

Diode

Fast Switching Emitter Controlled Diode

IDW50E60

Emitter Controlled Diode series

Data sheet

Industrial Power Control

Fast Switching Emitter Controlled Diode

Features:

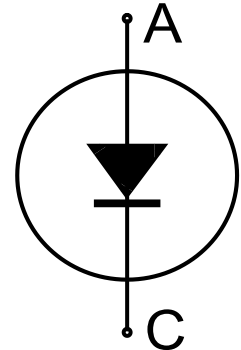
- Qualified according to JEDEC for target applications
- 600 V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- 175 °C junction operating temperature
- Easy paralleling
- Pb-free lead plating; RoHS compliant

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	$V_f, T_{vj}=25^{\circ}\text{C}$	T_{vjmax}	Marking	Package
IDW50E60	600V	50A	1.65V	175°C	D50E60	PG-TO247-3

Table of Contents

Description	2
Table of Contents	3
Maximum ratings	4
Thermal Resistance	4
Electrical Characteristics	4
Electrical Characteristics diagrams	6
Package Drawing	9
Testing Conditions	10
Revision History	11
Disclaimer	11

Maximum ratings

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	600	V
Diode forward current, limited by T_{vjmax} $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_F	80.0 50.0	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	150.0	A
Diode surge non repetitive forward current $T_C = 25^\circ\text{C}$, $t_p = 10.0\text{ms}$, sine halfwave	I_{FSM}	240.0	A
Power dissipation $T_C = 25^\circ\text{C}$	P_{tot}	187.0	W
Operating junction temperature	T_{vj}	-40...+175	$^\circ\text{C}$
Storage temperature	T_{stg}	-55...+150	$^\circ\text{C}$
Soldering temperature, wave soldering 1.6 mm (0.063 in.) from case for 10s		260	$^\circ\text{C}$
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	$R_{th(j-c)}$		0.80	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		40	K/W

Electrical Characteristic, at $T_{vj} = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Diode forward voltage	V_F	$I_F = 50.0A$ $T_{vj} = 25^{\circ}C$ $T_{vj} = 175^{\circ}C$	- -	1.65 1.60	2.00 -	V
Reverse leakage current	I_R	$V_R = 600V$ $T_{vj} = 25^{\circ}C$ $T_{vj} = 175^{\circ}C$	- -	- -	40.0 1650.0	μA

Electrical Characteristic, at $T_{vj} = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

Dynamic Characteristic
Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

Diode Characteristic, at $T_{vj} = 25^{\circ}\text{C}$

Diode reverse recovery time	t_{rr}	$T_{vj} = 25^{\circ}\text{C},$ $V_R = 400\text{V},$ $I_F = 50.0\text{A},$ $di_F/dt = 1200\text{A}/\mu\text{s}$	-	115	-	ns
Diode reverse recovery charge	Q_{rr}		-	1.50	-	μC
Diode peak reverse recovery current	I_{rrm}		-	30.0	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-470	-	$\text{A}/\mu\text{s}$

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

Diode Characteristic, at $T_{vj} = 175^{\circ}\text{C}$

Diode reverse recovery time	t_{rr}	$T_{vj} = 175^{\circ}\text{C},$ $V_R = 400\text{V},$ $I_F = 50.0\text{A},$ $di_F/dt = 1200\text{A}/\mu\text{s}$	-	192	-	ns
Diode reverse recovery charge	Q_{rr}		-	4.10	-	μC
Diode peak reverse recovery current	I_{rrm}		-	52.0	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	-650	-	$\text{A}/\mu\text{s}$

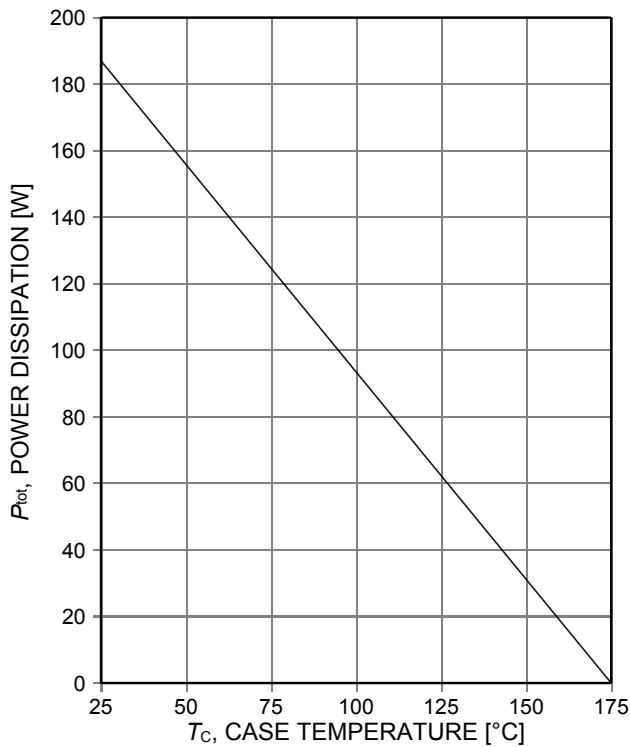


Figure 1. Power dissipation as a function of case temperature ($T_J \leq 175^\circ\text{C}$)

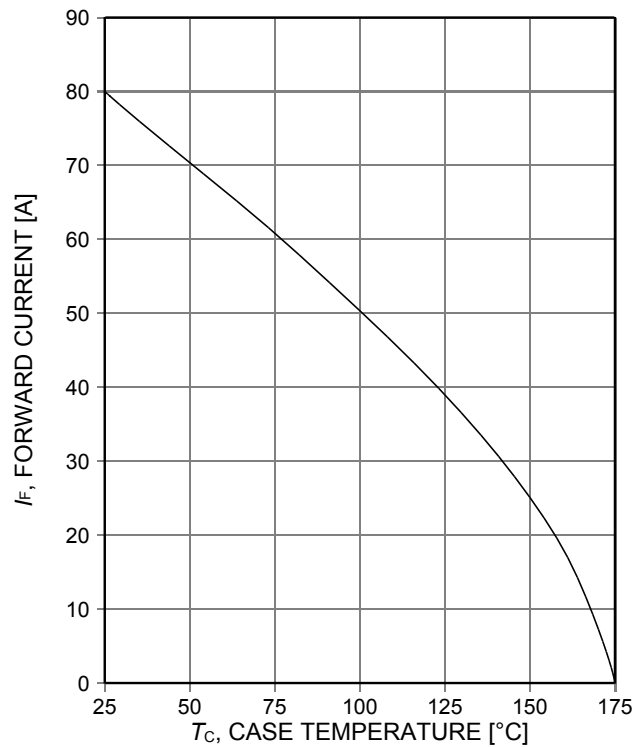


Figure 2. Diode forward current as a function of case temperature ($T_J \leq 175^\circ\text{C}$)

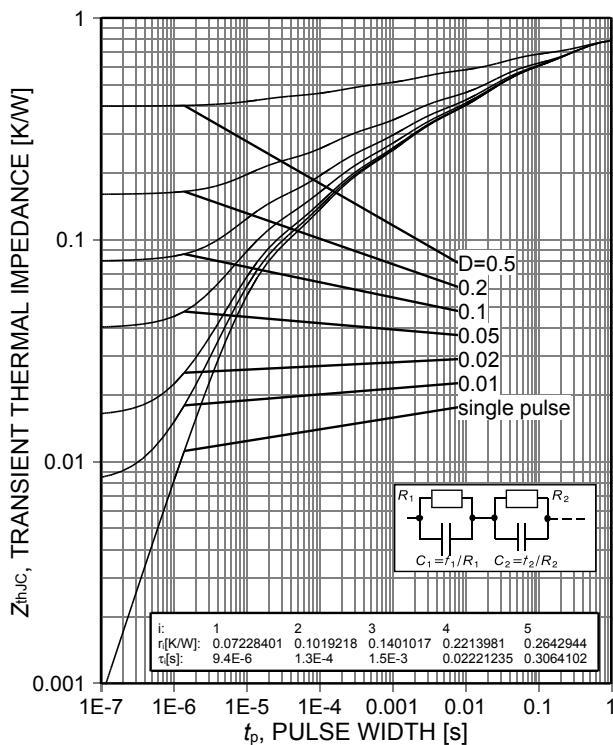


Figure 3. Diode transient thermal impedance as a function of pulse width ($D = t_p/T$)

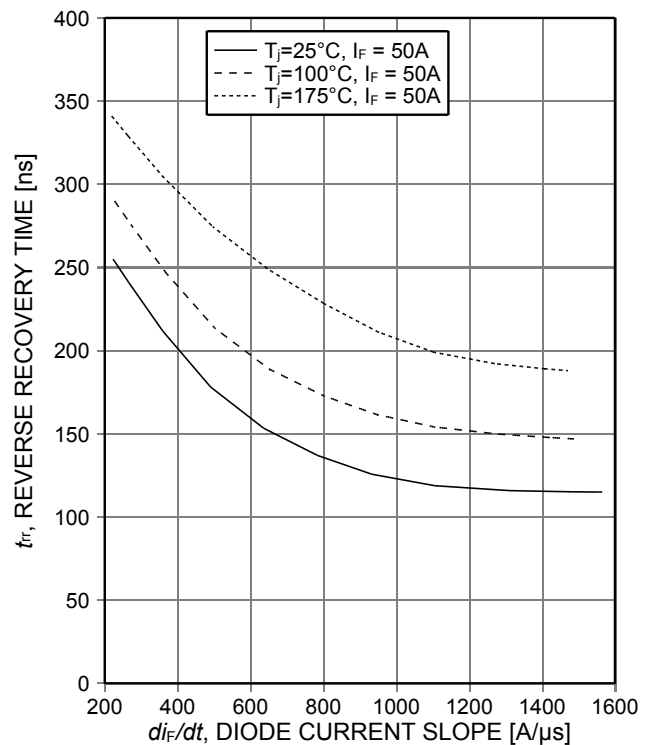


Figure 4. Typical reverse recovery time as a function of diode current slope ($V_R = 400\text{V}$, $I_F = 50\text{A}$, Dynamic test circuit in Figure E)

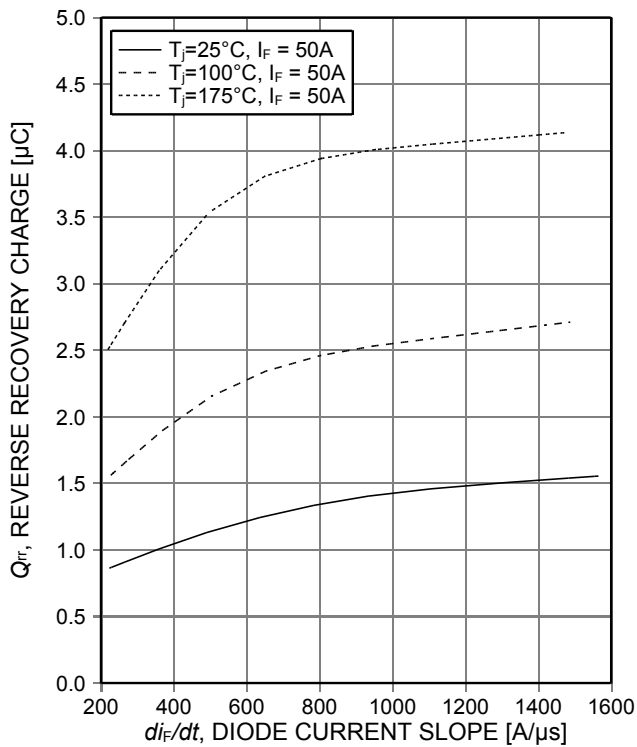


Figure 5. **Typical reverse recovery charge as a function of diode current slope**
($V_R=400V$, $I_F=50A$, Dynamic test circuit in Figure E)

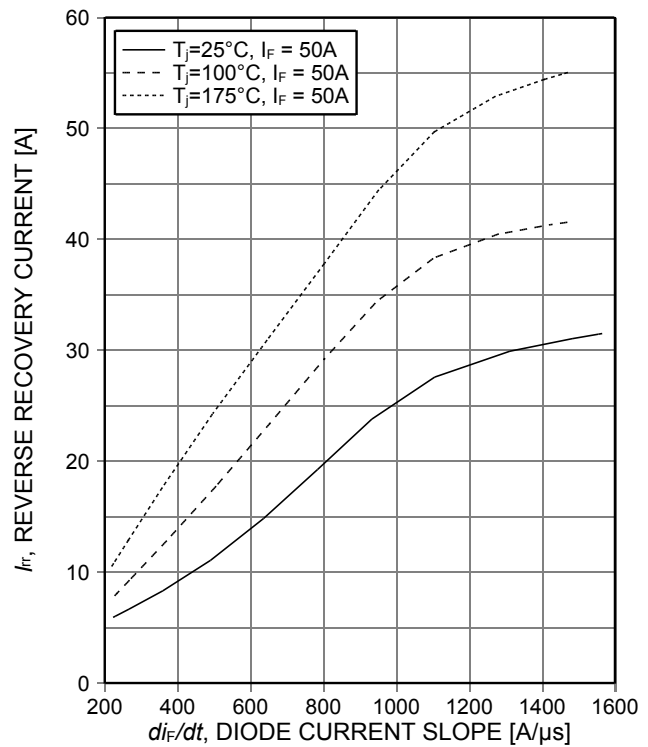


Figure 6. **Typical reverse recovery current as a function of diode current slope**
($V_R=400V$, $I_F=50A$, Dynamic test circuit in Figure E)

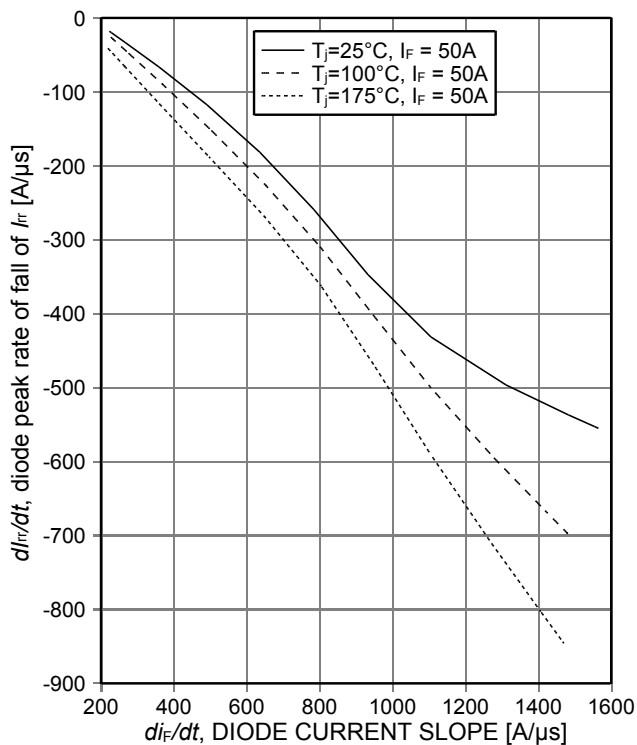


Figure 7. **Typical diode peak rate of fall of reverse recovery current as a function of diode current slope**
($V_R=400V$, $I_F=50A$, Dynamic test circuit in Figure E)

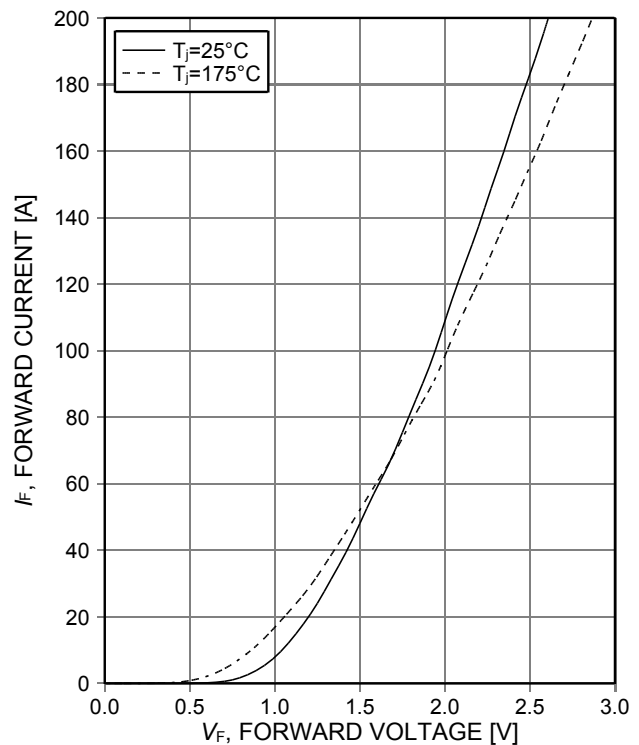


Figure 8. **Typical diode forward current as a function of forward voltage**

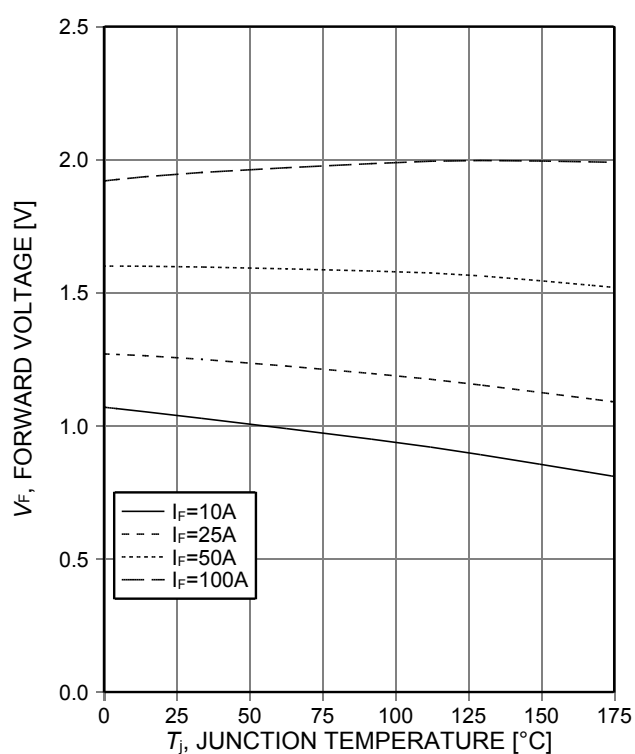
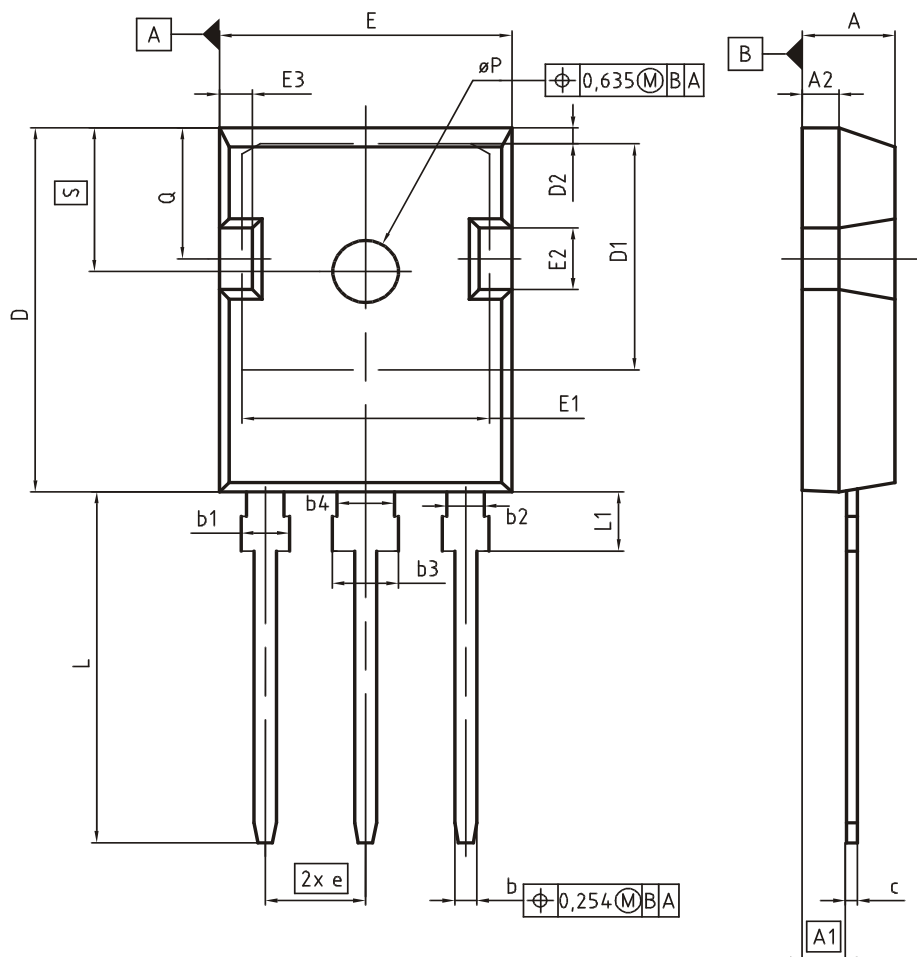
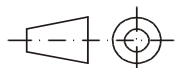


Figure 9. Typical diode forward voltage as a function of junction temperature

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 7.5mm
EUROPEAN PROJECTION 
ISSUE DATE 09-07-2010
REVISION 05

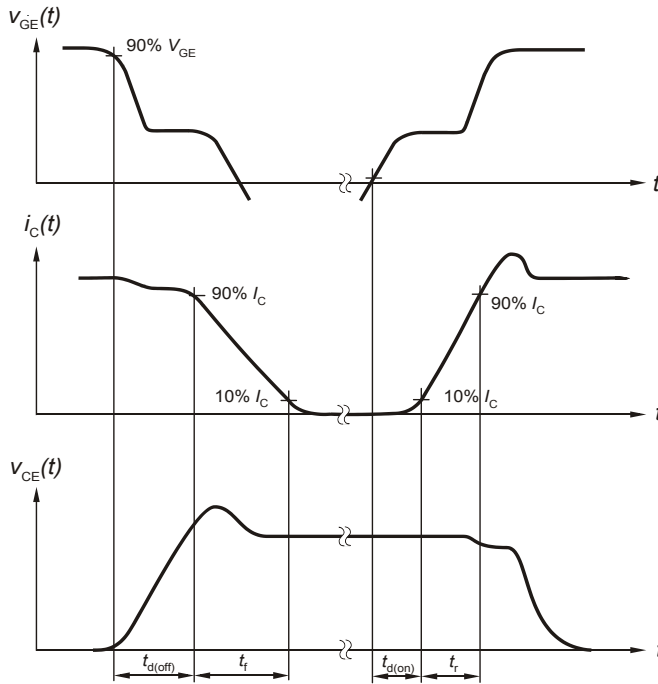


Figure A. Definition of switching times

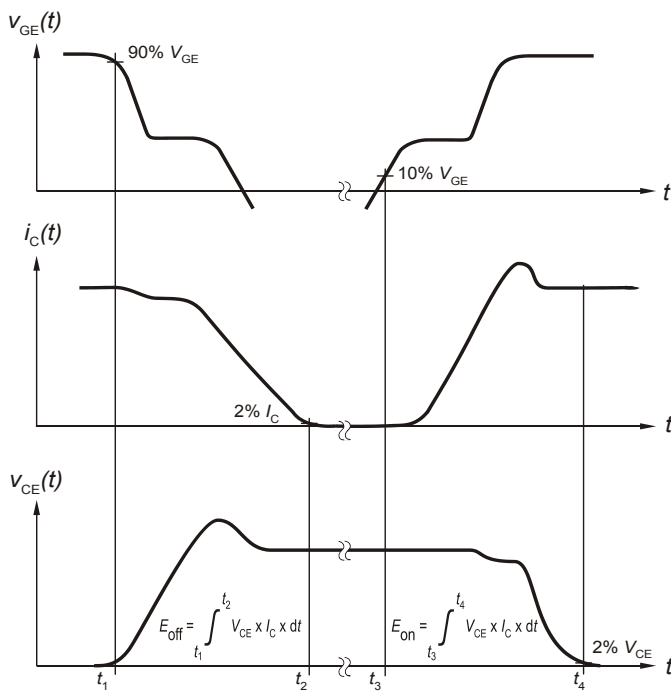


Figure B. Definition of switching losses

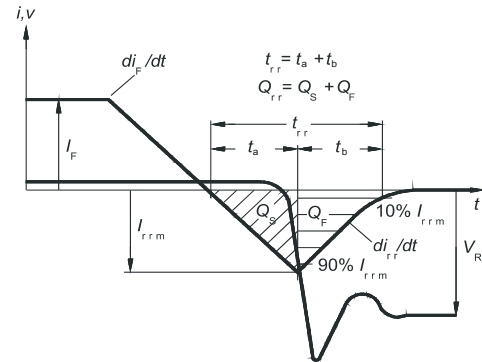


Figure C. Definition of diodes switching characteristics

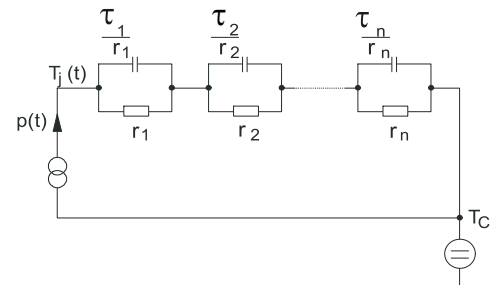
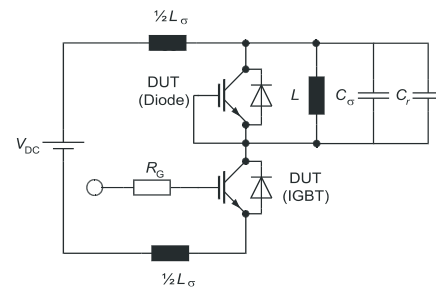


Figure D. Thermal equivalent circuit


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

Revision History

IDW50E60

Revision: 2014-02-24, Rev. 2.2

Previous Revision

Revision	Date	Subjects (major changes since last revision)
1.1	2011-12-07	Preliminary data sheet
1.2	2012-02-23	Prelim data sheet switch MOS C6 50A
2.1	2013-12-09	New value IRmax limit at 175°C
2.2	2014-02-24	New value IRmax limit at 175°C

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****© 2014 Infineon Technologies AG****All Rights Reserved.****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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Infineon:](#)

[IDW50E60FKSA1](#) [IDW50E60](#)