

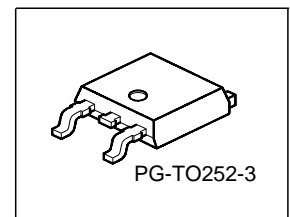
**Fast Switching Emitter Controlled Diode**

**Feature**

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

**Product Summary**

$V_{RRM}$	600	V
$I_F$	9	A
$V_F$	1.5	V
$T_{jmax}$	175	°C



Type	Package	Ordering Code	Marking	Pin 1	PIN 2,4	PIN 3
IDD09E60	PG-TO252-3	-	D09E60	NC	C	A

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

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	$V_{RRM}$	600	V
Continuous forward current $T_C = 25^\circ\text{C}$ $T_C = 90^\circ\text{C}$	$I_F$	19.3 13	A
Surge non repetitive forward current $T_C = 25^\circ\text{C}$ , $t_p = 10\text{ ms}$ , sine halfwave	$I_{FSM}$	40	A
Maximum repetitive forward current $T_C = 25^\circ\text{C}$ , $t_p$ limited by $t_{j,max}$ , $D = 0.5$	$I_{FRM}$	29.5	A
Power dissipation $T_C = 25^\circ\text{C}$ $T_C = 90^\circ\text{C}$	$P_{tot}$	57.7 32.7	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	$R_{thJC}$	-	-	2.6	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  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Reverse leakage current	$I_R$				$\mu\text{A}$
$V_R=600\text{V}, T_j=25^\circ\text{C}$		-	-	50	
$V_R=600\text{V}, T_j=150^\circ\text{C}$		-	-	750	
Forward voltage drop	$V_F$				V
$I_F=9\text{A}, T_j=25^\circ\text{C}$		-	1.5	2	
$I_F=9\text{A}, T_j=150^\circ\text{C}$		-	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.

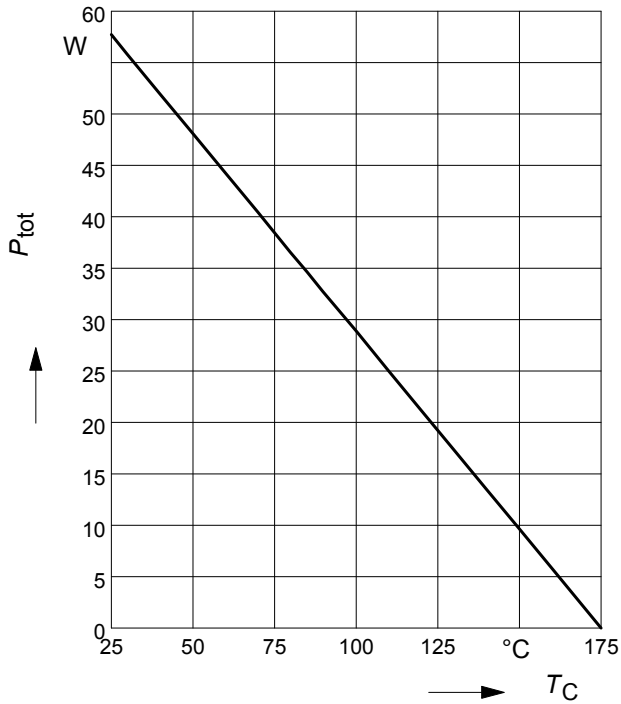
**Electrical Characteristics, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Reverse recovery time $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	$t_{rr}$	-	75 110 112	-	ns
Peak reverse current $V_R=400\text{V}$ , $I_F = 9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	$I_{rrm}$	-	10.2 11.8 12.3	-	A
Reverse recovery charge $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F = 9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	$Q_{rr}$	-	343 585 612	-	nC
Reverse recovery softness factor $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125^\circ\text{C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150^\circ\text{C}$	S	-	4 5.5 5.7	-	

**1 Power dissipation**

$$P_{tot} = f(T_C)$$

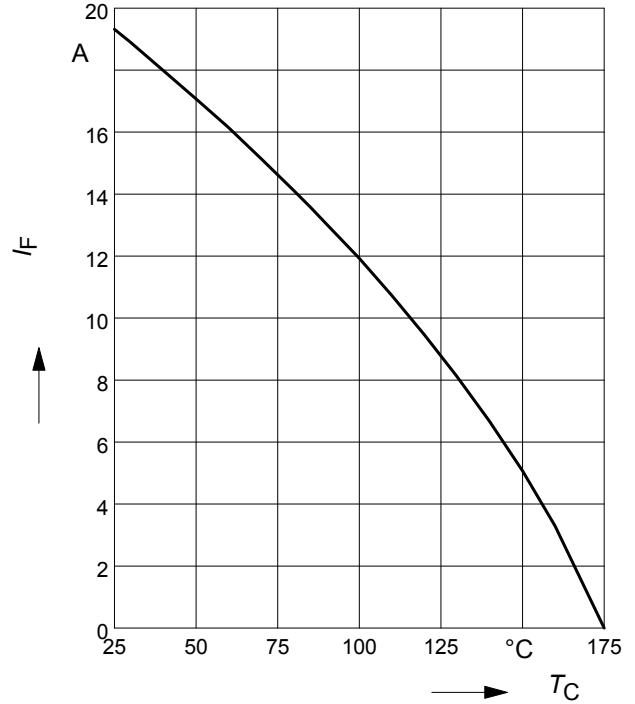
parameter:  $T_j \leq 175\text{ °C}$



**2 Diode forward current**

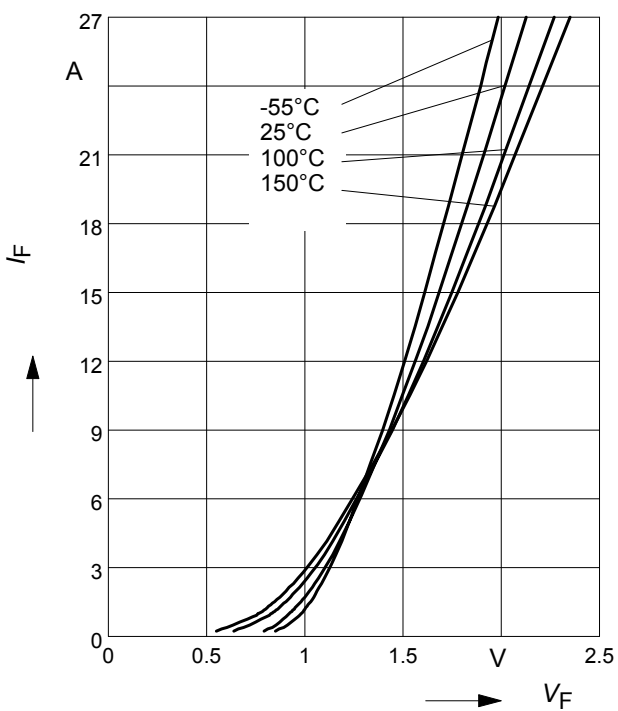
$$I_F = f(T_C)$$

parameter:  $T_j \leq 175\text{ °C}$



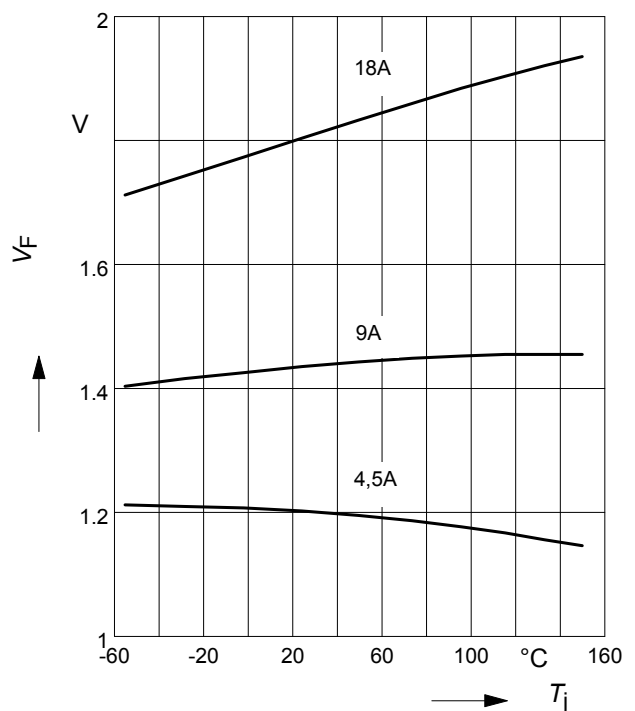
**3 Typ. diode forward current**

$$I_F = f(V_F)$$



**4 Typ. diode forward voltage**

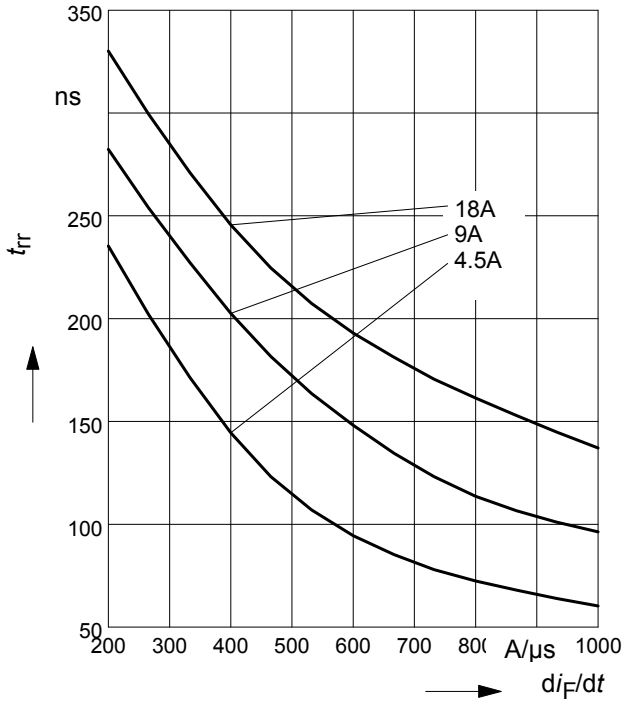
$$V_F = f(T_j)$$



**5 Typ. reverse recovery time**

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

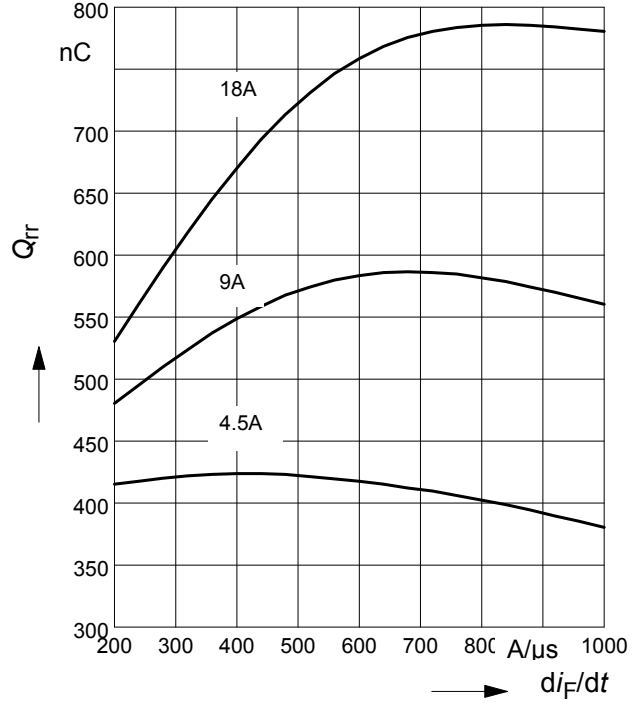
parameter:  $V_R = 400V, T_j = 125^\circ C$



**6 Typ. reverse recovery charge**

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

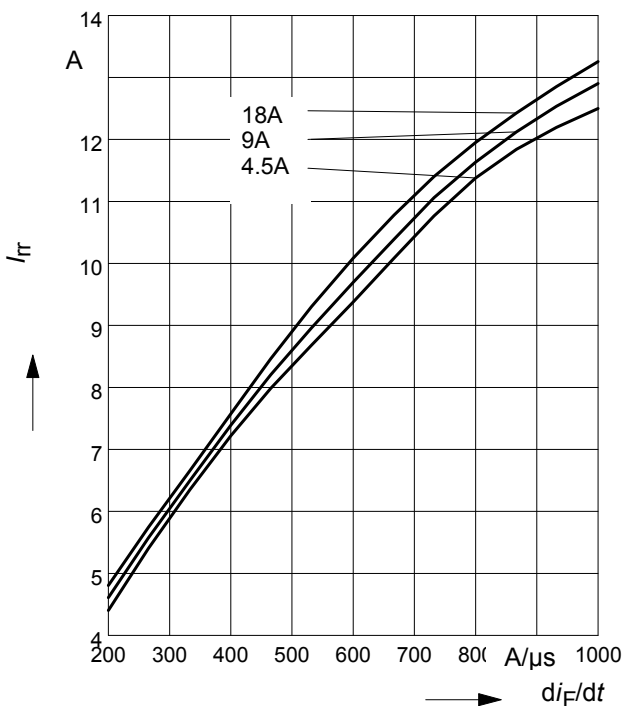
parameter:  $V_R = 400V, T_j = 125^\circ C$



**7 Typ. reverse recovery current**

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

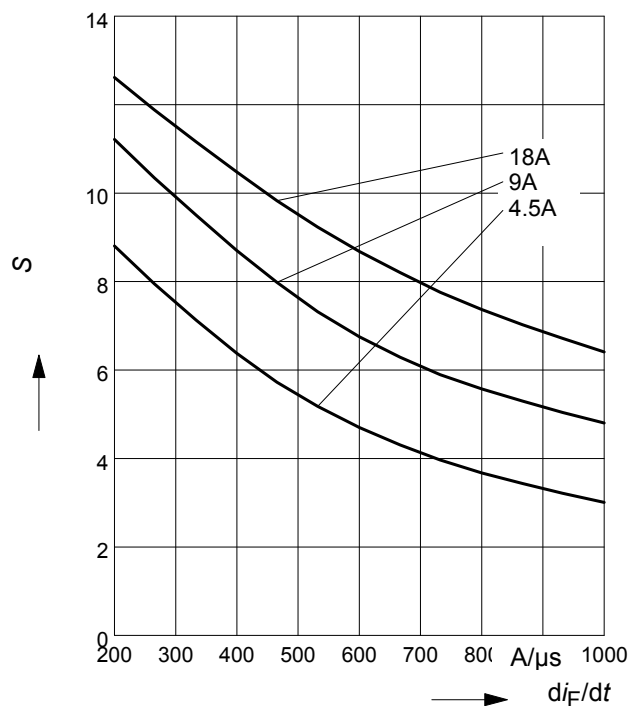
parameter:  $V_R = 400V, T_j = 125^\circ C$



**8 Typ. reverse recovery softness factor**

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

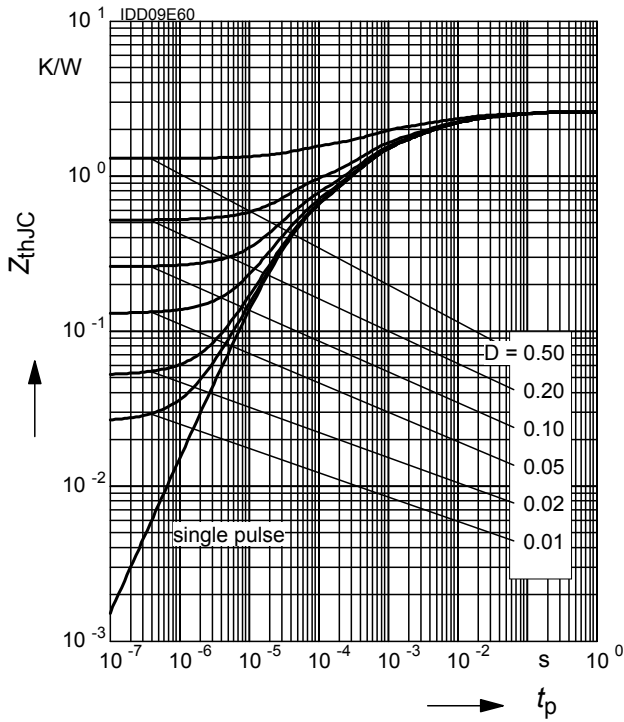
parameter:  $V_R = 400V, T_j = 125^\circ C$



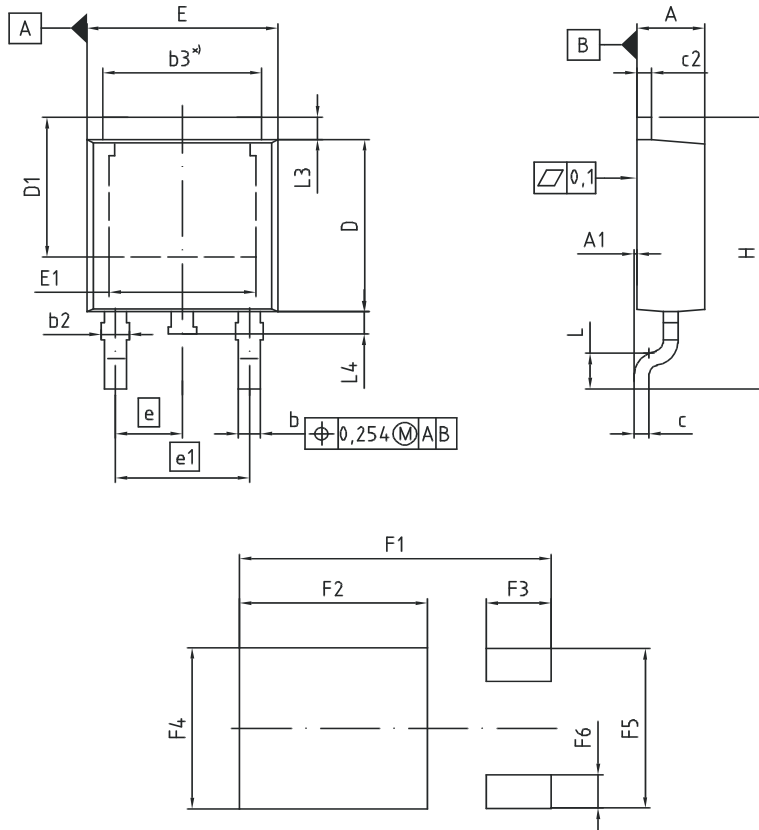
**9 Max. transient thermal impedance**

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

parameter :  $D = t_p/T$



PG-TO252 -3



\*) mold flash not included

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.16	2.41	0.085	0.095
A1	0.00	0.15	0.000	0.006
b	0.64	0.89	0.025	0.035
b2	0.65	1.15	0.026	0.045
b3	5.00	5.50	0.197	0.217
c	0.46	0.60	0.018	0.024
c2	0.46	0.98	0.018	0.039
D	5.97	6.22	0.235	0.245
D1	5.02	5.84	0.198	0.230
E	6.40	6.73	0.252	0.265
E1	4.70	5.21	0.185	0.205
e	2.29 (BSC)		0.090 (BSC)	
e1	4.57		0.180	
N	3		3	
H	9.40	10.48	0.370	0.413
L	1.18	1.70	0.046	0.067
L3	0.90	1.25	0.035	0.049
L4	0.51	1.00	0.020	0.039
F1	10.60		0.417	
F2	6.40		0.252	
F3	2.20		0.087	
F4	5.80		0.228	
F5	5.76		0.227	
F6	1.20		0.047	

DOCUMENT NO.  
Z8B00003328

SCALE

EUROPEAN PROJECTION

ISSUE DATE  
16-02-2011

REVISION  
04

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