fast recovery
- Low reverse recovery charge (Q_{rr})
- Low reverse recovery current (I_{rrm})
- 175°C junction operating temperature
- Pb-free lead plating
- RoHS compliant



Applications:

- AC/DC converters
- Boost diode in PFC stages
- Free wheeling diodes in inverters and motor drives
- General purpose inverters
- Switch mode power supplies

Package pin definition:

- Pin 1 - anode
- Pin 2 and backside - cathode
- Pin 3 - anode

Green

Halogen-Free

RoHS

Key Performance and Package Parameters

Type	V_{rrm}	I_f	V_f, T_{vj}=25°C	T_{vjmax}	Marking	Package
IDW75D65D1	650V	75A	1.35V	175°C	D75ED1	PG-TO247-3

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} [1] T_C = 25°C T_C = 100°C	I_F	 150.0 75.0	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	225.0	A
Diode surge non repetitive forward current [2] T_C = 25°C, t_p = 10.0ms, sine halfwave	I_{FSM}	 580.0	A
Power dissipation T_C = 25°C Power dissipation T_C = 100°C	P_{tot}	326.0 163.0	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 Resistances

Parameter	Symbol	Conditions	Max. Value	Unit
Characteristic				
Diode thermal resistance, [3] junction - case	$R_{th(j-c)}$		0.46	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		40	K/W

Electrical Characteristics, 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 = 75.0A T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 175°C	 - - -	 1.35 1.32 1.28	 1.70 - -	V
Reverse leakage current	I_R	V_R = 650V T_{vj} = 25°C T_{vj} = 175°C	 - -	 - 3000.0	 40.0 -	µA

[1] Maximum current for pin 1 and pin 3 is 80A (value limited by bondwire).
[2] For a balanced current flow through pins 1 and 3.
[3] Please be aware that in nonstandard load conditions, due to high $R_{th(j-c)}$, T_{vj} close to T_{vjmax} can be reached.

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

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Dynamic Characteristic						
Internal emitter inductance[1] measured 5mm (0.197 in.) from case	L_E		-	7.0	-	nH

Switching Characteristics, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Diode Characteristic, at T_{vj} = 25°C						
Diode reverse recovery time	t_{rr}	T_{vj} = 25°C, V_R = 400V, I_F = 75.0A, di_F/dt = 1000A/µs, Lσ = 30nH, Cσ = 40pF, switch IGZ100N65H5.	-	108	-	ns
Diode reverse recovery charge	Q_{rr}		-	1.25	-	µC
Diode peak reverse recovery current	I_{rrm}		-	19.9	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-1100	-	A/µs
Diode reverse recovery time	t_{rr}	T_{vj} = 25°C, V_R = 400V, I_F = 40.0A, di_F/dt = 200A/µs, Lσ = 30nH, Cσ = 40pF, switch IGZ100N65H5.	-	127	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.48	-	µC
Diode peak reverse recovery current	I_{rrm}		-	6.4	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-32	-	A/µs

Switching Characteristics, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Diode Characteristic, at T_{vj} = 175°C/125°C						
Diode reverse recovery time	t_{rr}	T_{vj} = 175°C, V_R = 400V, I_F = 75.0A, di_F/dt = 1000A/µs, Lσ = 30nH, Cσ = 40pF, switch IGZ100N65H5.	-	174	-	ns
Diode reverse recovery charge	Q_{rr}		-	4.16	-	µC
Diode peak reverse recovery current	I_{rrm}		-	37.9	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-1170	-	A/µs

[1] For a balanced current flow through pins 1 and 3.

Diode reverse recovery time	t_{rr}	T_{vj} = 125°C, V_R = 400V, I_F = 40.0A, di_F/dt = 200A/µs, $L\sigma$ = 30nH, $C\sigma$ = 40pF, switch IGZ100N65H5.	-	184	-	ns
Diode reverse recovery charge	Q_{rr}		-	1.64	-	µC
Diode peak reverse recovery current	I_{rrm}		-	13.2	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-62	-	A/µs

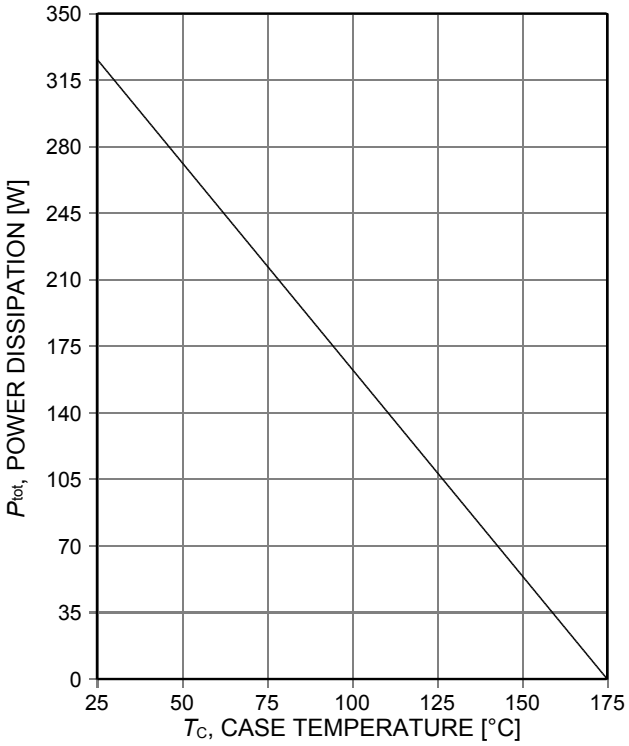


Figure 1. **Power dissipation as a function of case temperature**
(T_{vj}≤175°C)

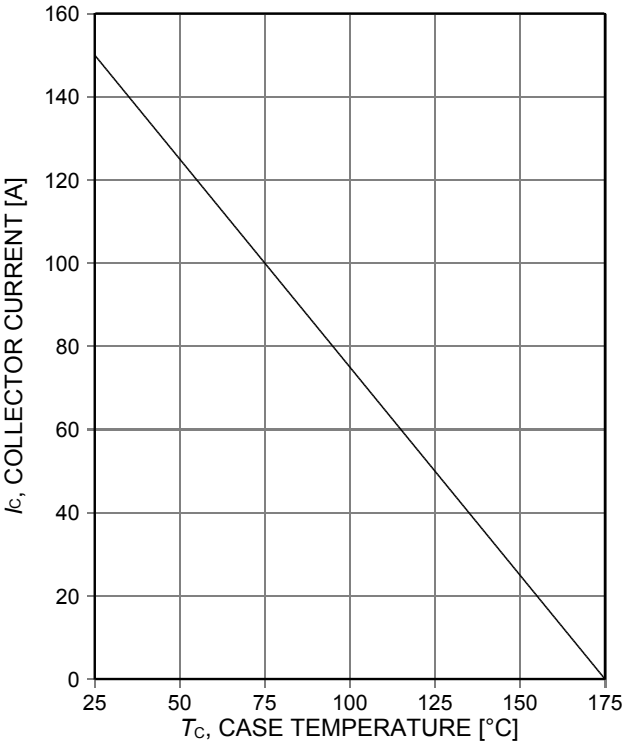


Figure 2. **Collector current as a function of case temperature**
(V_{GE}≥15V, T_{vj}≤175°C)

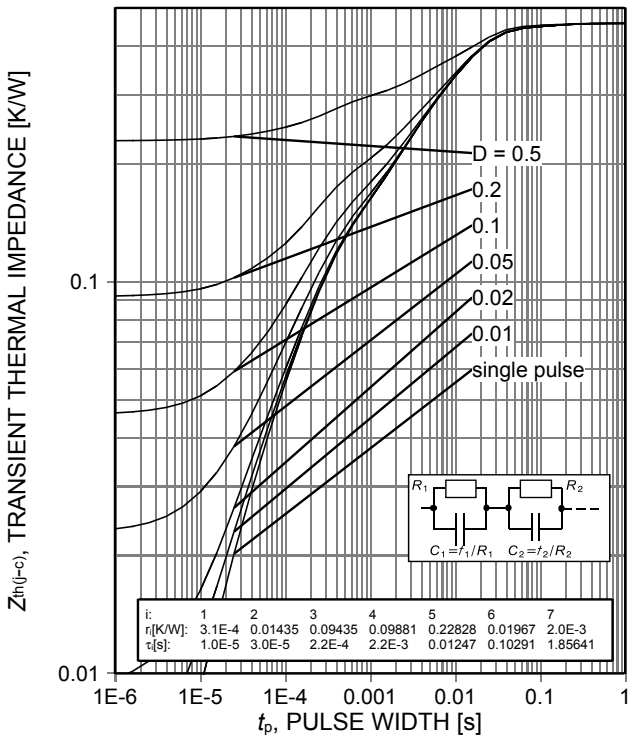


Figure 3. **Diode transient thermal impedance as a function of pulse width**
($D=t_p/T$)

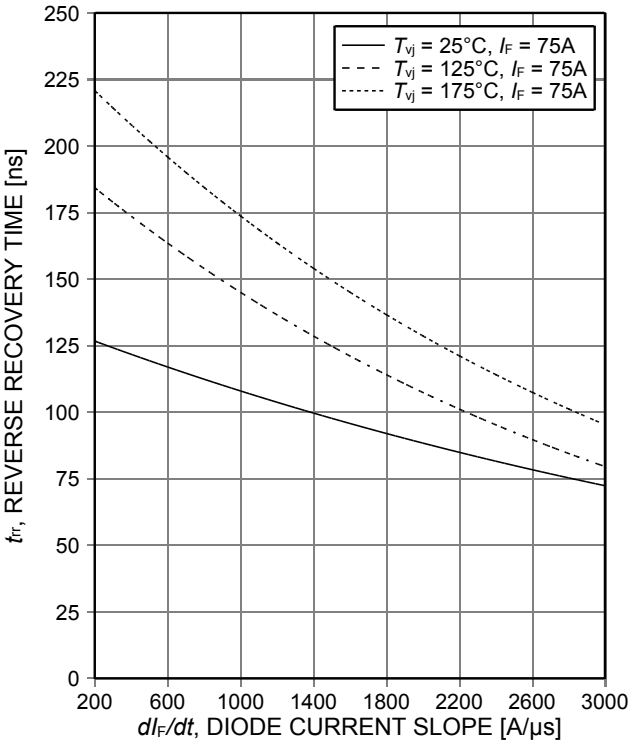


Figure 4. **Typical reverse recovery time as a function of diode current slope**
(V_R=400V)

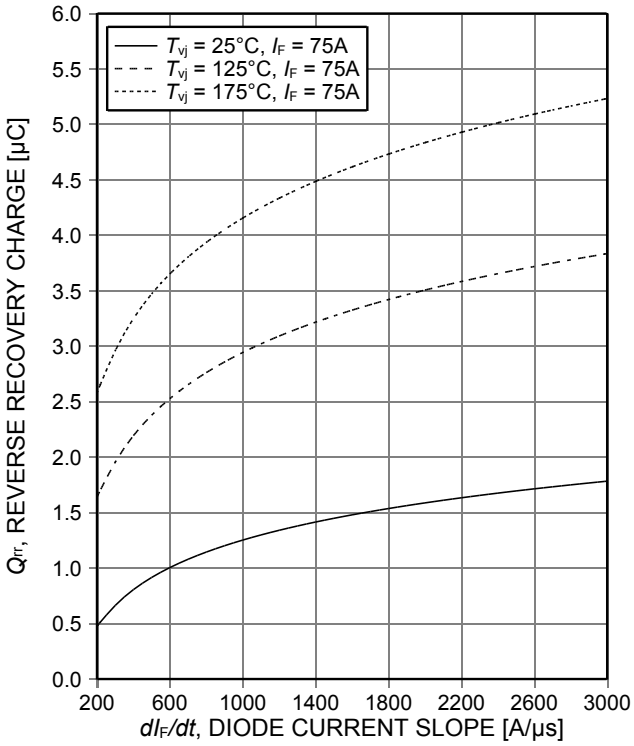


Figure 5. **Typical reverse recovery charge as a function of diode current slope**
(V_R=400V)

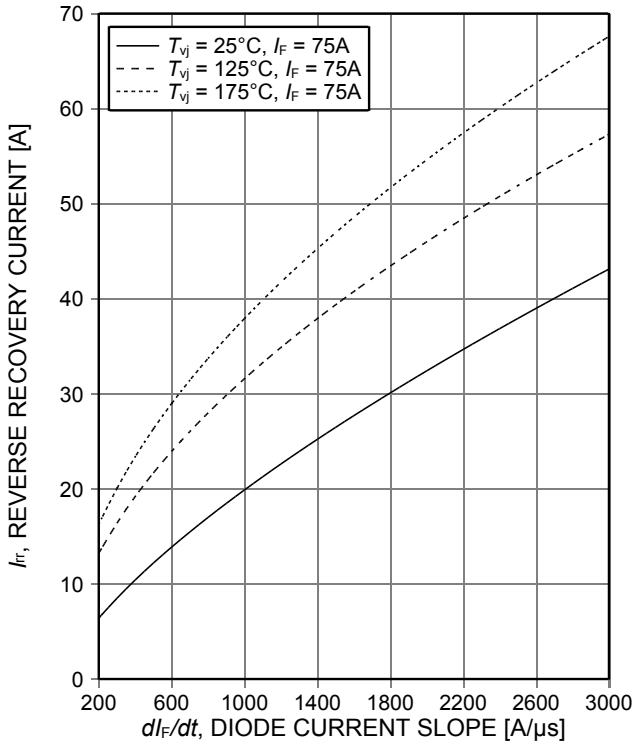


Figure 6. **Typical reverse recovery current as a function of diode current slope**
(V_R=400V)

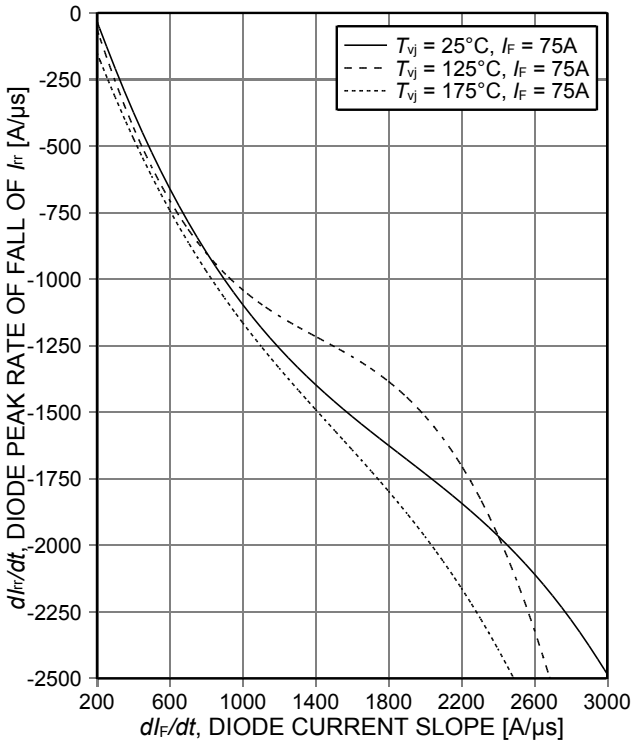


Figure 7. **Typical diode peak rate of fall of reverse recovery current as a function of diode current slope**
(V_R=400V)

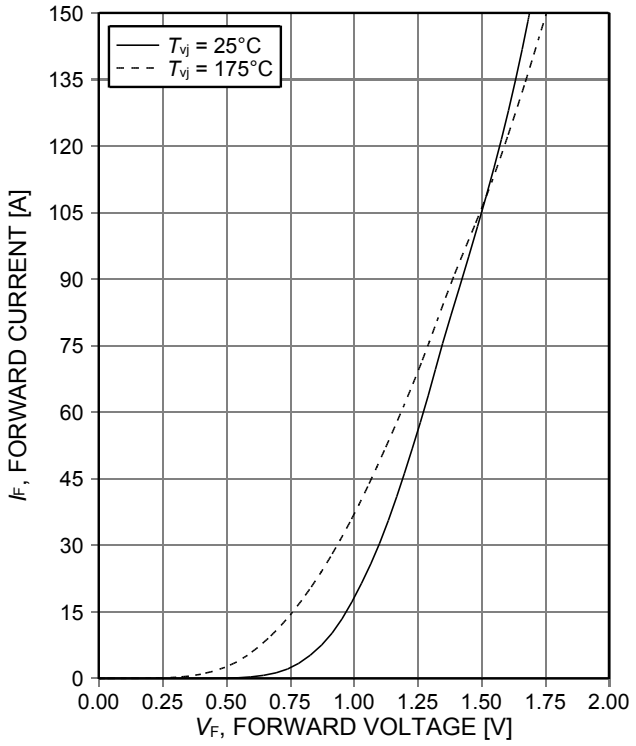


Figure 8. **Typical diode forward current as a function of forward voltage**

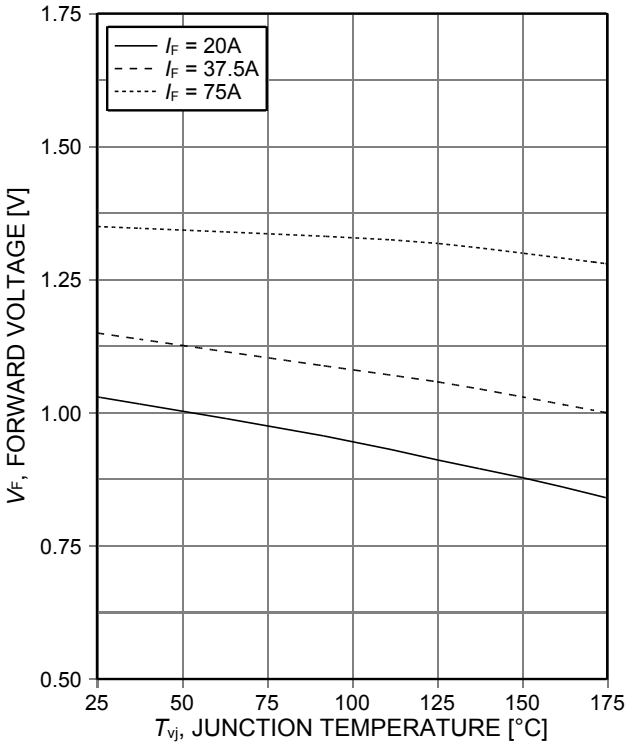
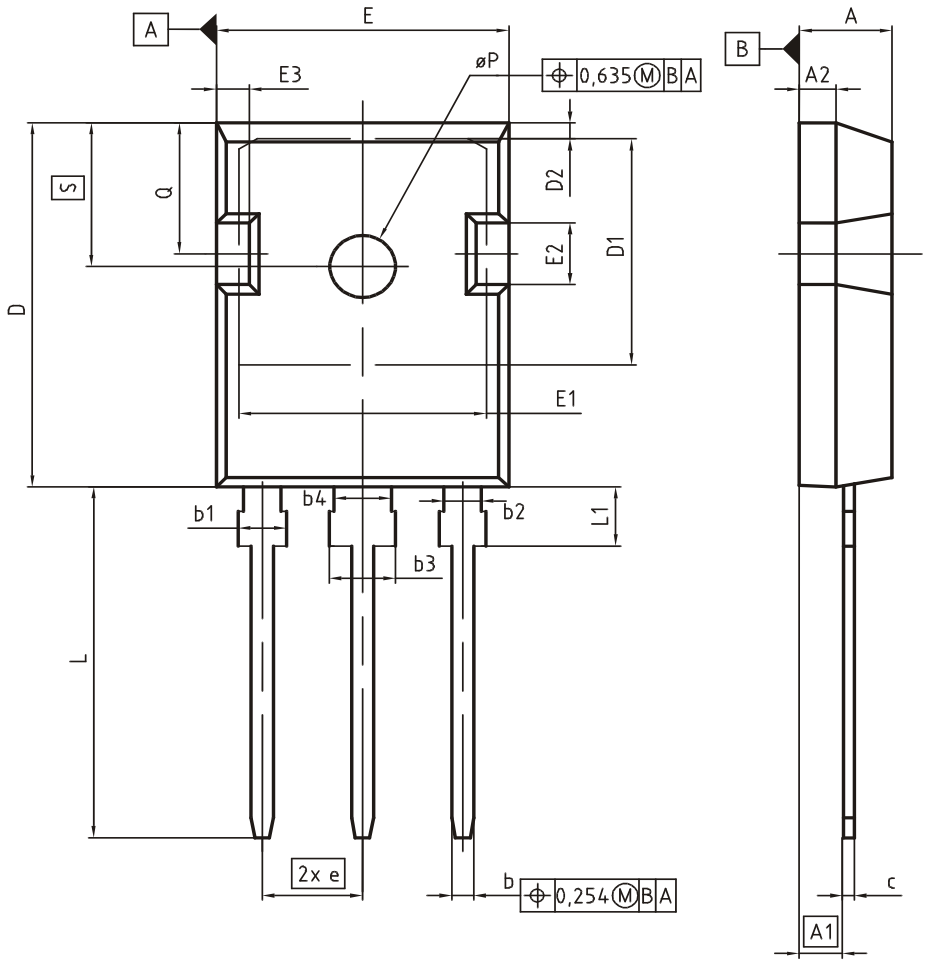


Figure 9. **Typical diode forward voltage as a function of junction temperature**

PG-TO247-3

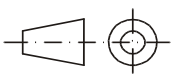


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.27	2.54	0.089	0.100
A2	1.85	2.16	0.073	0.085
b	1.07	1.33	0.042	0.052
b1	1.90	2.41	0.075	0.095
b2	1.90	2.16	0.075	0.085
b3	2.87	3.38	0.113	0.133
b4	2.87	3.13	0.113	0.123
c	0.55	0.68	0.022	0.027
D	20.80	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
E	15.70	16.13	0.618	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	2.60	0.039	0.102
e	5.44 (BSC)		0.214 (BSC)	
N	3		3	
L	19.80	20.32	0.780	0.800
L1	4.10	4.47	0.161	0.176
øP	3.50	3.70	0.138	0.146
Q	5.49	6.00	0.216	0.236
S	6.04	6.30	0.238	0.248

DOCUMENT NO.
Z8B00003327

SCALE
0 5 5 7.5mm

EUROPEAN PROJECTION



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09-07-2010

REVISION
05

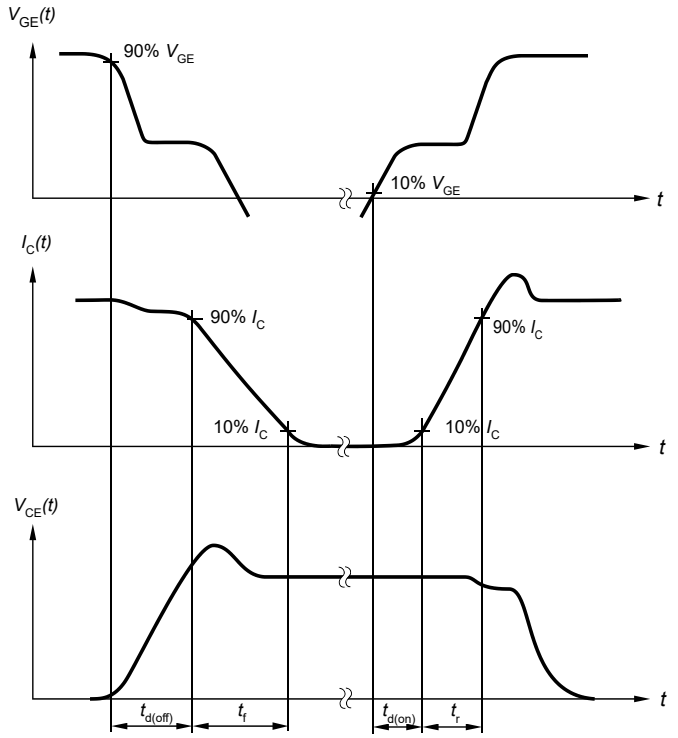

Figure A. **Definition of switching times**

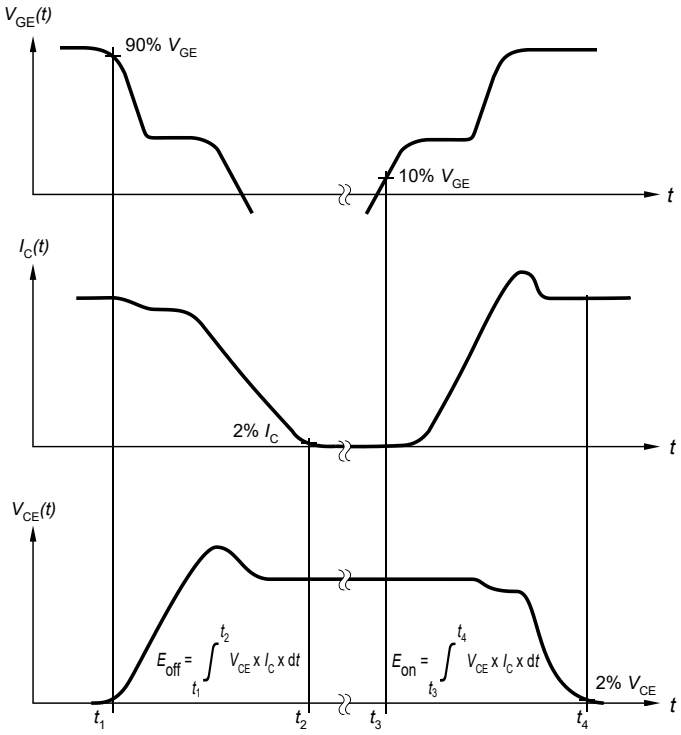

Figure B. **Definition of switching losses**

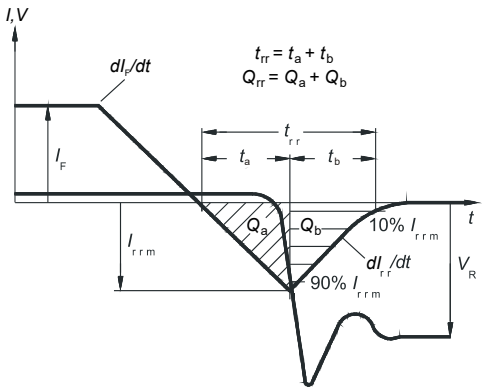

Figure C. **Definition of diode switching characteristics**

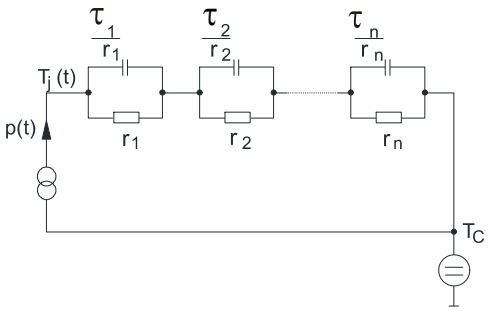

Figure D. **Thermal equivalent circuit**

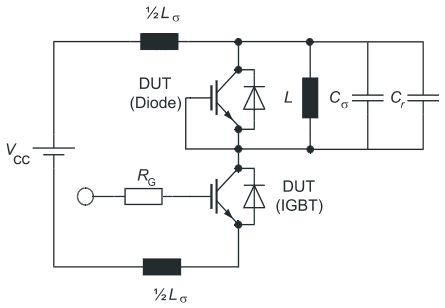

Figure E. **Dynamic test circuit**
Parasitic inductance L_σ,
parasitic capacitor C_σ,
relief capacitor C_r,
(only for ZVT switching)

Revision History

IDW75D65D1

Revision: 2014-12-10, Rev. 2.1

Previous Revision

Revision	Date	Subjects (major changes since last revision)
1.1	2014-12-02	Preliminaryt data sheet
2.1	2014-12-10	Final data sheet

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