

Fast Switching Emitter Controlled Diode

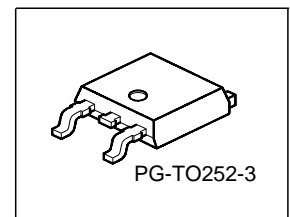


Feature

- 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 JEDEC⁰⁾ 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.	
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.

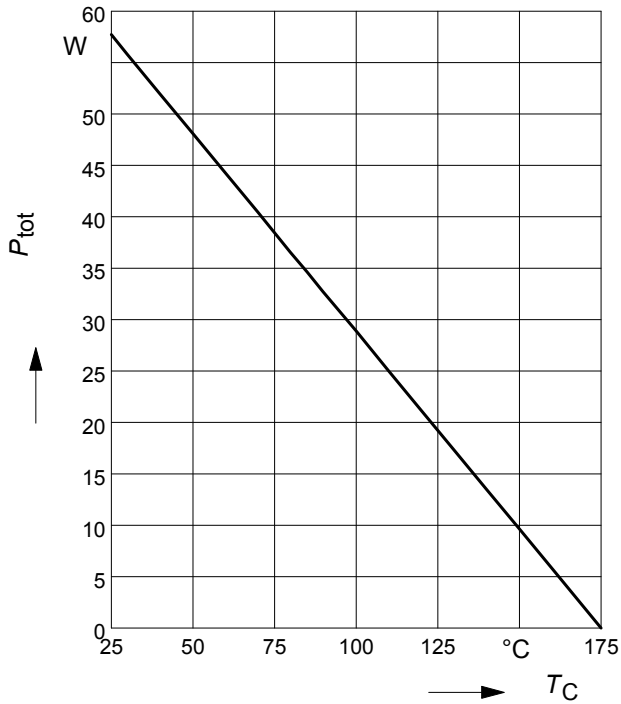
Electrical Characteristics, at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Reverse recovery time $V_R=400\text{V}$, $I_F=9\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$ $V_R=400\text{V}$, $I_F=9\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$ $V_R=400\text{V}$, $I_F=9\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$	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

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

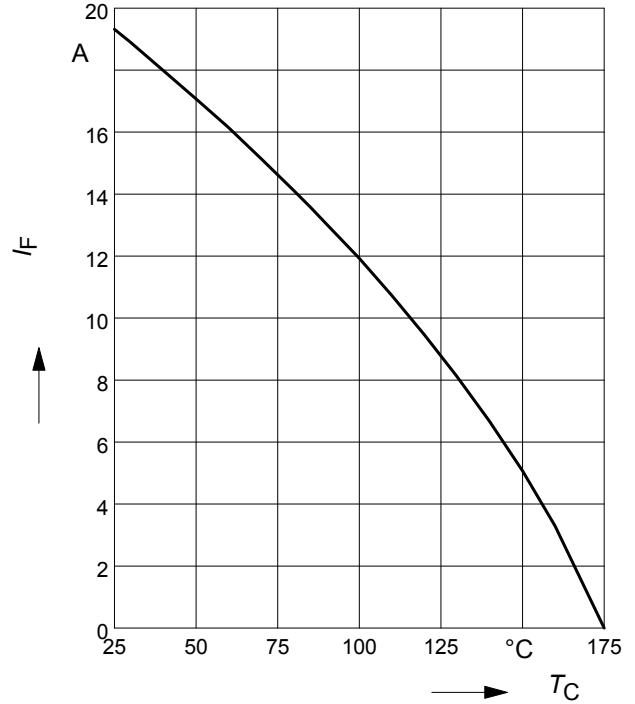
parameter: $T_j \leq 175^\circ\text{C}$



2 Diode forward current

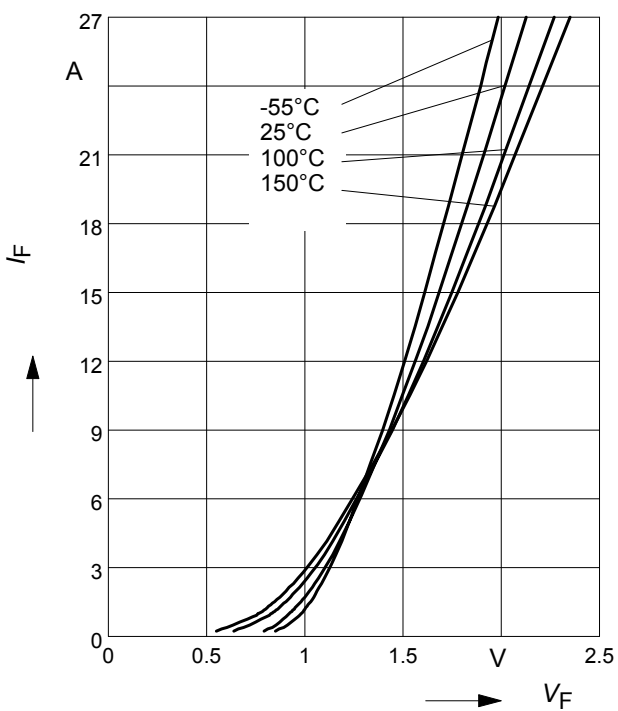
$$I_F = f(T_C)$$

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



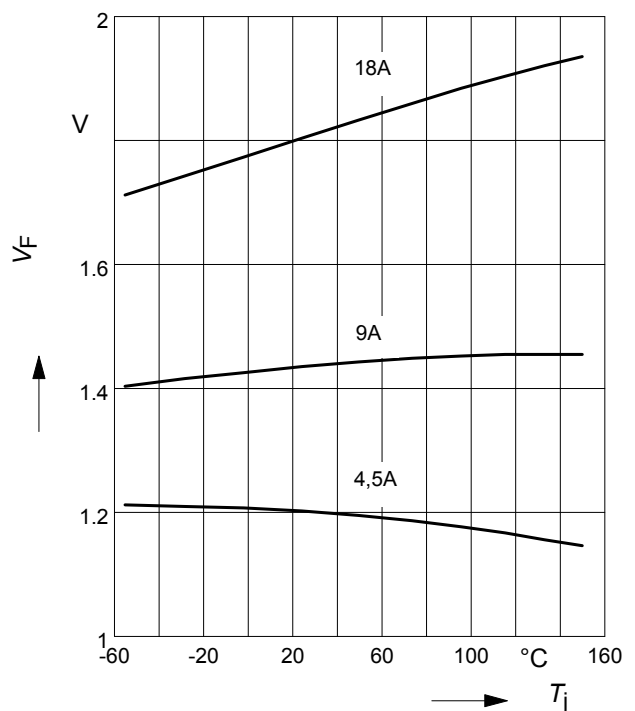
3 Typ. diode forward current

$$I_F = f(V_F)$$



4 Typ. diode forward voltage

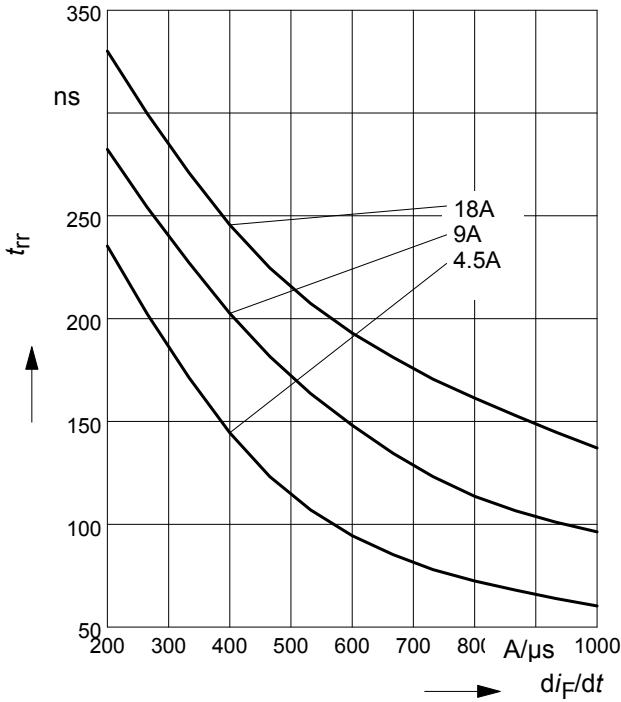
$$V_F = f(T_j)$$



5 Typ. reverse recovery time

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

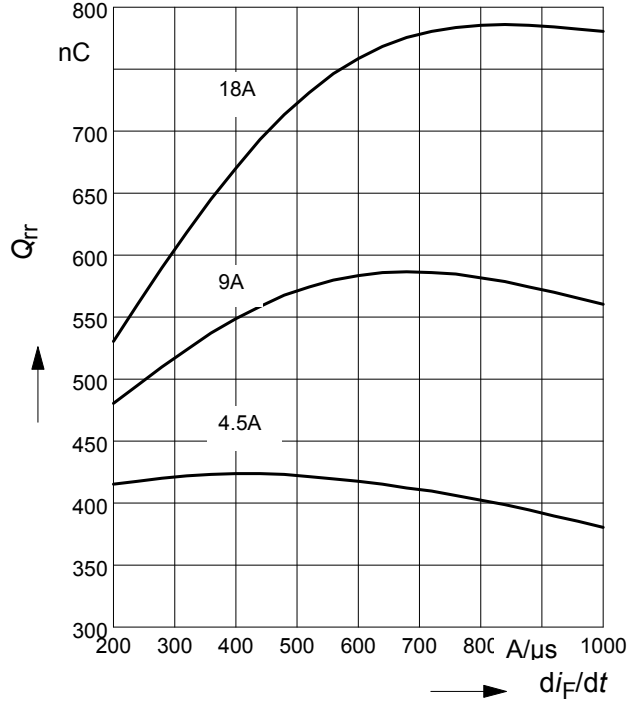
parameter: $V_R = 400V, T_j = 125^\circ C$



6 Typ. reverse recovery charge

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

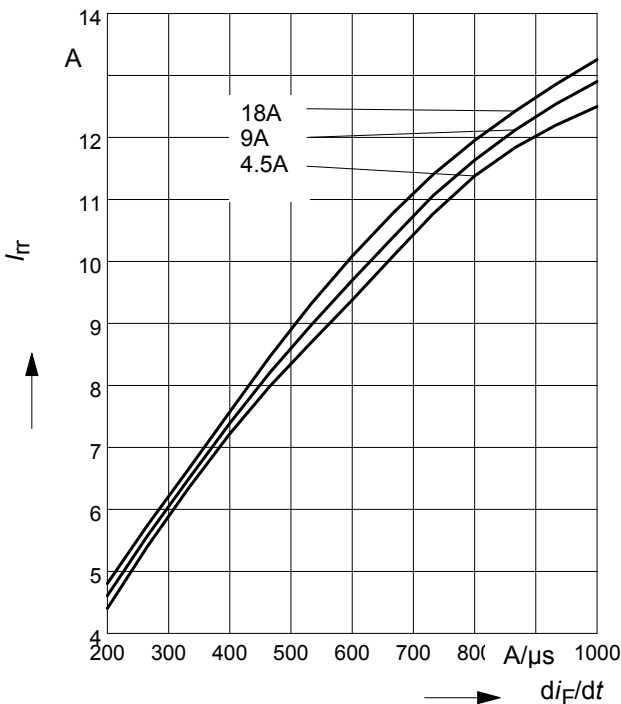
parameter: $V_R = 400V, T_j = 125^\circ C$



7 Typ. reverse recovery current

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

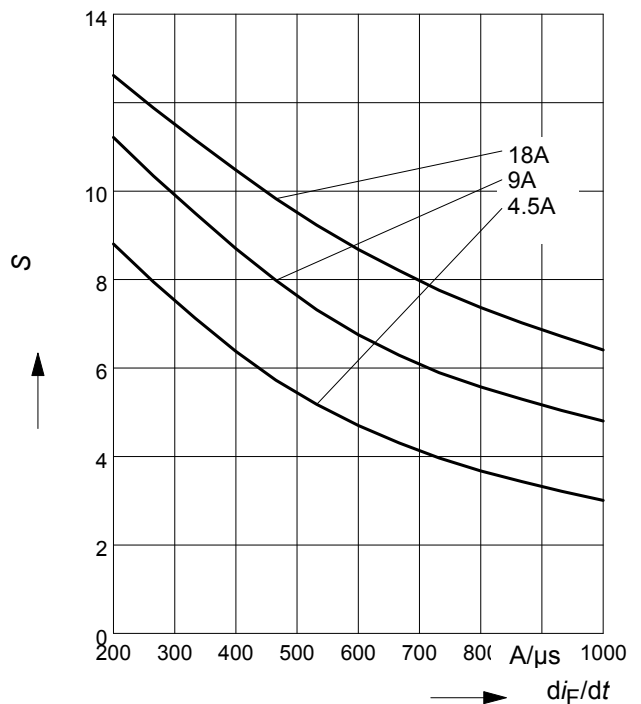
parameter: $V_R = 400V, T_j = 125^\circ C$



8 Typ. reverse recovery softness factor

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

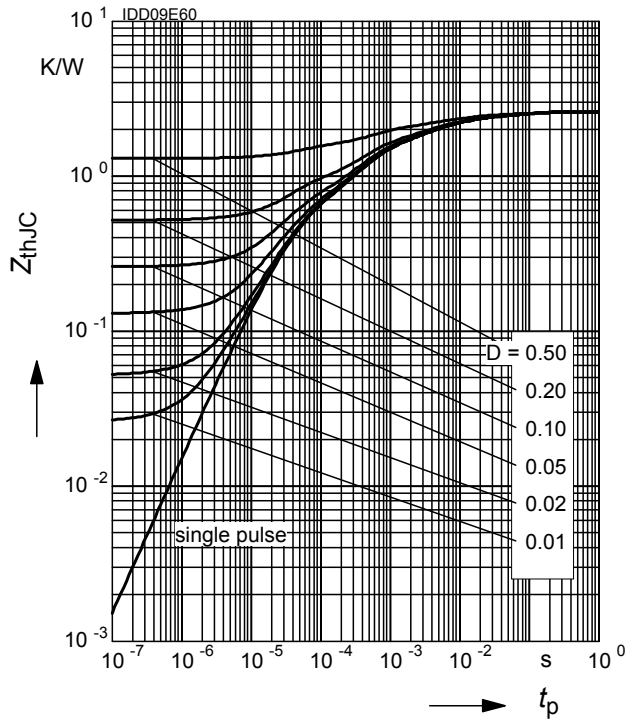
parameter: $V_R = 400V, T_j = 125^\circ C$



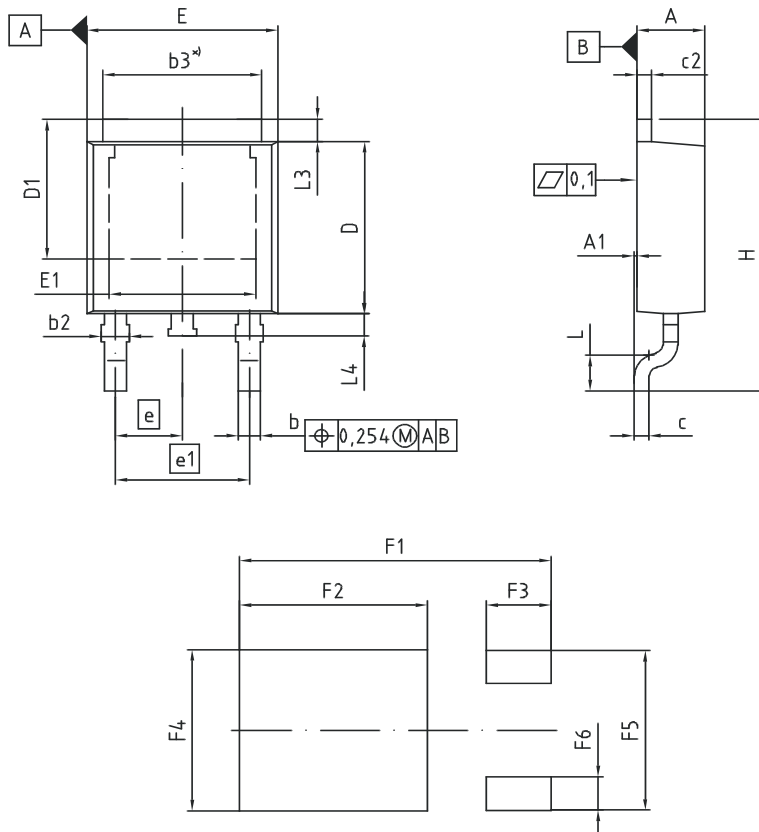
9 Max. transient thermal impedance

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

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	

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