Fast Switching Emitter Controlled Diode

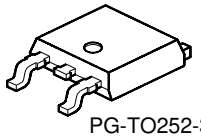
Product Summary

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

RoHS

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[0)] for target applications



PG-TO252-3

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 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	600	V
Continuous forward current T_C = 25°C T_C = 90°C	I_F	 19.3 13	A
Surge non repetitive forward current T_C = 25°C, t_p = 10 ms, sine halfwave	I_{FSM}	40	A
Maximum repetitive forward current T_C = 25°C, t_p limited by $t_{j,max}$, D = 0.5	I_{FRM}	29.5	A
Power dissipation T_C = 25°C T_C = 90°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 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Reverse leakage current	I_R				µA
V_R=600V, T_j=25°C		-	-	50	
V_R=600V, T_j=150°C		-	-	750	
Forward voltage drop	V_F				V
I_F=9A, T_j=25°C		-	1.5	2	
I_F=9A, T_j=150°C		-	1.5	-	

[0]J-STD20 and JESD22

[1]Device 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.

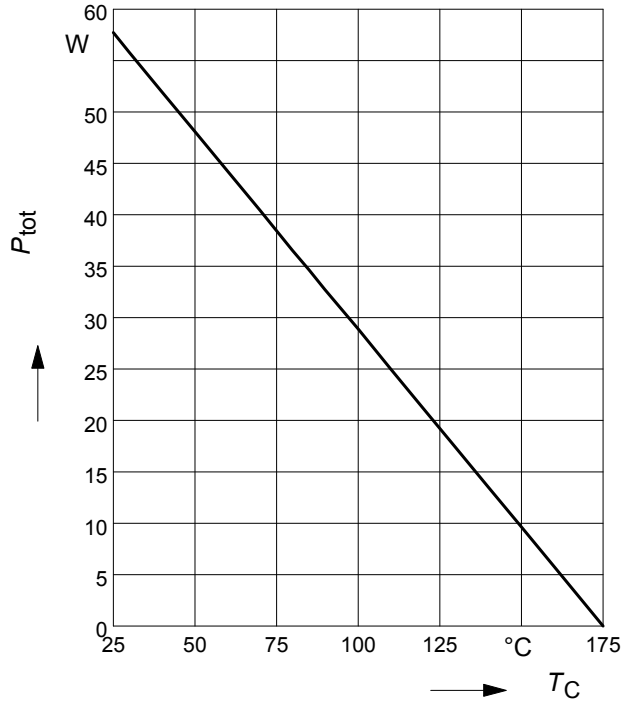
Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

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

1 Power dissipation

$P_{tot} = f(T_C)$

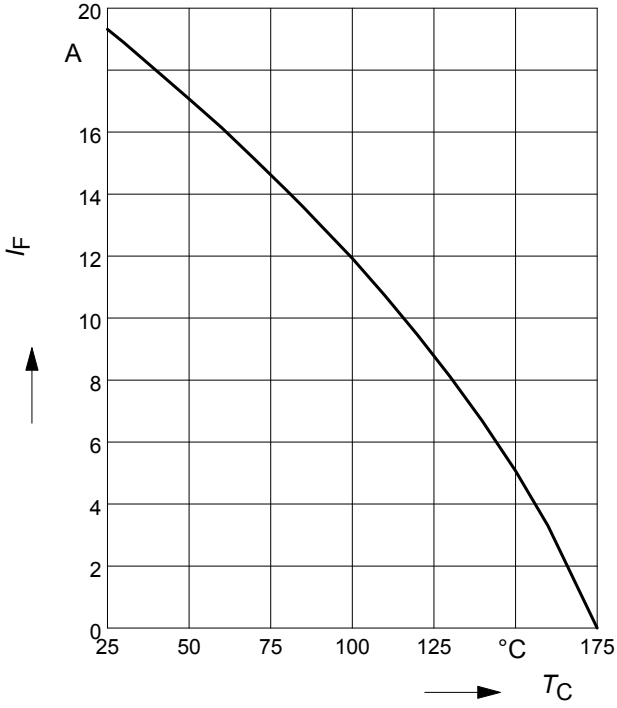
parameter: $T_j \leq 175$ °C



2 Diode forward current

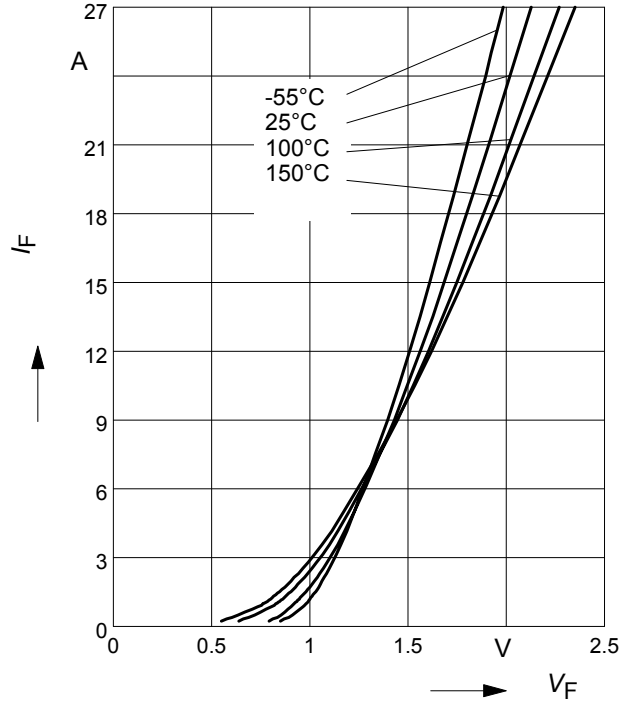
$I_F = f(T_C)$

parameter: $T_j \leq 175$°C



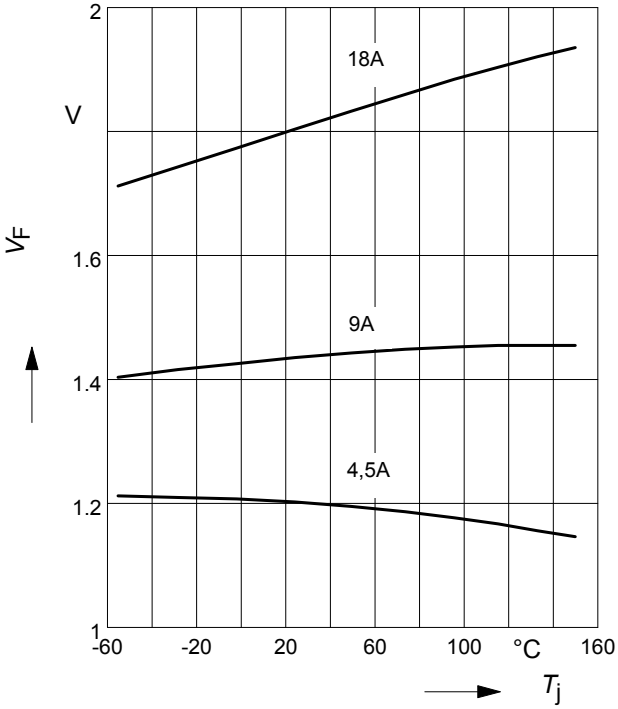
3 Typ. diode forward current

$I_F = f(V_F)$



4 Typ. diode forward voltage

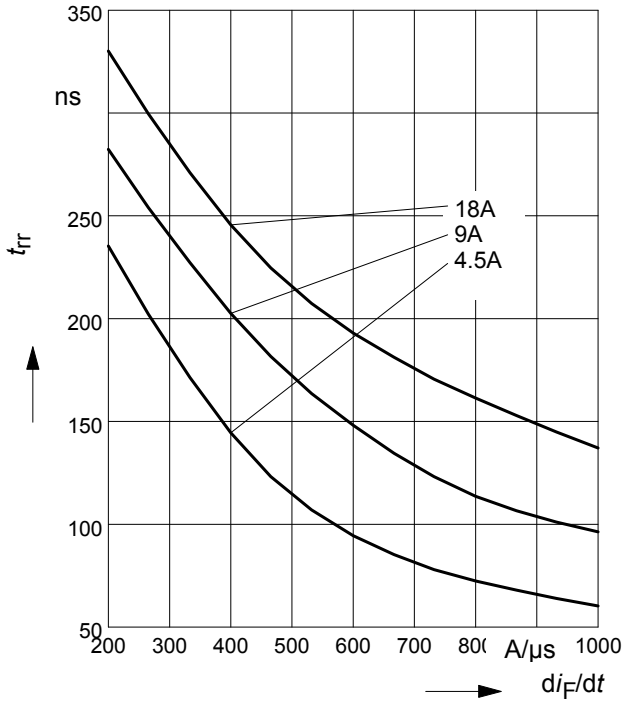
$V_F = f(T_j)$



5 Typ. reverse recovery time

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

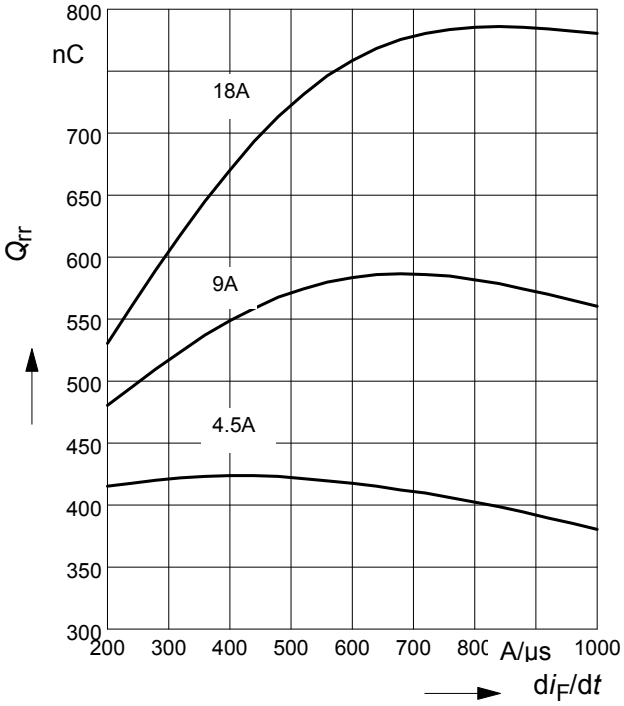
parameter: V_R = 400V, T_j = 125°C



6 Typ. reverse recovery charge

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

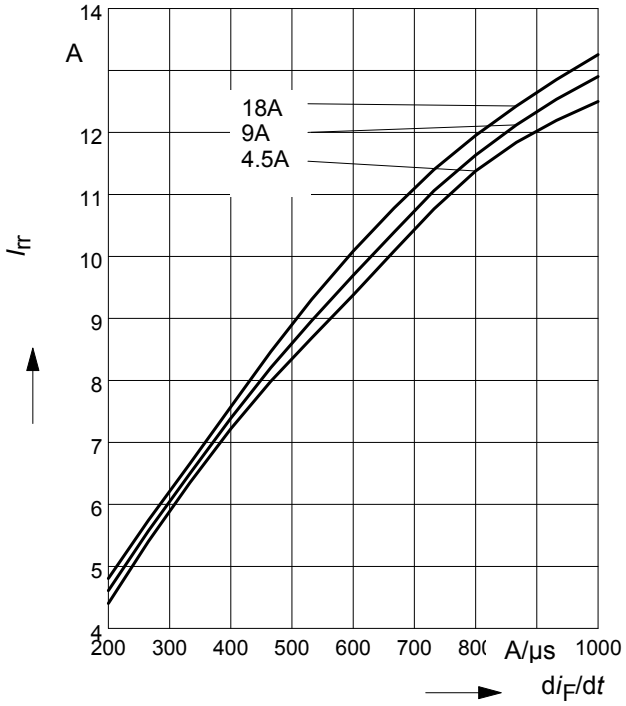
parameter: V_R = 400V, T_j = 125 °C



7 Typ. reverse recovery current

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

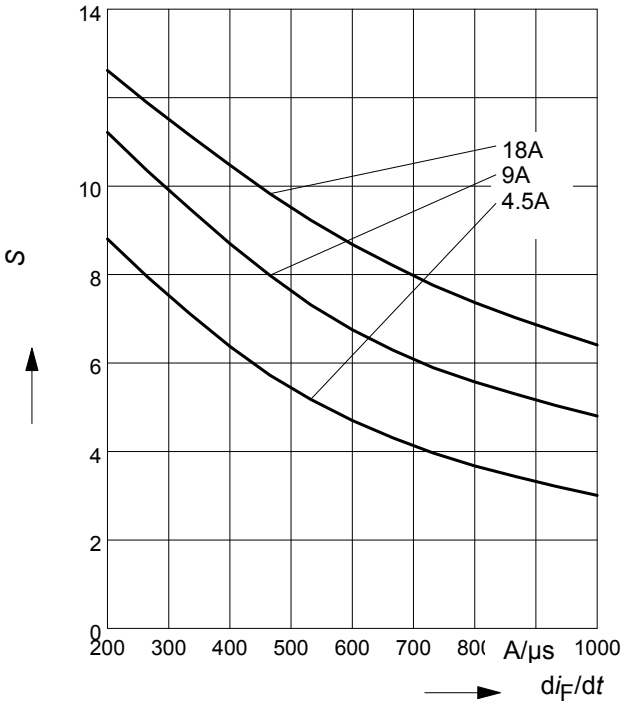
parameter: V_R = 400V, T_j = 125°C



8 Typ. reverse recovery softness factor

S = f(di_F/dt)

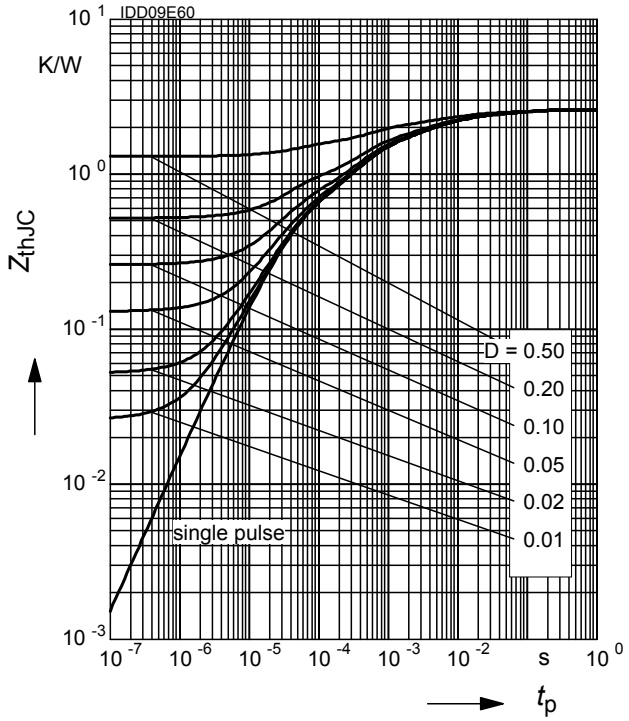
parameter: V_R = 400V, T_j = 125°C



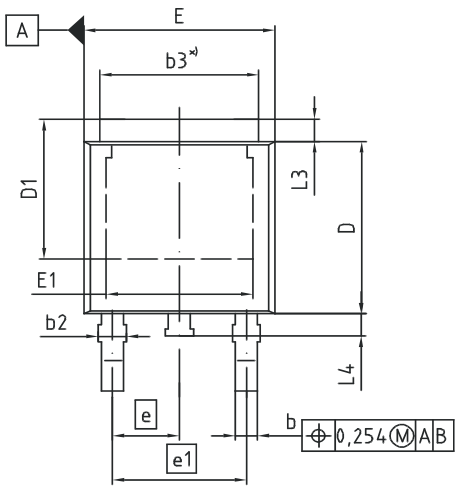
9 Max. transient thermal impedance

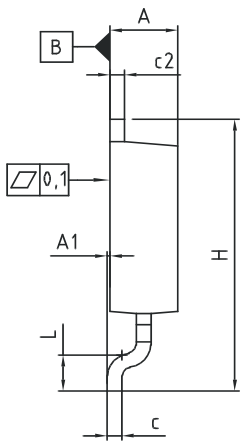
$Z_{thJC} = f(t_p)$

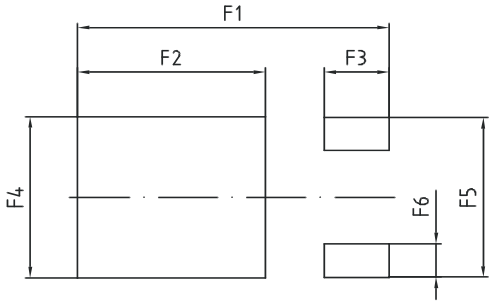
parameter : $D = t_p/T$



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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