



**THE DATASHEET OF
IDD09E60BUMA1**



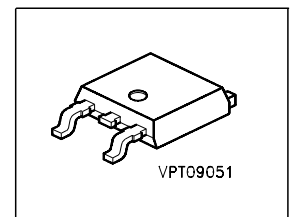
Fast Switching Emitter Controlled Diode

Product Summary

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

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 JEDEC⁰⁾ for target applications



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 $T_C = 25^\circ\text{C}$, $t_p = 10$ 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.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	2.6	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	75	
@ 6 cm ² cooling area ¹⁾		-	-	50	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Reverse leakage current	I_R				μA
$V_R=600\text{V}, T_j=25^\circ\text{C}$		-	-	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	-	

⁰J-STD20 and JESD22

¹Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

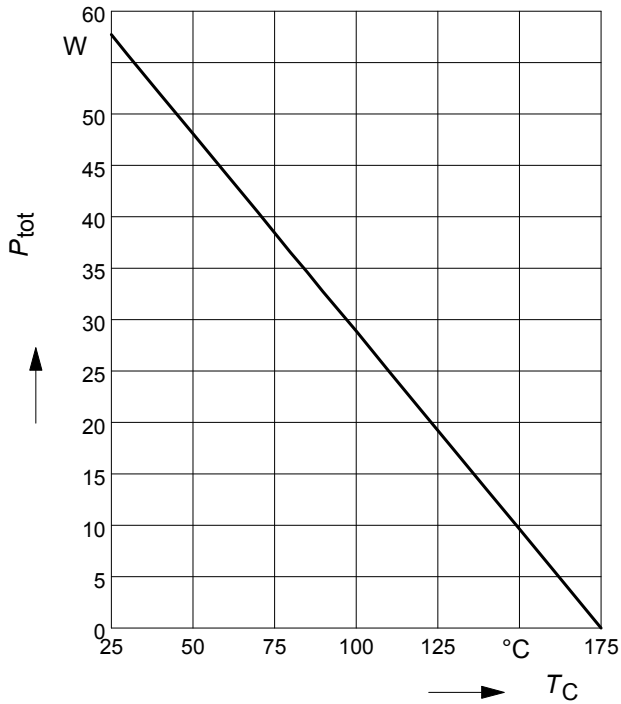
Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

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

1 Power dissipation

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

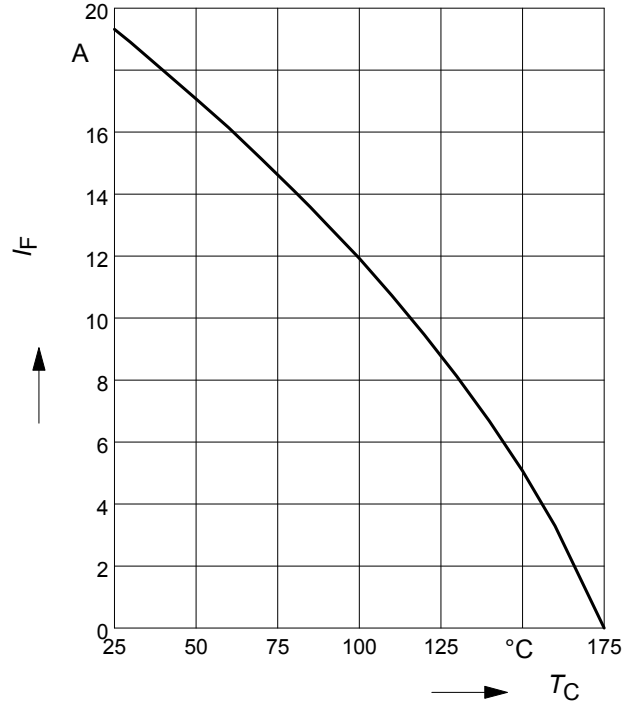
parameter: $T_j \leq 175^\circ\text{C}$



2 Diode forward current

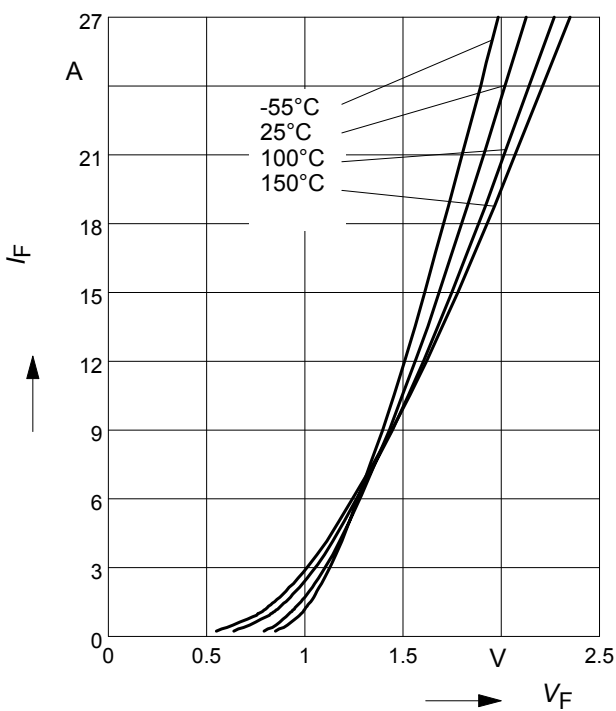
$$I_F = f(T_C)$$

parameter: $T_j \leq 175^\circ\text{C}$



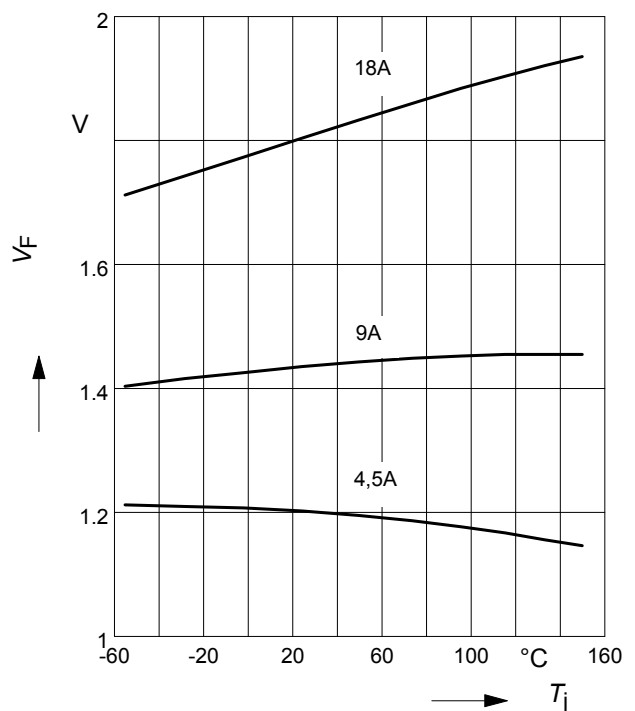
3 Typ. diode forward current

$$I_F = f(V_F)$$



4 Typ. diode forward voltage

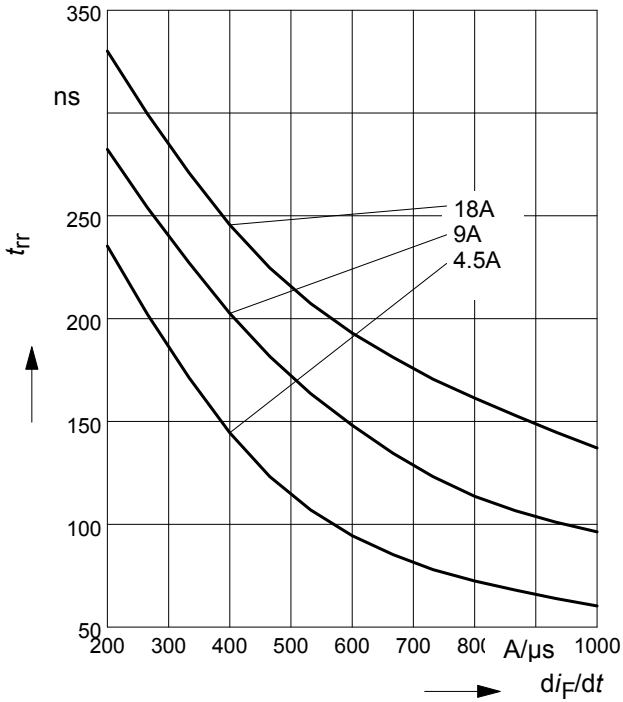
$$V_F = f(T_j)$$



5 Typ. reverse recovery time

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

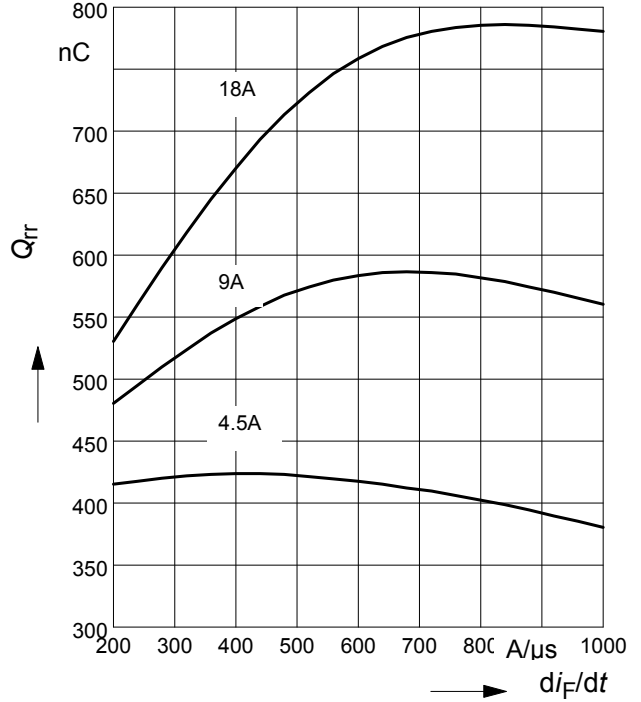
parameter: $V_R = 400V, T_j = 125^\circ C$



6 Typ. reverse recovery charge

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

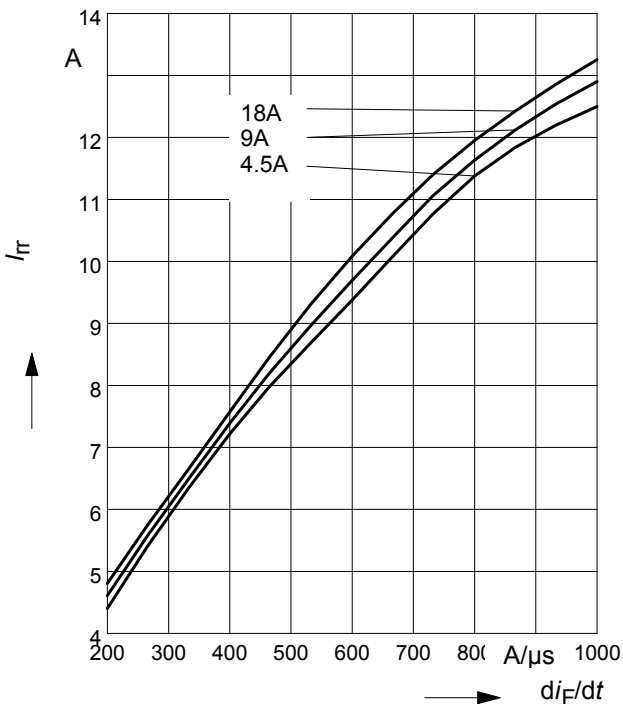
parameter: $V_R = 400V, T_j = 125^\circ C$



7 Typ. reverse recovery current

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

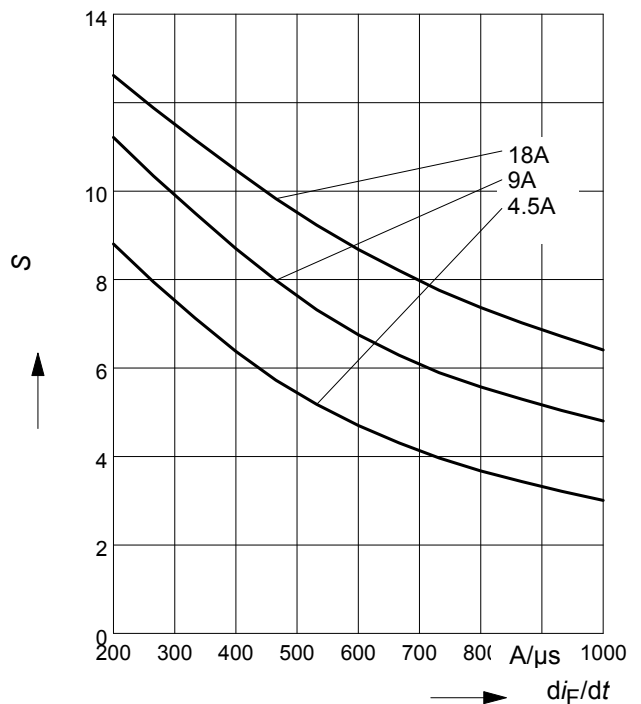
parameter: $V_R = 400V, T_j = 125^\circ C$



8 Typ. reverse recovery softness factor

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

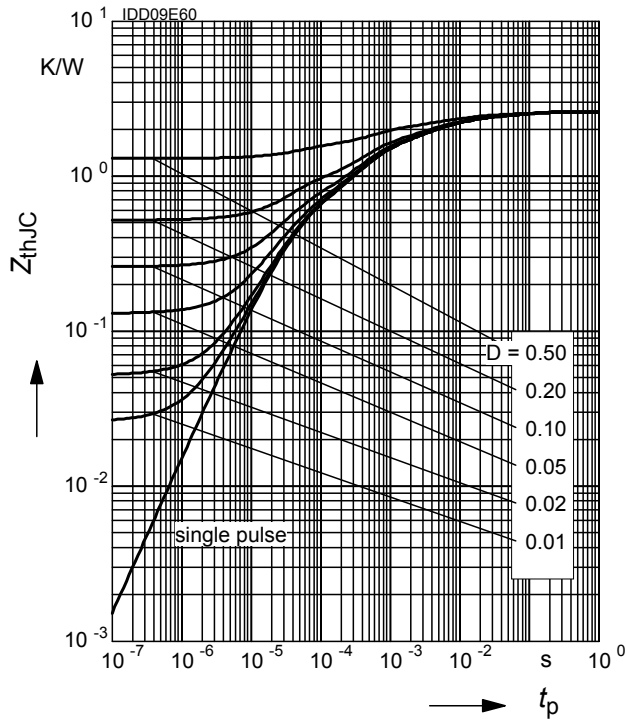
parameter: $V_R = 400V, T_j = 125^\circ C$



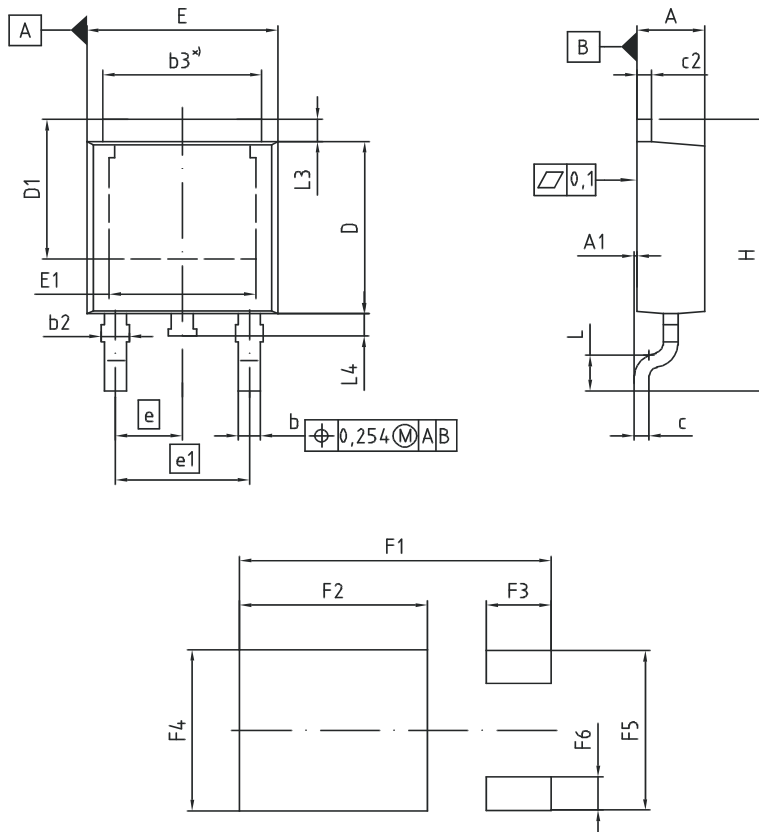
9 Max. transient thermal impedance

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

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,
Bereichs Kommunikation
St.-Martin-Strasse 53,
D-81541 München
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