

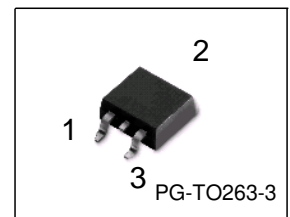
**Fast Switching Emitter Controlled Diode**

**Feature**

- 600V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- 175°C operating temperature
- Easy paralleling
- Qualified according to JEDEC<sup>0)</sup> for target applications
- \* RoHS compliant

**Product Summary**

$V_{RRM}$	600	V
$I_F$	23	A
$V_F$	1.5	V
$T_{jmax}$	175	°C



Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDB23E60	PG -TO263-3	-	D23E60	NC	C	A

**Maximum Ratings, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	$V_{RRM}$	600	V
Continuous forward current $T_C = 25\text{ °C}$ $T_C = 90\text{ °C}$	$I_F$	41 28	A
Surge non repetitive forward current $T_C = 25\text{ °C}$ , $t_p = 10\text{ ms}$ , sine halfwave	$I_{FSM}$	89	A
Maximum repetitive forward current $T_C = 25\text{ °C}$ , $t_p$ limited by $t_{j,max}$ , $D = 0.5$	$I_{FRM}$	65	A
Power dissipation $T_C = 25\text{ °C}$ $T_C = 90\text{ °C}$	$P_{tot}$	115 65	W
Operating junction temperature	$T_j$	-40...+175	°C
Storage temperature	$T_{stg}$	-55...+150	
Soldering temperature 1.6mm (0.063 in.) from case for 10 s	$T_S$	260	

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.3	K/W
SMD version, device on PCB:	$R_{thJA}$				
@ min. footprint		-	-	75	
@ 6 cm <sup>2</sup> cooling area <sup>1)</sup>		-	-	50	

**Electrical Characteristics, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Reverse leakage current	$I_R$				$\mu\text{A}$
$V_R=600\text{V}, T_j=25\text{°C}$		-	-	50	
$V_R=600\text{V}, T_j=150\text{°C}$		-	-	1900	
Forward voltage drop	$V_F$				V
$I_F=23\text{A}, T_j=25\text{°C}$		-	1.5	2	
$I_F=23\text{A}, T_j=150\text{°C}$		-	1.5	-	

<sup>0</sup>J-STD20 and JESD22

<sup>1</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air.

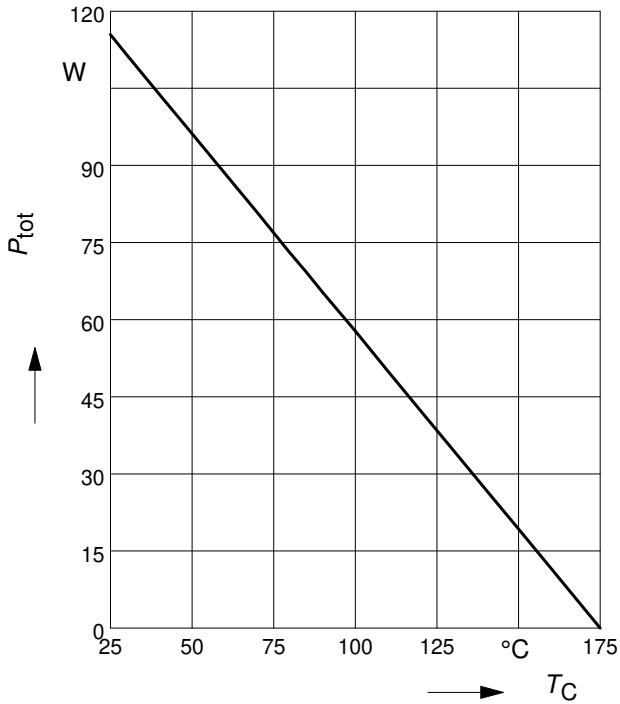
**Electrical Characteristics**, at  $T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Reverse recovery time $V_R=400\text{V}$ , $I_F=23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F=23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F=23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	$t_{rr}$	-	120 164 170	-	ns
Peak reverse current $V_R=400\text{V}$ , $I_F = 23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F = 23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F = 23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	$I_{rrm}$	-	17 19.5 21.5	-	A
Reverse recovery charge $V_R=400\text{V}$ , $I_F=23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F = 23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F = 23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	$Q_{rr}$	-	970 1580 1770	-	nC
Reverse recovery softness factor $V_R=400\text{V}$ , $I_F=23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F=23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F=23\text{A}$ , $di_F/dt=1000\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	S	-	4.4 4.8 5	-	

**1 Power dissipation**

$P_{tot} = f(T_C)$

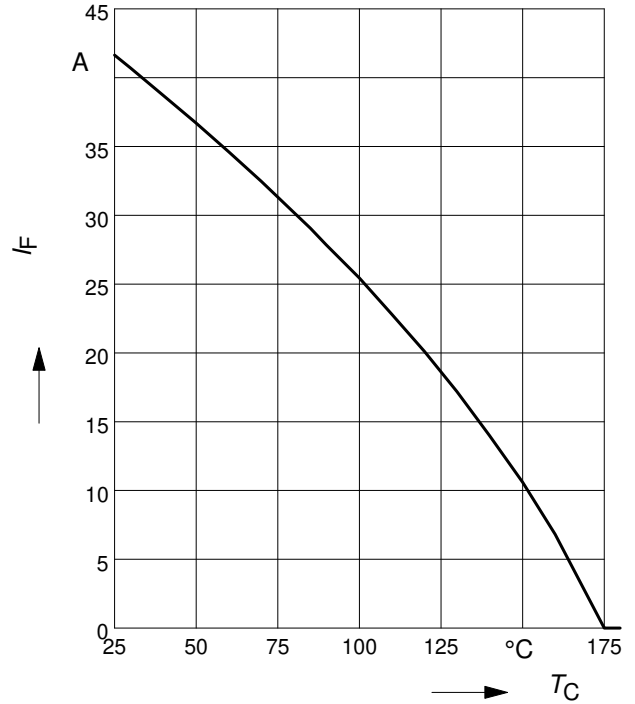
parameter:  $T_j \leq 175\text{ °C}$



**2 Diode forward current**

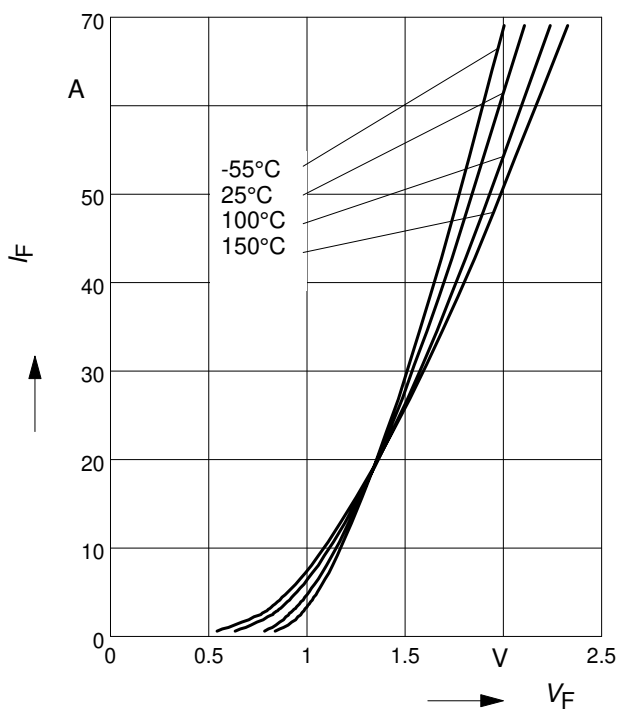
$I_F = f(T_C)$

parameter:  $T_j \leq 175\text{ °C}$



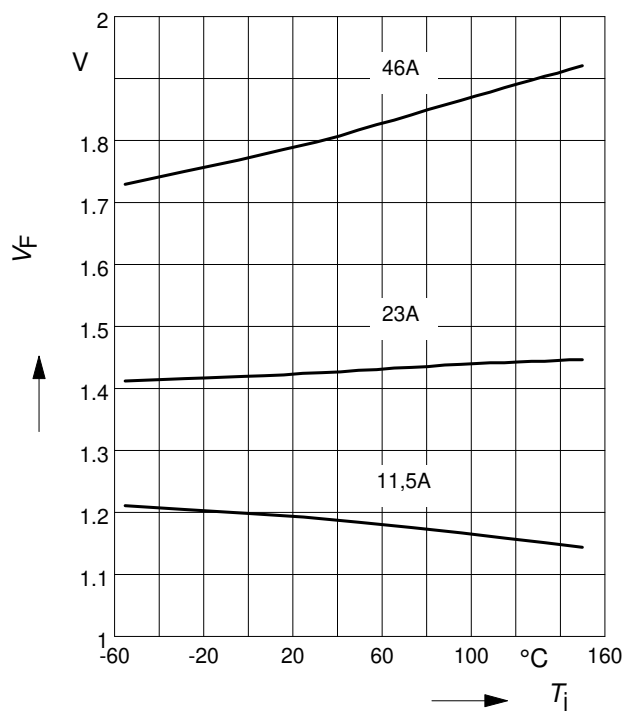
**3 Typ. diode forward current**

$I_F = f(V_F)$



**4 Typ. diode forward voltage**

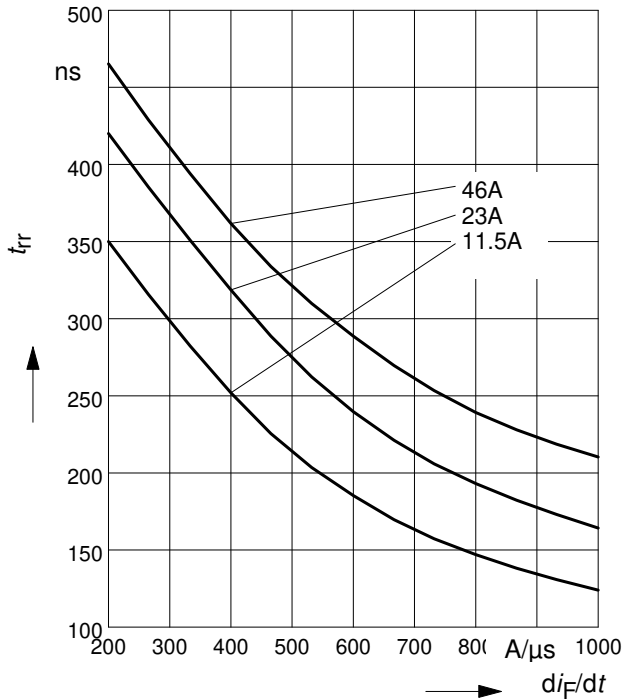
$V_F = f(T_j)$



**5 Typ. reverse recovery time**

$$t_{rr} = f(dI_F/dt)$$

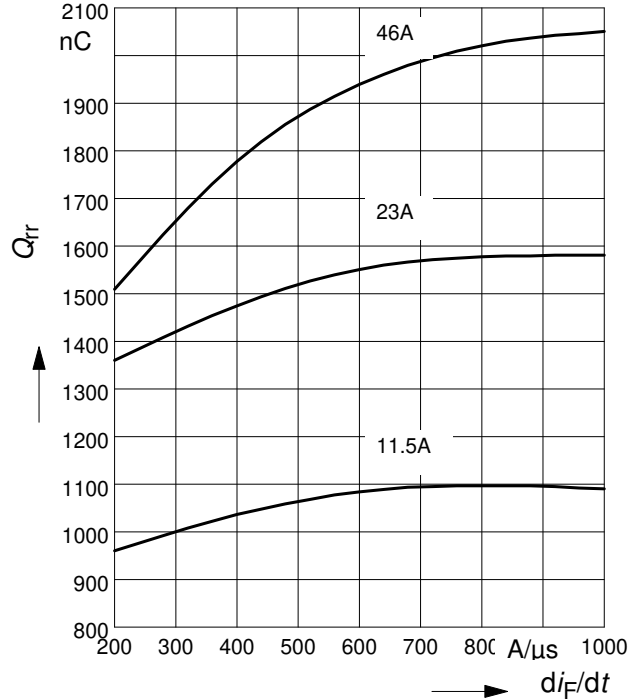
parameter:  $V_R = 400V, T_j = 125^\circ C$



**6 Typ. reverse recovery charge**

$$Q_{rr} = f(dI_F/dt)$$

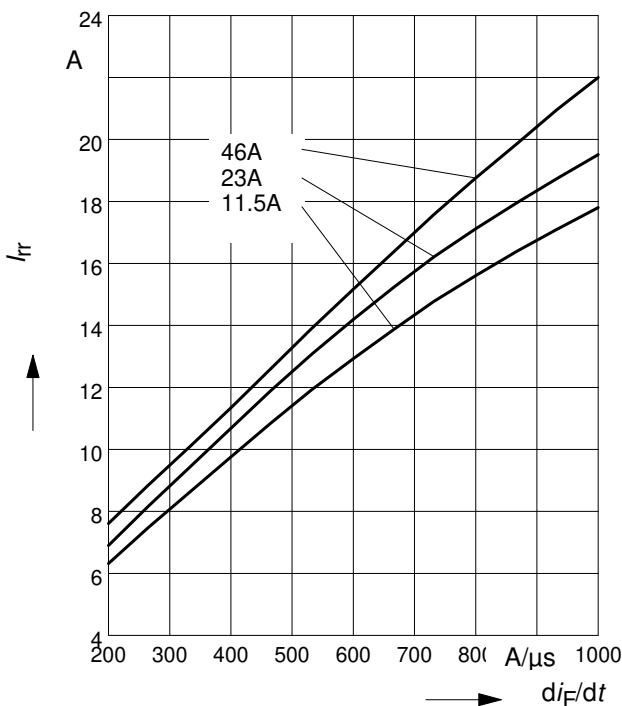
parameter:  $V_R = 400V, T_j = 125^\circ C$



**7 Typ. reverse recovery current**

$$I_{rr} = f(dI_F/dt)$$

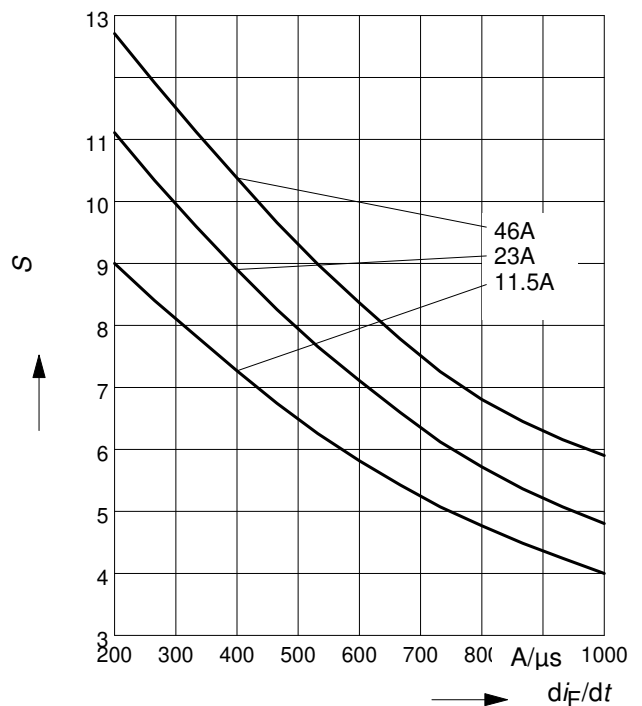
parameter:  $V_R = 400V, T_j = 125^\circ C$



**8 Typ. reverse recovery softness factor**

$$S = f(dI_F/dt)$$

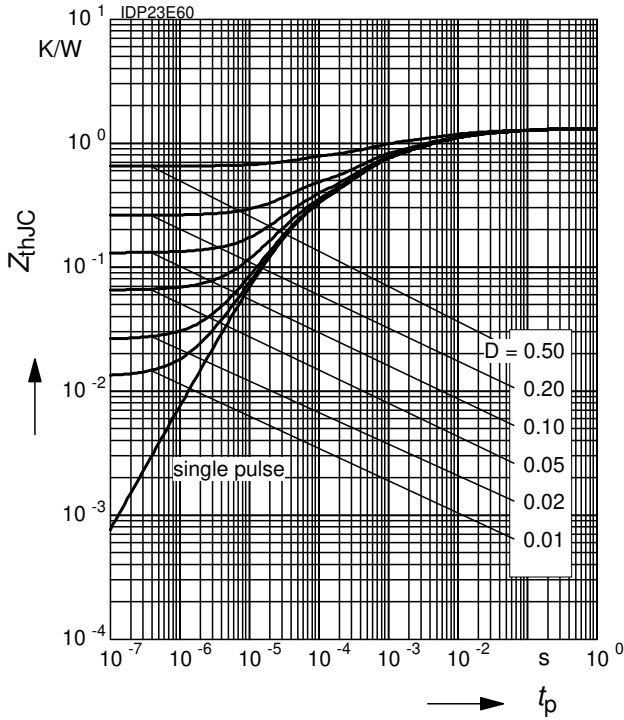
parameter:  $V_R = 400V, T_j = 125^\circ C$

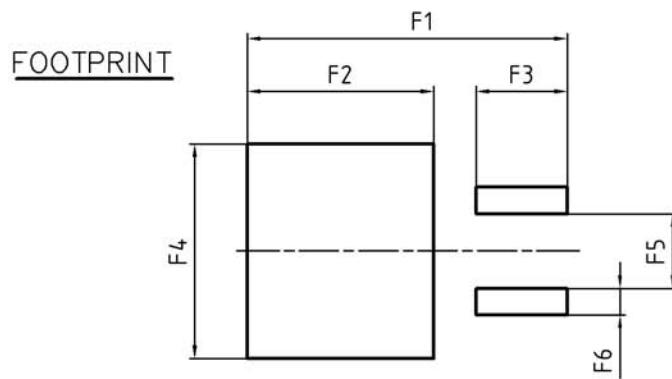
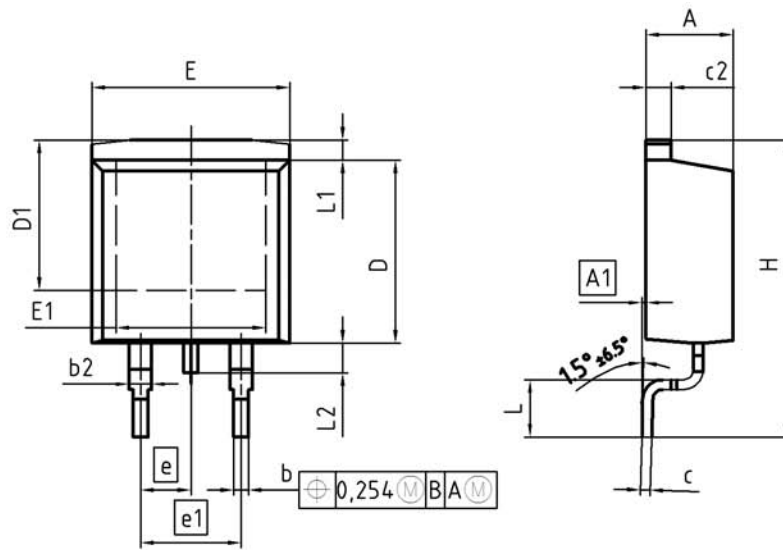


**9 Max. transient thermal impedance**

$$Z_{thJC} = f(t_p)$$

parameter :  $D = t_p/T$





DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	0.00	0.25	0.000	0.010
b	0.65	0.85	0.026	0.033
b2	0.95	1.15	0.037	0.045
c	0.33	0.65	0.013	0.026
c2	1.17	1.40	0.046	0.055
D	8.51	9.45	0.335	0.372
D1	7.10	7.90	0.280	0.311
E	9.80	10.31	0.386	0.406
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	2		2	
H	14.61	15.88	0.575	0.625
L	2.29	3.00	0.090	0.118
L1	0.70	1.60	0.028	0.063
L2	1.00	1.78	0.039	0.070
F1	16.05	16.25	0.632	0.640
F2	9.30	9.50	0.366	0.374
F3	4.50	4.70	0.177	0.185
F4	10.70	10.90	0.421	0.429
F5	3.65	3.85	0.144	0.152
F6	1.25	1.45	0.049	0.057

DOCUMENT NO.  
Z8B00003324

SCALE

7.5mm

EUROPEAN PROJECTION

ISSUE DATE  
30-08-2007

REVISION  
01

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