

## Diode

Fast Switching Emitter Controlled Diode

## IDV30E60C

FullPAK with Emitter Controlled Diode

Datasheet

Industrial & Multimarket

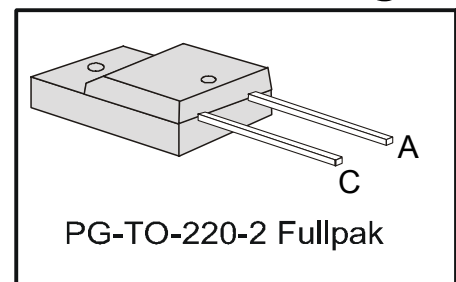
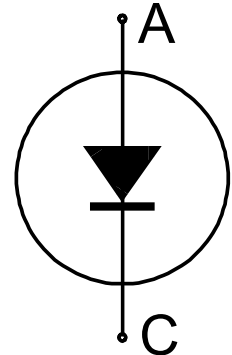
## Fast Switching Emitter Controlled Diode

### Features:

- Electrically isolated FullPAK for easy assembly
- 600 V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Qualified according to JESD-022 for target applications
- Pb-free lead plating; RoHS compliant
- Halogen free (according to IEC 61249-2-21)
- Complete product spectrum and PSpice Models:  
<http://www.infineon.com/diode/>

### Applications:

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



### Key Performance and Package Parameters

Type	$V_{rrm}$	$I_f$	$V_f, T_{vj}=25^\circ\text{C}$	$T_{vjmax}$	Marking	Package
IDV30E60C	600V	30A	1.65V	175°C	D30E60C	PG-TO220-2-22 FP



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## Emitter Controlled Diode

**Maximum ratings**

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	$V_{RRM}$	600	V
Diode forward current, limited by $T_{vjmax}$ $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	$I_F$	21.0 12.0	A
Diode pulsed current, $I_F$ limited by $T_{vjmax}$	$I_{Fpuls}$	90.0	A
Power dissipation $T_C = 25^\circ\text{C}$	$P_{tot}$	37.0	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
<b>Characteristic</b>				
Diode thermal resistance, <sup>1)</sup> junction - case	$R_{th(j-c)}$		4.00	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		65	K/W

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

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>Static Characteristic</b>						
Diode forward voltage	$V_F$	$I_F = 30.0\text{A}$ $T_{vj} = 25^\circ\text{C}$ $T_{vj} = 175^\circ\text{C}$	- -	1.65 1.65	2.05	V
Reverse leakage current	$I_R$	$V_R = 600\text{V}$ $T_{vj} = 25^\circ\text{C}$ $T_{vj} = 175^\circ\text{C}$	- -	- -	40.0 1000.0	$\mu\text{A}$

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

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

**Switching Characteristic, Inductive Load, at  $T_{vj} = 25^\circ\text{C}$** 

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

<sup>1)</sup> Please be aware that in non standard load conditions, due to high  $R_{th(j-c)}$ ,  $T_{vj}$  close to  $T_{vjmax}$  can be reached.

## Emitter Controlled Diode

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

Diode reverse recovery time	$t_{rr}$	$T_{vj} = 25^{\circ}\text{C},$ $V_R = 400\text{V},$ $I_F = 30.0\text{A},$ $dI_F/dt = 1000\text{A}/\mu\text{s}$	-	130	-	ns
Diode reverse recovery charge	$Q_{rr}$		-	0.88	-	$\mu\text{C}$
Diode peak reverse recovery current	$I_{rrm}$		-	16.9	-	A
Diode peak rate of fall of reverse recovery current during $t_b$	$di_{rr}/dt$		-	-598	-	$\text{A}/\mu\text{s}$

 Switching Characteristic, Inductive Load, at  $T_{vj} = 175^{\circ}\text{C}$ 

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	

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

Diode reverse recovery time	$t_{rr}$	$T_{vj} = 175^{\circ}\text{C},$ $V_R = 400\text{V},$ $I_F = 30.0\text{A},$ $dI_F/dt = 1000\text{A}/\mu\text{s}$	-	217	-	ns
Diode reverse recovery charge	$Q_{rr}$		-	2.40	-	$\mu\text{C}$
Diode peak reverse recovery current	$I_{rrm}$		-	22.9	-	A
Diode peak rate of fall of reverse recovery current during $t_b$	$di_{rr}/dt$		-	-307	-	$\text{A}/\mu\text{s}$

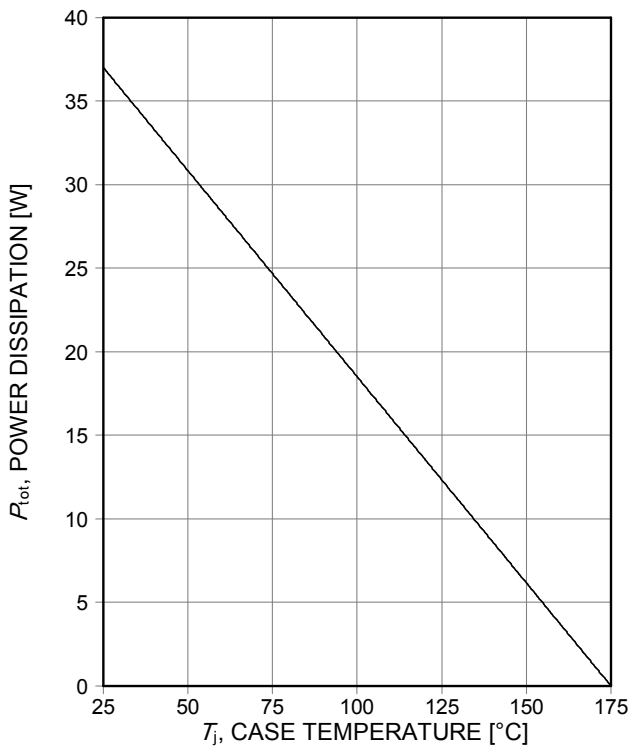


Figure 1. Power dissipation as a function of case temperature ( $T_j \leq 175^\circ\text{C}$ )

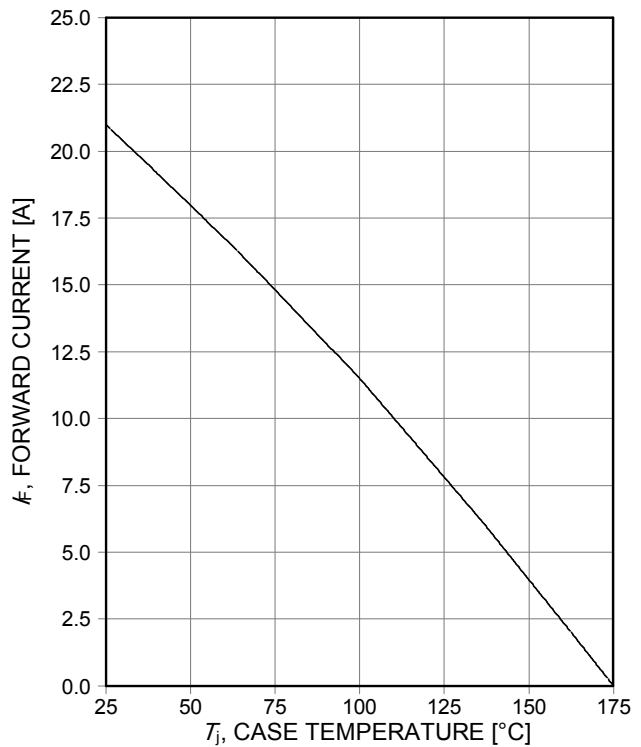


Figure 2. Diode forward current as a function of case temperature ( $V_{GE} \geq 15\text{V}$ ,  $T_j \leq 175^\circ\text{C}$ )

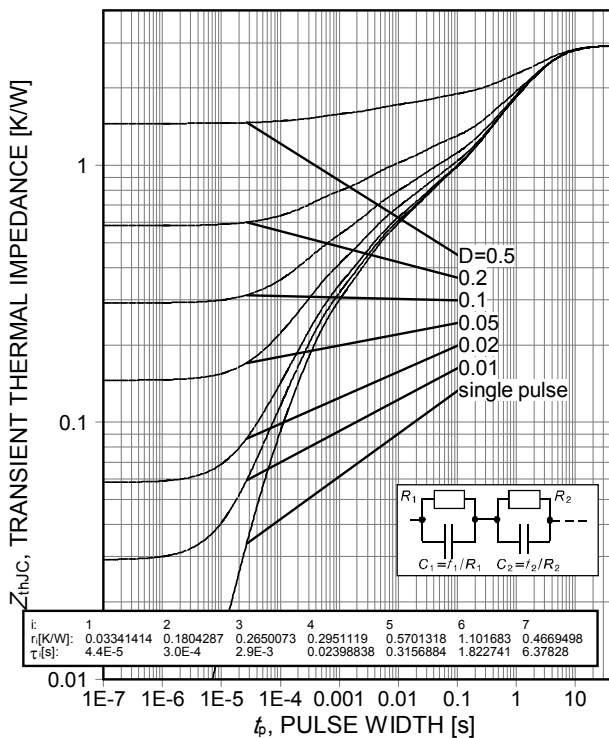


Figure 3. Diode transient thermal impedance as a function of pulse width ( $D = t_p/T$ )

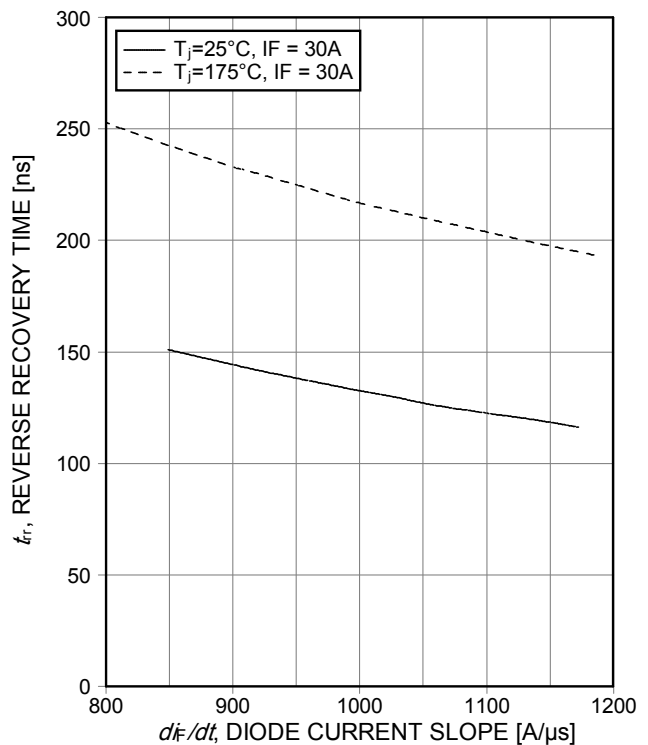
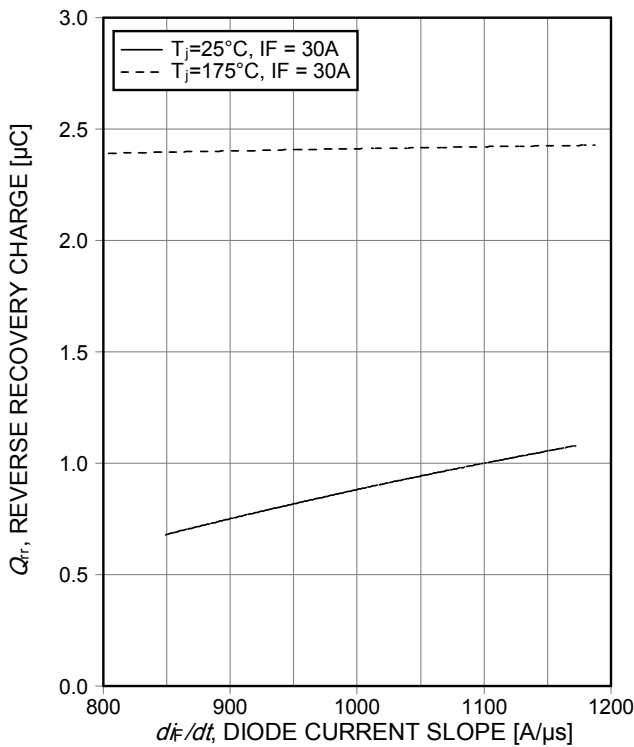
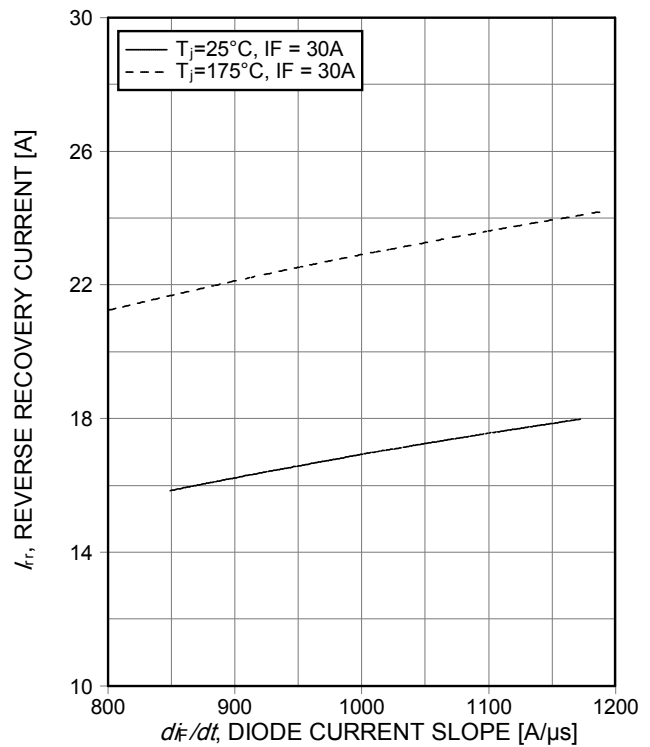


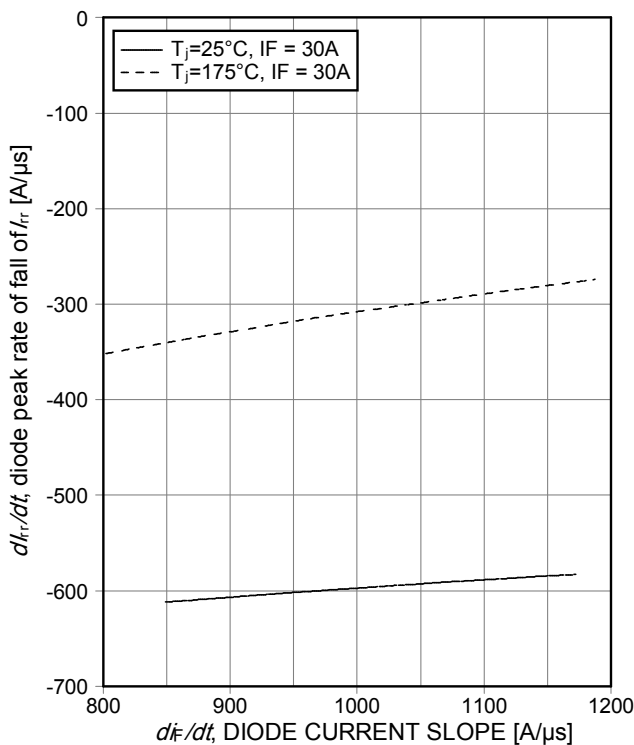
Figure 4. Typical reverse recovery time as a function of diode current slope ( $V_R = 400\text{V}$ ,  $I_F = 30\text{A}$ , Dynamic test circuit in Figure E)



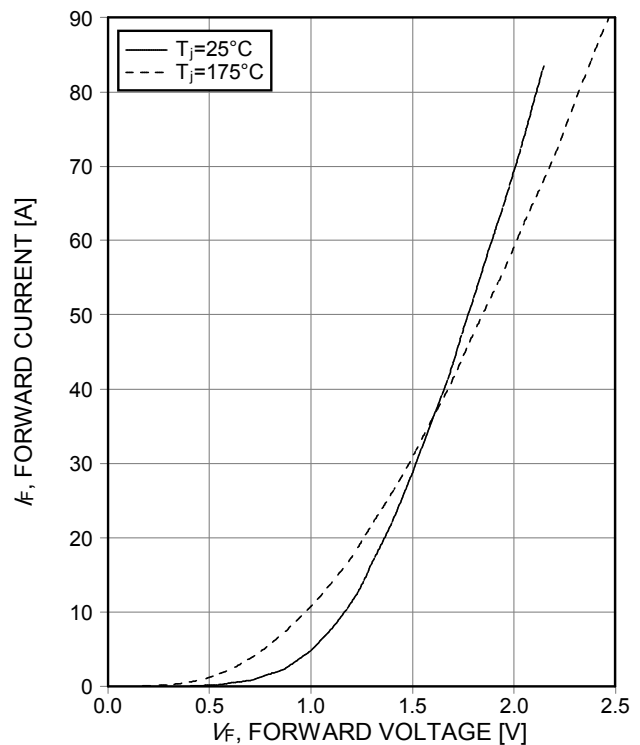
**Figure 5. Typical reverse recovery charge as a function of diode current slope**  
 ( $V_R=400V$ ,  $I_F=30A$ , Dynamic test circuit in Figure E)



**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**

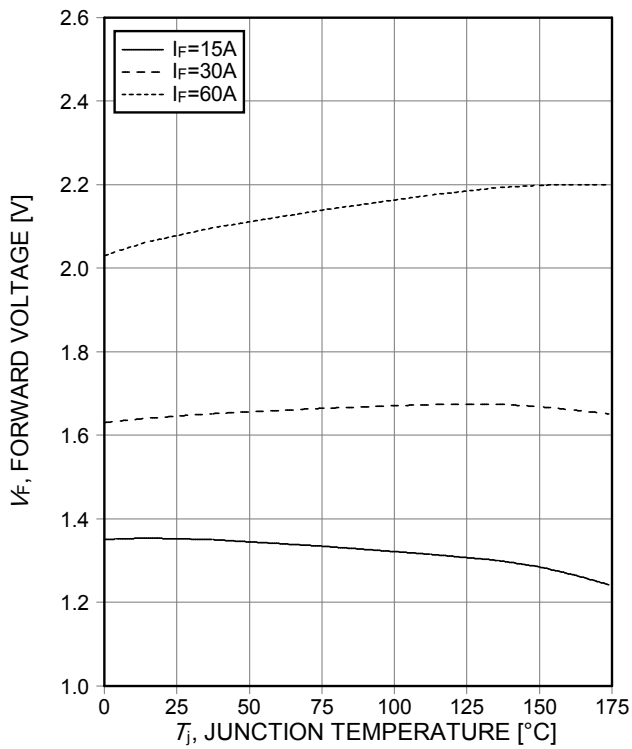
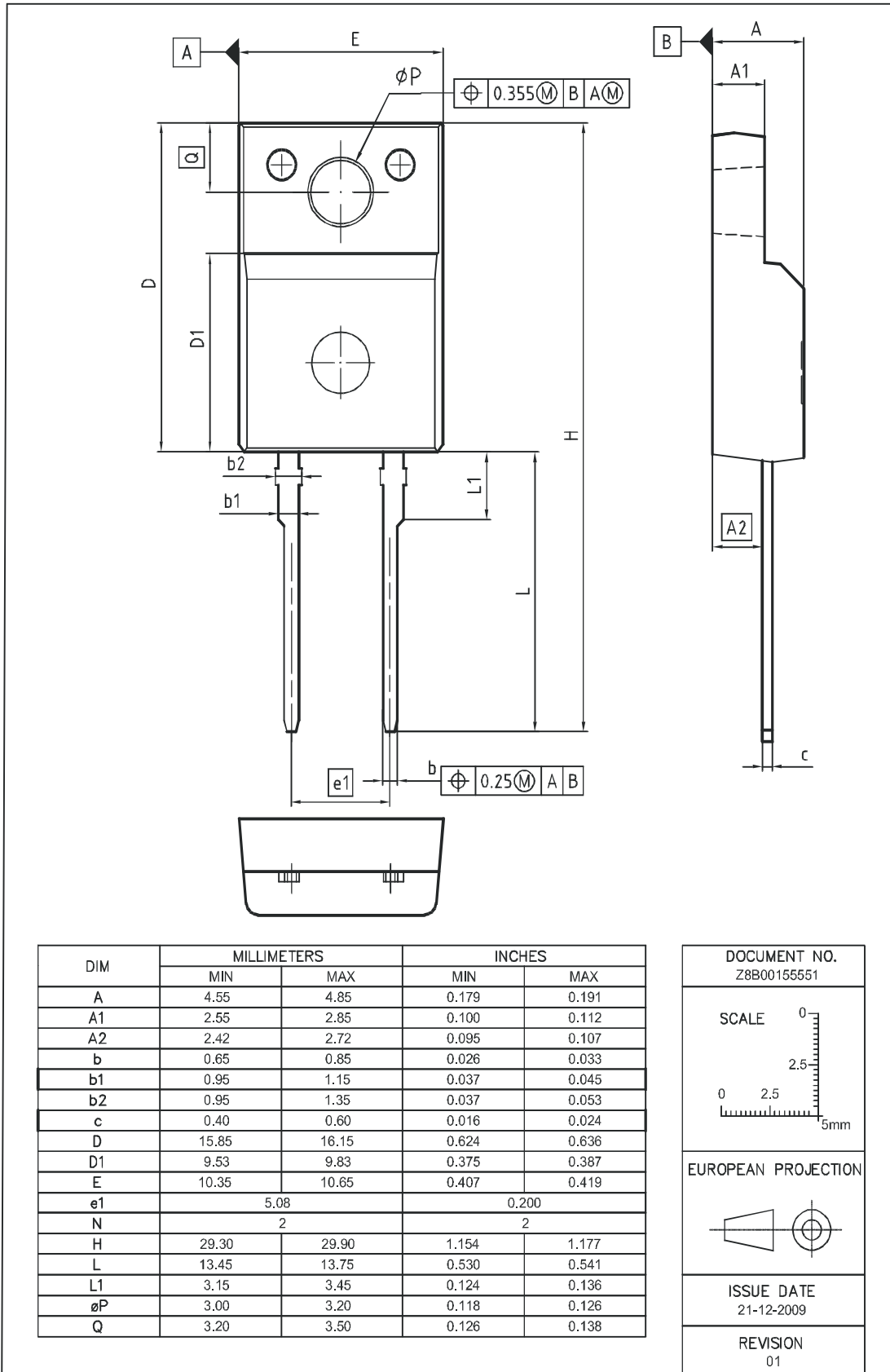


Figure 9. Typical diode forward voltage as a function of junction temperature



PG-TO220-2-22



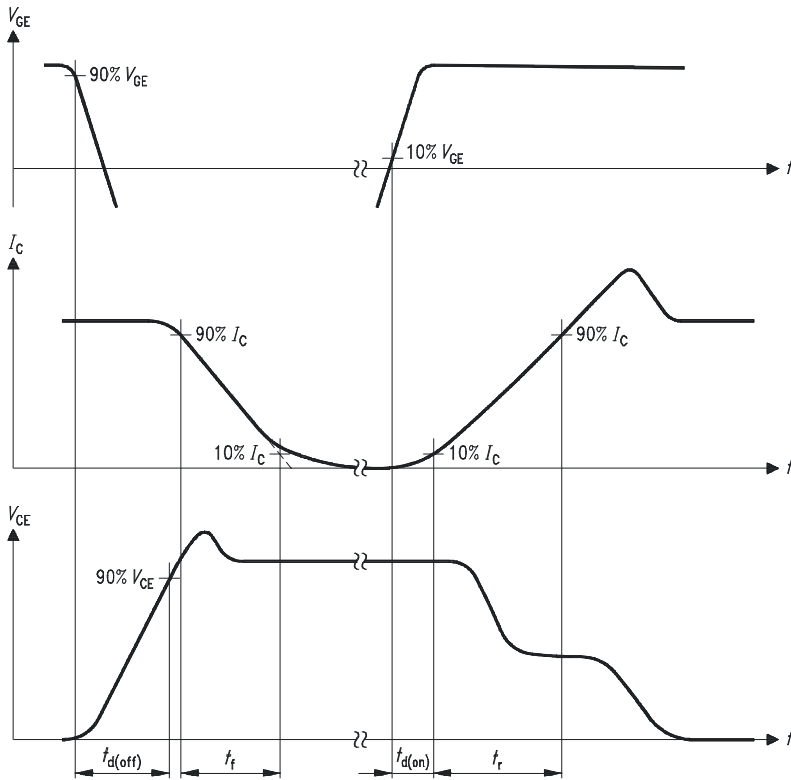


Figure A. Definition of switching times

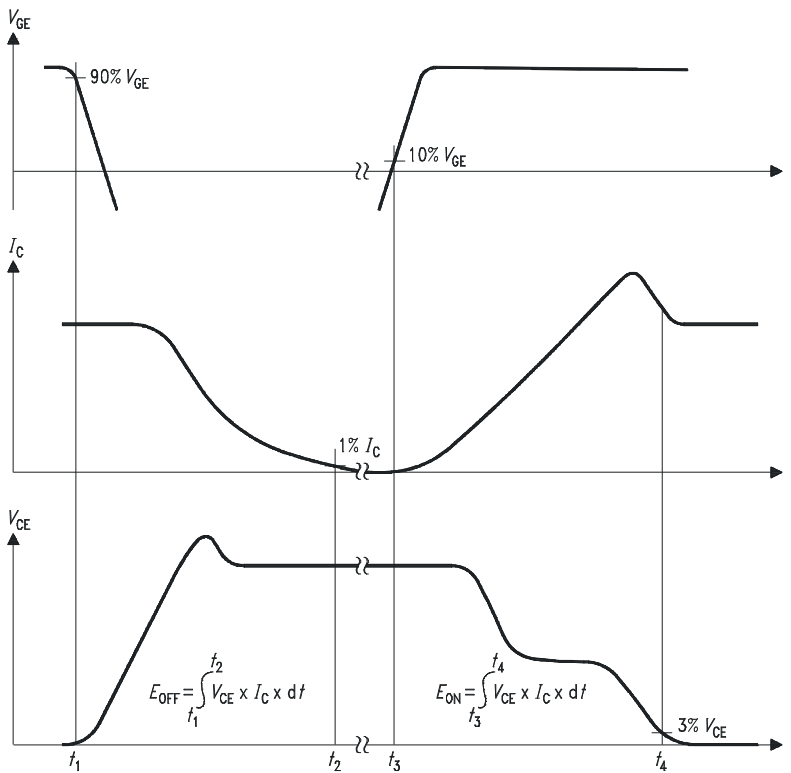


Figure B. Definition of switching losses

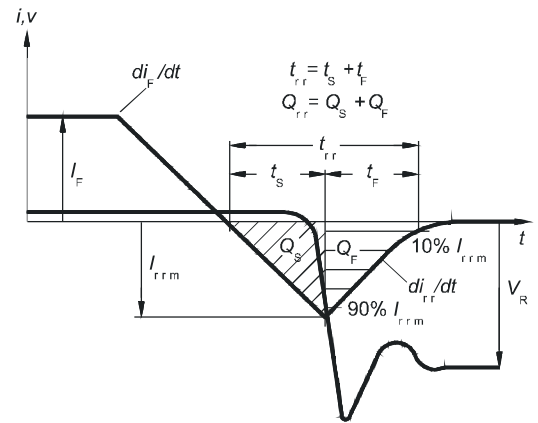


Figure C. Definition of diodes switching characteristics

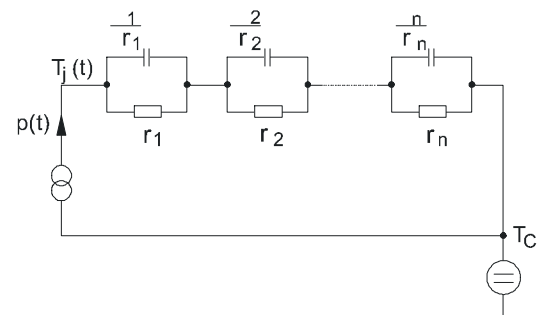


Figure D. Thermal equivalent circuit

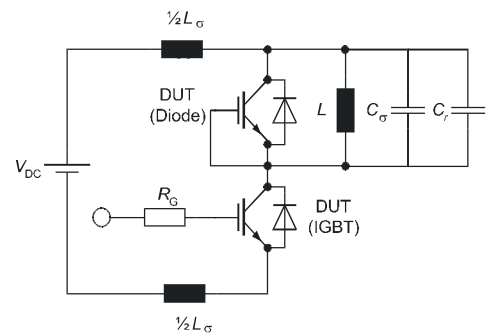


Figure E. Dynamic test circuit  
Parasitic inductance  $L_{\sigma}$ ,  
Parasitic capacitor  $C_{\sigma}$ ,  
Relief capacitor  $C_r$   
(only for ZVT switching)

**Revision History**

IDV30E60C

**Revision: 2010-07-26, Rev. 2.1**

Previous Revision

Revision	Date	Subjects (major changes since last revision)
2.1	-	Release of final datasheet

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