

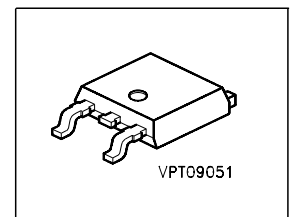
## Fast Switching Emitter Controlled Diode

### 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-TO252-3-1	-	D09E60	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	$I_F$	19.3	A
$T_C=25\text{ °C}$		19.3	
$T_C=90\text{ °C}$		13	
Surge non repetitive forward current	$I_{FSM}$	40	
$T_C=25\text{ °C}$ , $t_p=10\text{ ms}$ , sine halfwave			
Maximum repetitive forward current	$I_{FRM}$	29.5	
$T_C=25\text{ °C}$ , $t_p$ limited by $T_{jmax}$ , $D=0.5$			
Power dissipation	$P_{tot}$	57.7	W
$T_C=25\text{ °C}$		57.7	
$T_C=90\text{ °C}$		32.7	
Operating and storage temperature	$T_j, T_{stg}$	-55...+175	°C
Soldering temperature reflow soldering, MSL3	$T_S$	260	°C

**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.

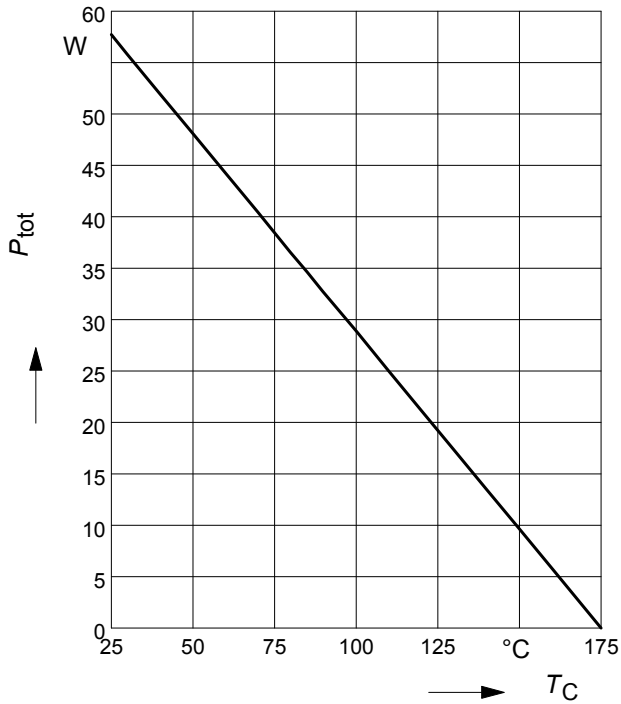
**Electrical Characteristics, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Reverse recovery time $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	$t_{rr}$	-	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**

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

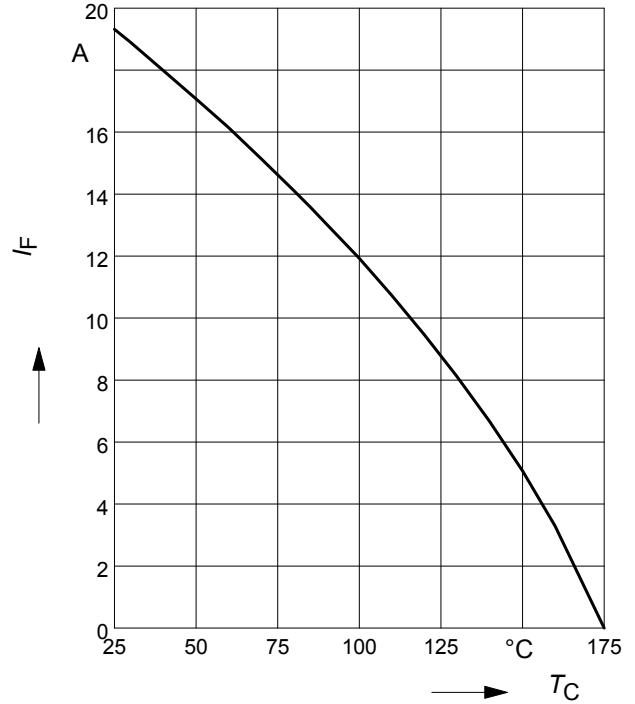
parameter:  $T_j \leq 175^\circ\text{C}$



**2 Diode forward current**

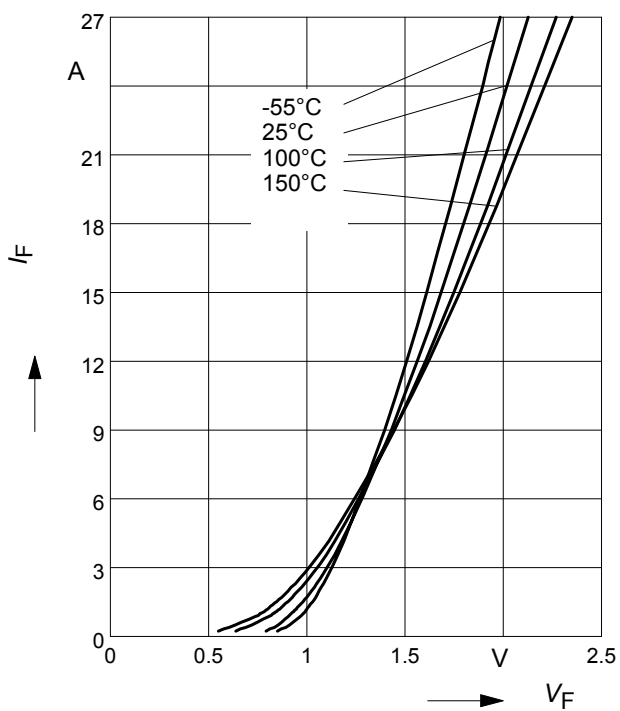
$$I_F = f(T_C)$$

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



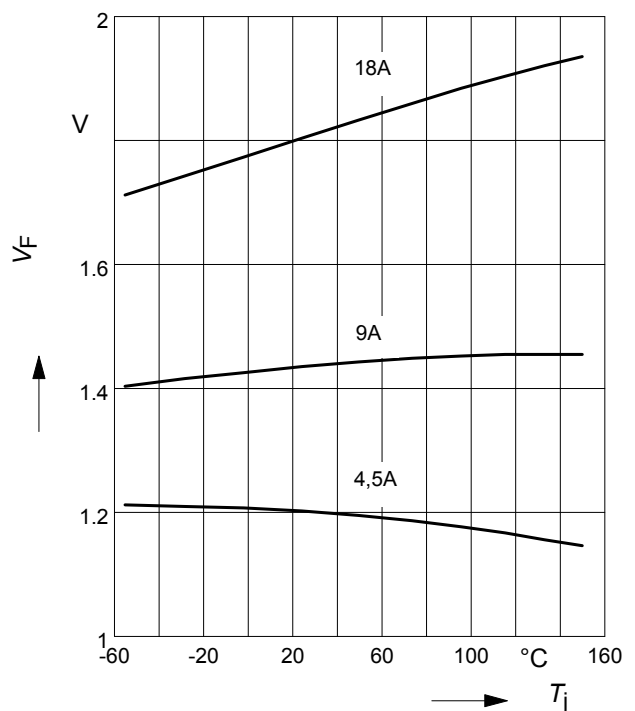
**3 Typ. diode forward current**

$$I_F = f(V_F)$$



**4 Typ. diode forward voltage**

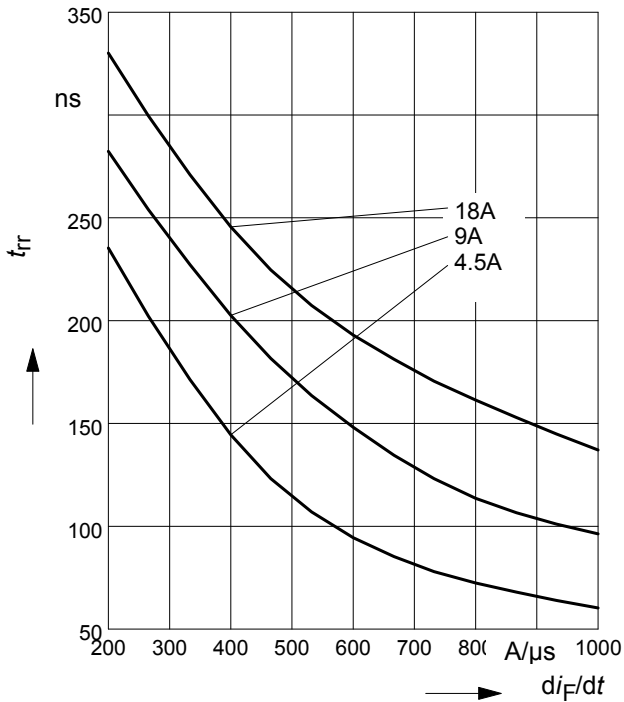
$$V_F = f(T_j)$$



**5 Typ. reverse recovery time**

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

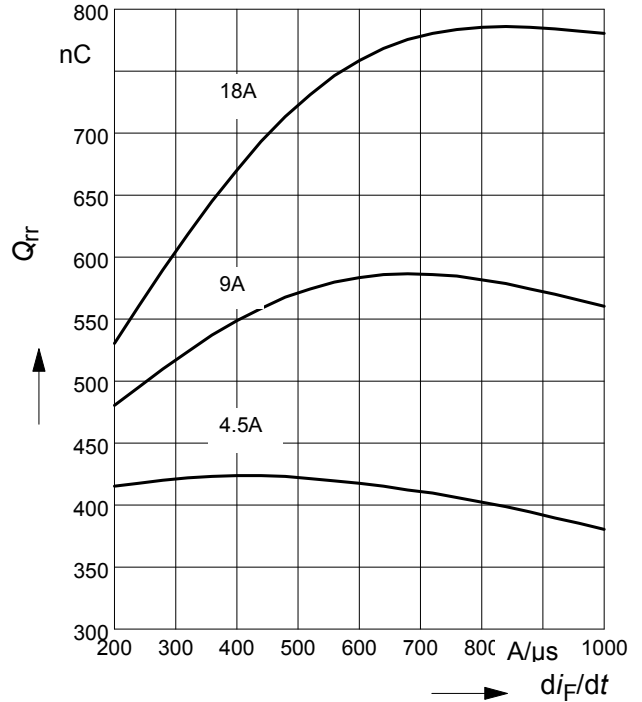
parameter:  $V_R = 400V, T_j = 125^\circ C$



**6 Typ. reverse recovery charge**

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

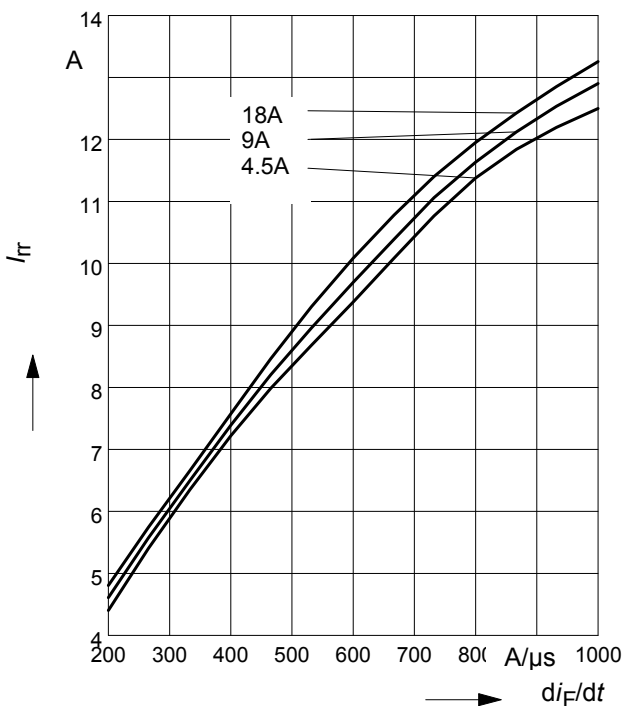
parameter:  $V_R = 400V, T_j = 125^\circ C$



**7 Typ. reverse recovery current**

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

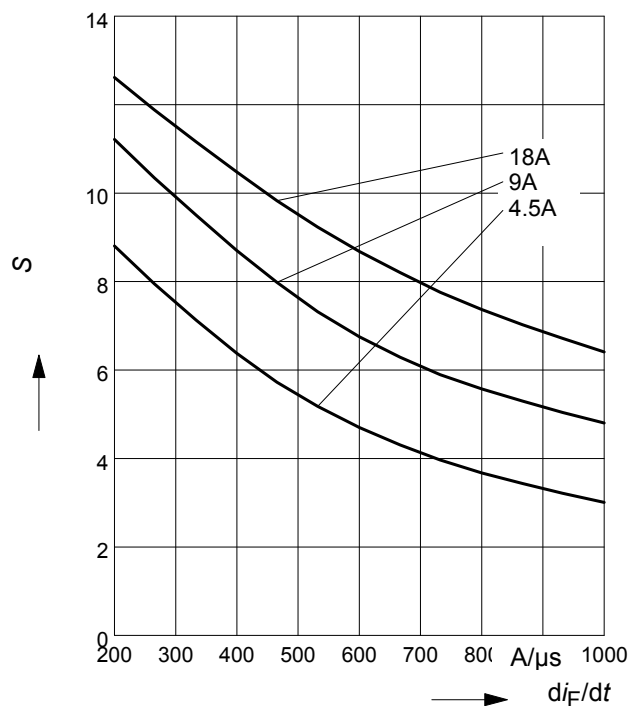
parameter:  $V_R = 400V, T_j = 125^\circ C$



**8 Typ. reverse recovery softness factor**

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

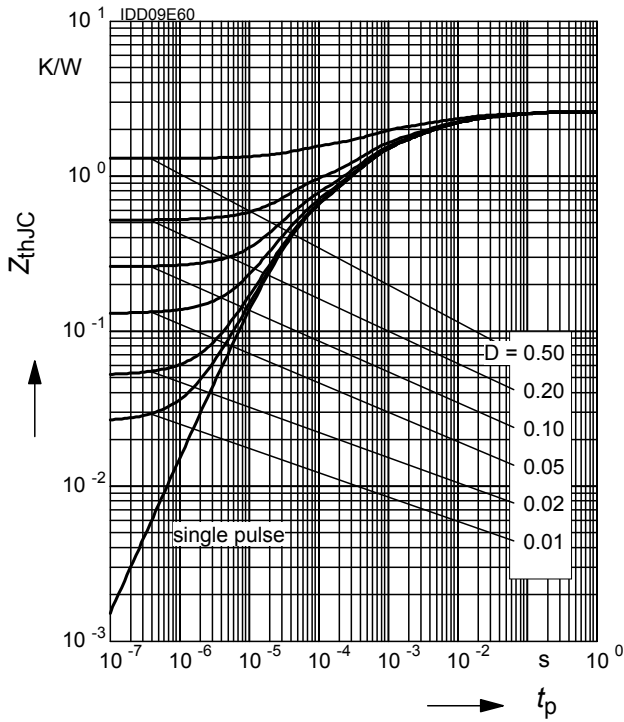
parameter:  $V_R = 400V, T_j = 125^\circ C$



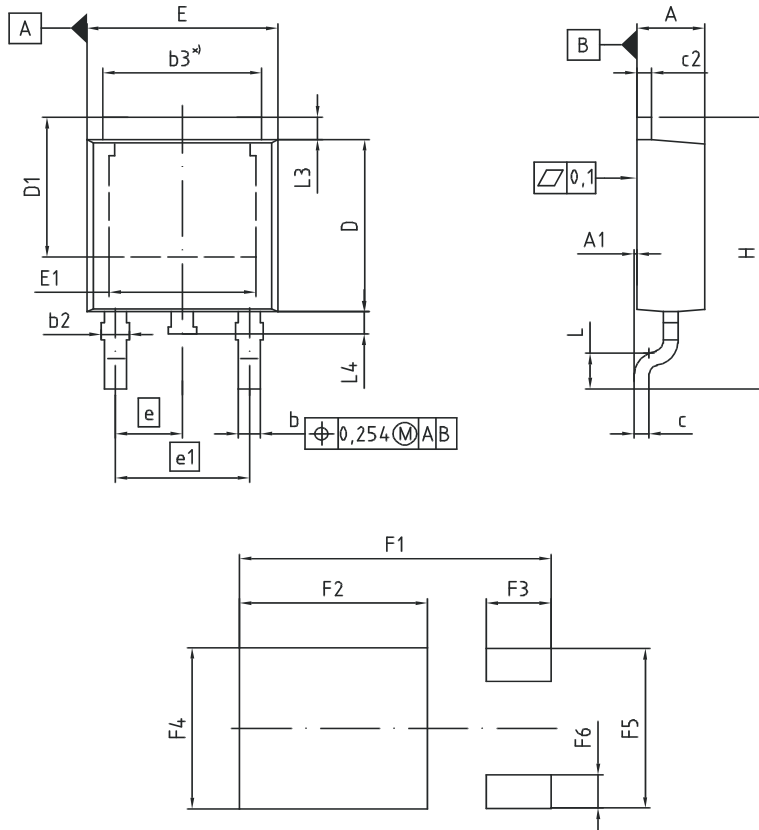
**9 Max. transient thermal impedance**

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

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	

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