Diode

Fast Switching Emitter Controlled Diode

IDW30E60

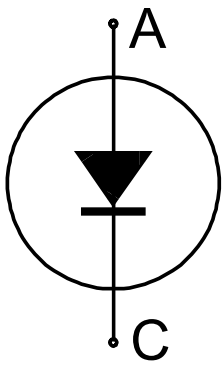
Emitter Controlled Diode series

Data sheet

Industrial & Multimarket

Fast Switching Emitter Controlled Diode

Features:



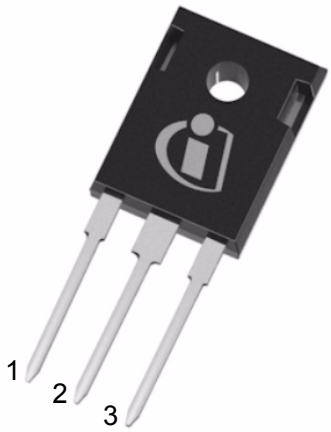
- Qualified according to JEDEC for target applications
- 600 V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- 175 °C junction operating temperature
- Easy paralleling
- Pb-free lead plating; RoHS compliant

Applications:

- Switching diode for PFC applications with operating range up to 30kHz

Package pin definition:

- Pin 1 - not connected
- Pin 2 - cathode
- Pin 3 - anode



Key Performance and Package Parameters

Type	V_{rrm}	I_f	V_f, T_{vj}=25°C	T_{vjmax}	Marking	Package
IDW30E60	600V	30A	1.65V	175°C	D30E60	PG-TO247-3

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Maximum ratings

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	600	V
Diode forward current, limited by T_{vjmax} T_C = 25°C T_C = 115°C	I_F	 60.0 30.0	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 = 10.0ms, sine halfwave	I_{FSM}	 150.0	A
Power dissipation T_C = 25°C	P_{tot}	143.0	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, junction - case	$R_{th(j-c)}$		1.05	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		40	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	 - -	 1.65 1.60	 2.00	V
Reverse leakage current	I_R	V_R = 600V T_{vj} = 25°C T_{vj} = 175°C	 - -	 - -	 40.0 1000.0	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		-	13.0	-	nH

Switching Characteristic, Inductive Load, at T_{vj} = 25°C

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 = 30.0A, di_F/dt = 1000A/µs	-	143	-	ns
Diode reverse recovery charge	Q_{rr}		-	1.20	-	µC
Diode peak reverse recovery current	I_{rrm}		-	13.0	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-108	-	A/µs

Switching Characteristic, Inductive Load, at T_{vj} = 175°C

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

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

Diode reverse recovery time	t_{rr}	T_{vj} = 175°C, V_R = 400V, I_F = 30.0A, di_F/dt = 1000A/µs	-	255	-	ns
Diode reverse recovery charge	Q_{rr}		-	2.80	-	µC
Diode peak reverse recovery current	I_{rrm}		-	23.0	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-108	-	A/µs

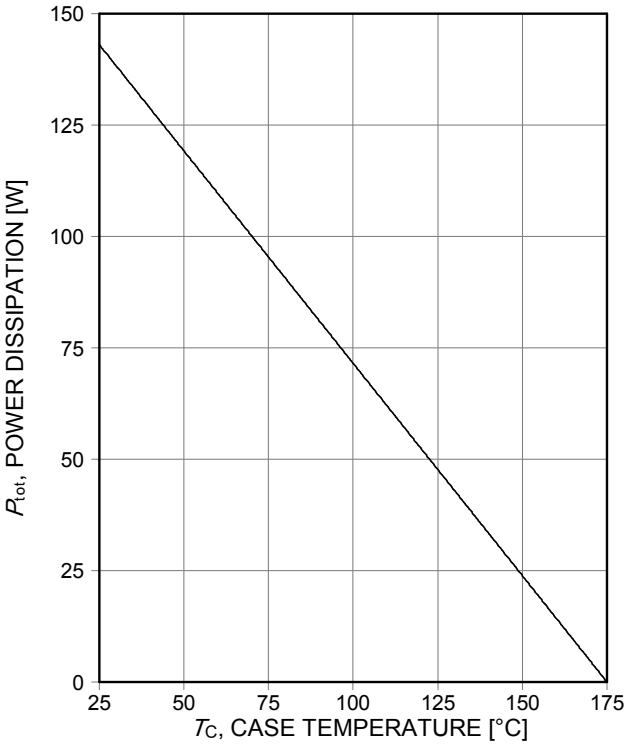


Figure 1. Power dissipation as a function of case temperature
(T_j≤175°C)

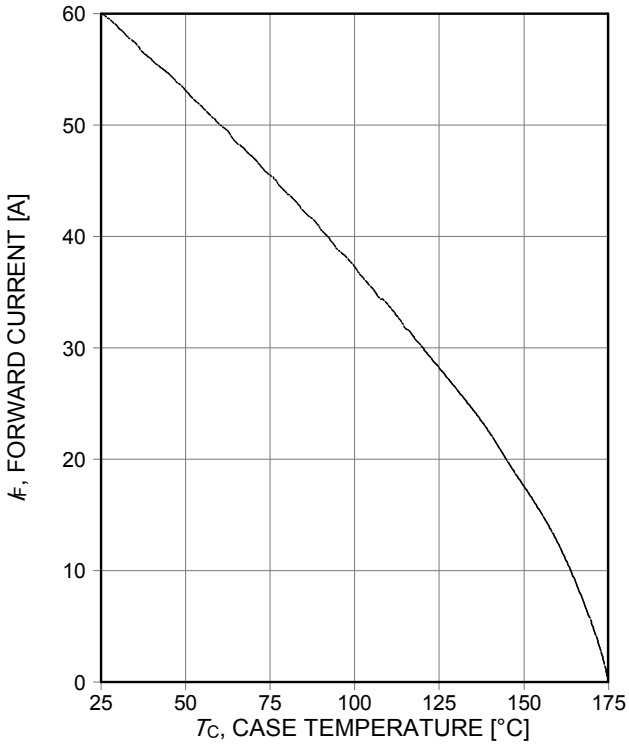


Figure 2. Diode forward current as a function of case temperature
(T_j≤175°C)

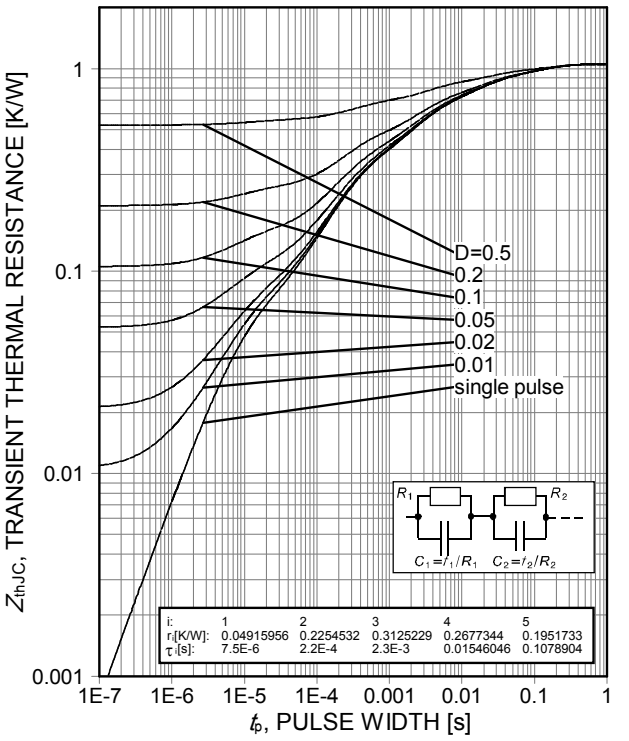


Figure 3. Diode transient thermal impedance as a function of pulse width
($D=t_p/T$)

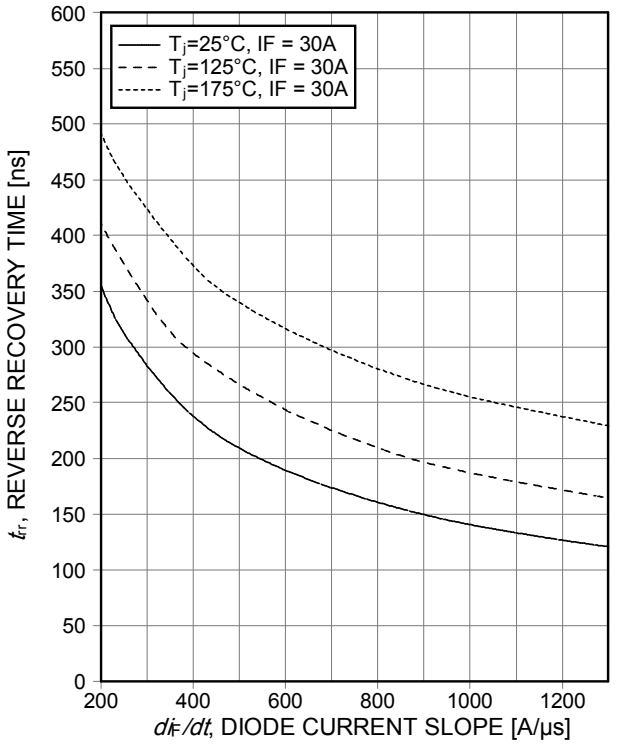


Figure 4. Typical reverse recovery time as a function of diode current slope
(V_R=400V, I_F=30A, Dynamic test circuit in Figure E)

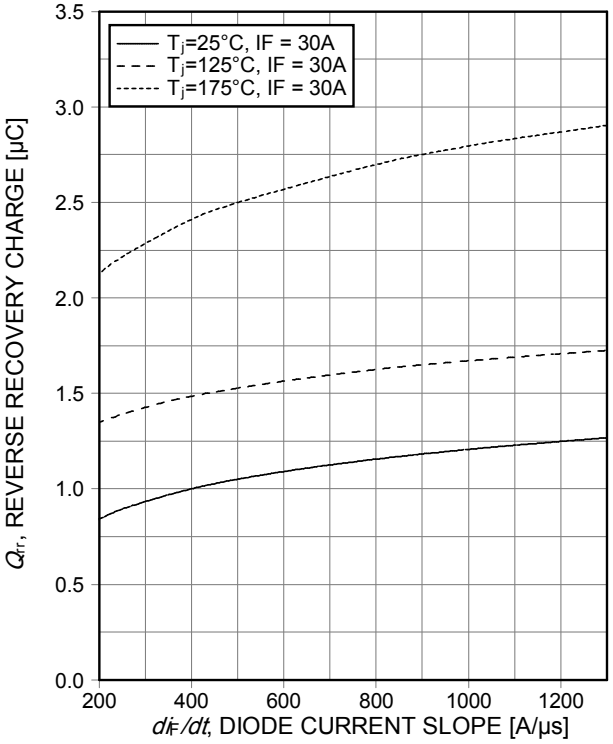


Figure 5. Typical reverse recovery charge as a function of diode current slope
(V_R=400V, I_F=30A, Dynamic test circuit in Figure E)

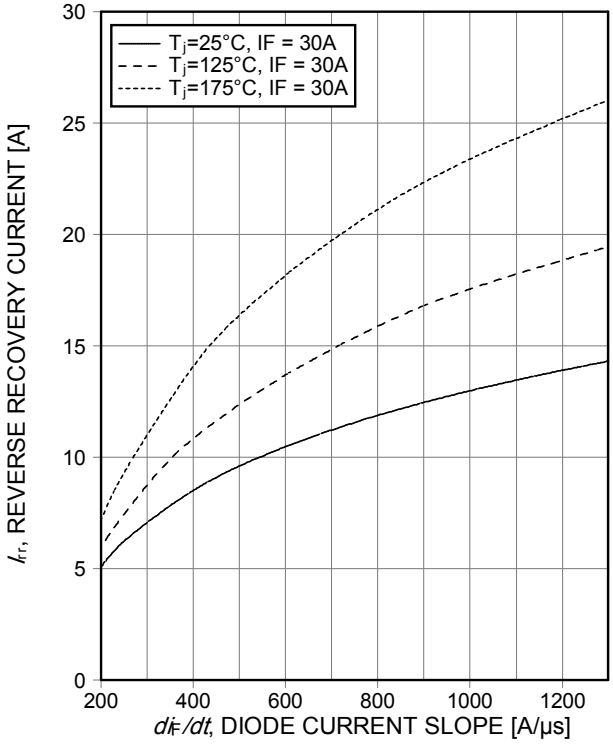


Figure 6. Typical reverse recovery current as a function of diode current slope
(V_R=400V, I_F=30A, Dynamic test circuit in Figure E)

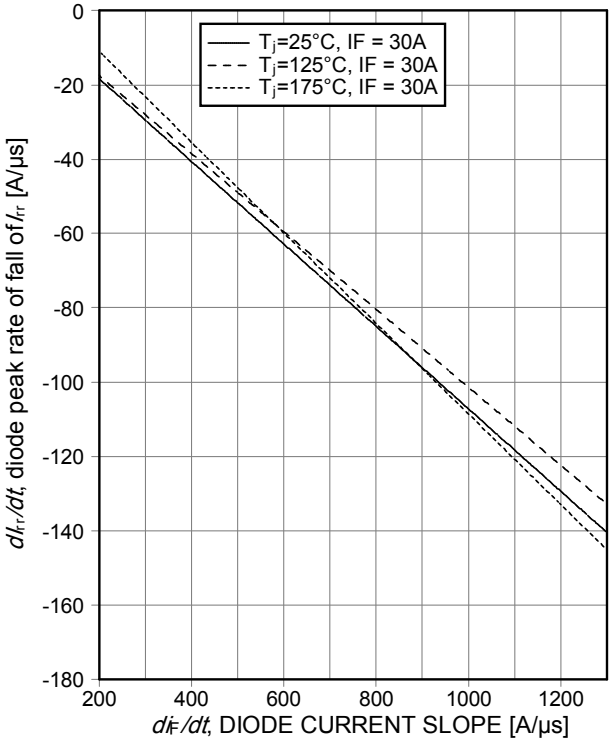


Figure 7. Typical diode peak rate of fall of reverse recovery current as a function of diode current slope
(V_R=400V, I_F=30A, Dynamic test circuit in Figure E)

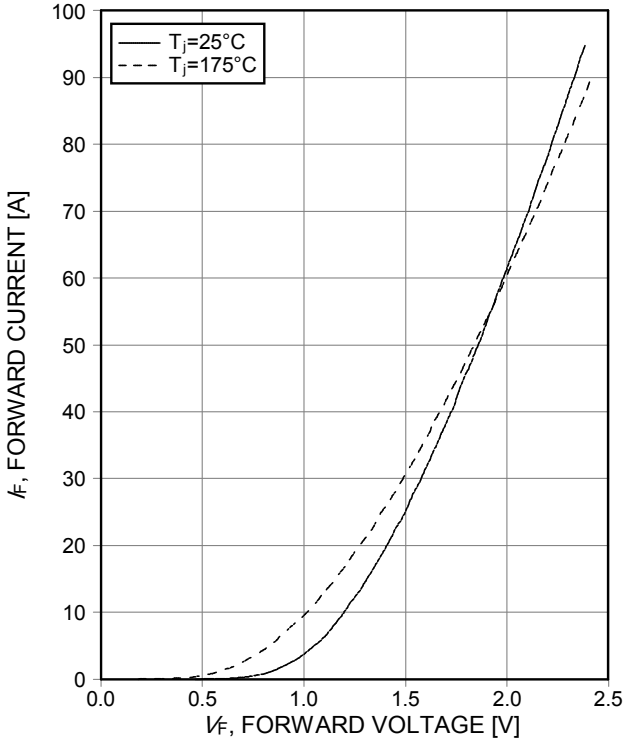


Figure 8. Typical diode forward current as a function of forward voltage

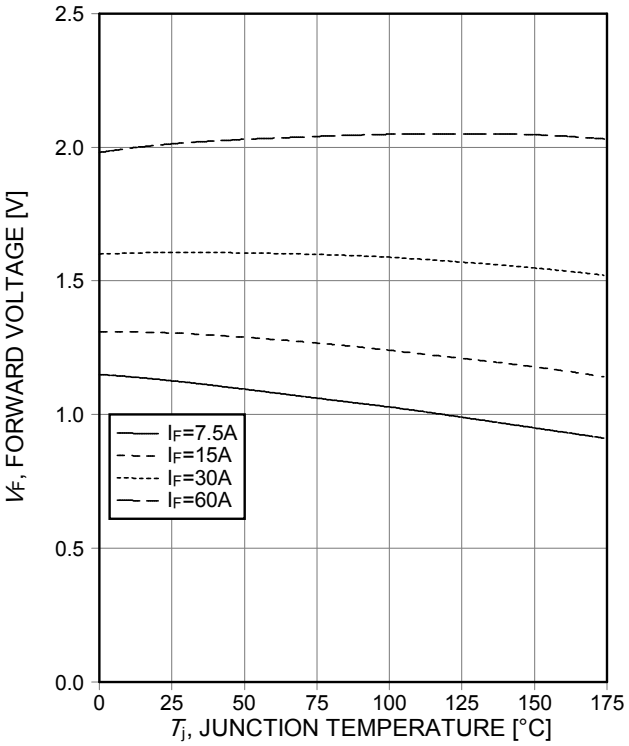
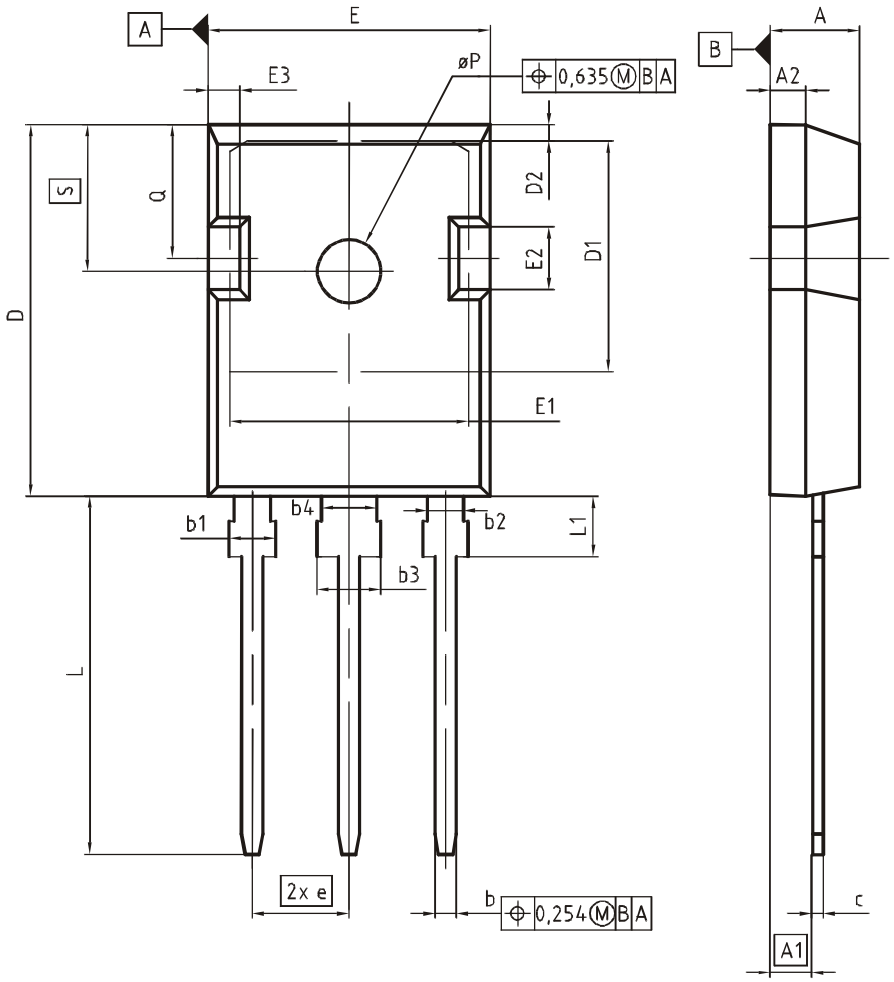


Figure 9. Typical diode forward voltage as a function of junction temperature

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	
ISSUE DATE	09-07-2010
REVISION	05

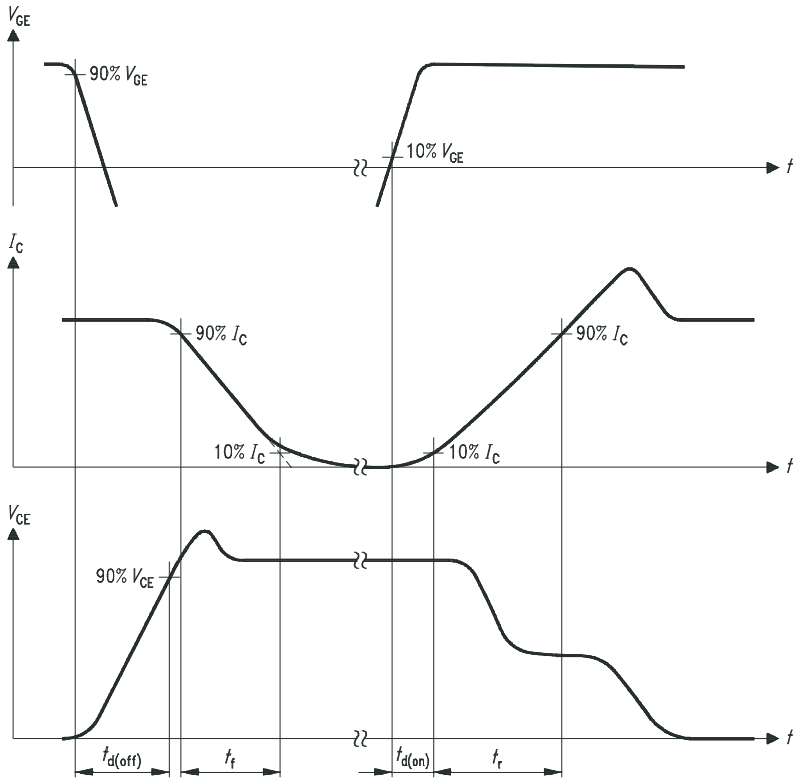


Figure A. Definition of switching times

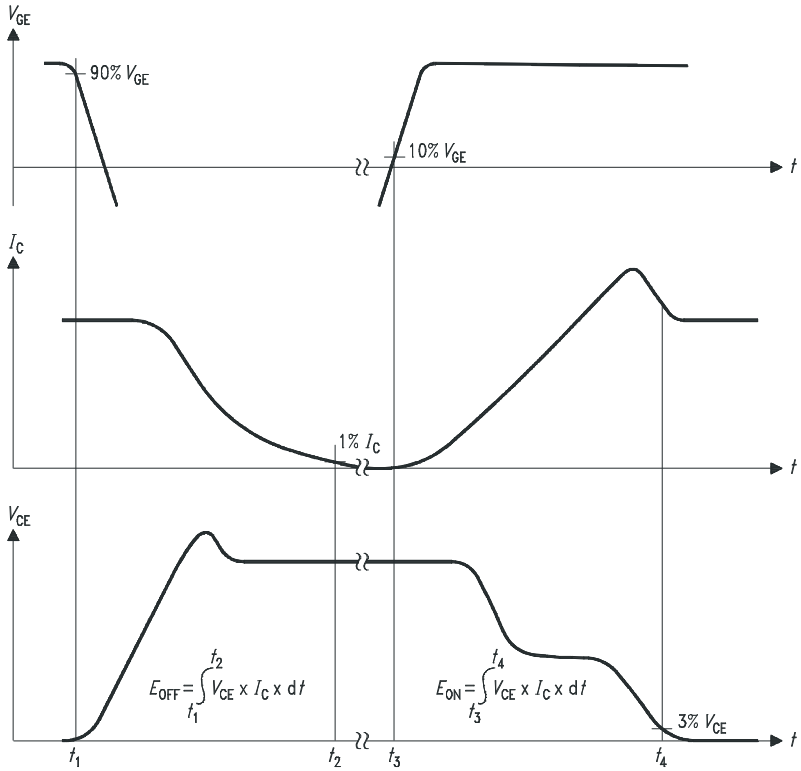


Figure B. Definition of switching losses

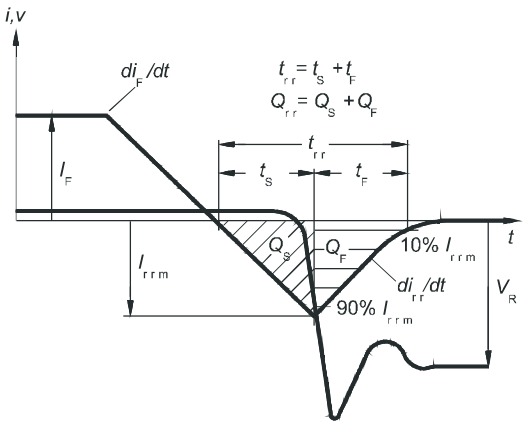


Figure C. Definition of diodes switching characteristics

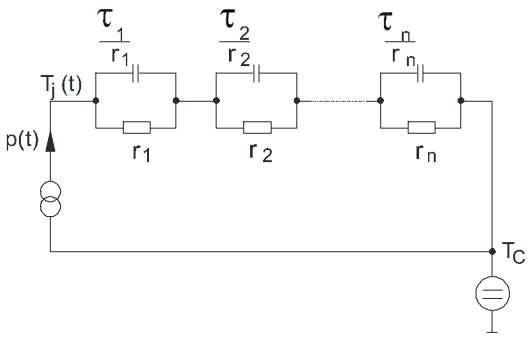


Figure D. Thermal equivalent circuit

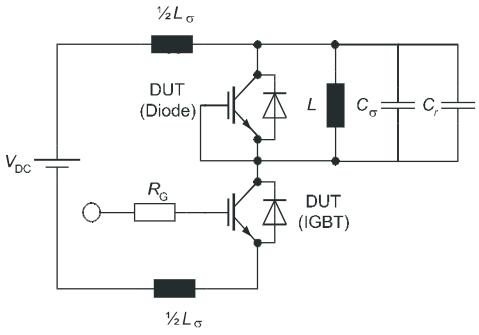


Figure E. Dynamic test circuit
Parasitic inductance L_σ,
Parasitic capacitor C_σ,
Relief capacitor C_r
(only for ZVT switching)

Revision History

IDW30E60

Revision: 2011-11-10, Rev. 1.1

Previous Revision

Revision	Date	Subjects (major changes since last revision)
1.1	2011-11-10	Preliminary data sheet

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