

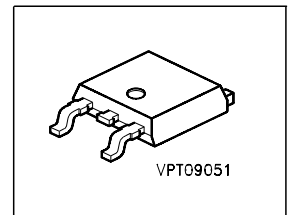
Fast Switching EmCon Diode

Feature

- 600 V EmCon 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	23	A
V_F	1.5	V
T_{jmax}	175	°C



Type	Package	Ordering Code	Marking	Pin 1	PIN 2,4	PIN 3
IDD23E60	PG-TO252-3-1	-	D23E60	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	41.6 27.8	A
Surge non repetitive forward current $T_C=25^\circ\text{C}$, $t_p=10$ ms, sine halfwave	I_{FSM}	89	
Maximum repetitive forward current $T_C=25^\circ\text{C}$, t_p limited by T_{jmax} , $D=0.5$	I_{FRM}	65	
Power dissipation $T_C=25^\circ\text{C}$ $T_C=90^\circ\text{C}$	P_{tot}	115.4 65.4	W
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.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	1.3	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	75	
@ 6 cm ² cooling area ¹⁾		-	-	50	

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, 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	
$V_R=600\text{V}$, $T_j=150^\circ\text{C}$		-	-	1900	
Forward voltage drop	V_F				V
$I_F=23\text{A}$, $T_j=25^\circ\text{C}$		-	1.5	2	
$I_F=23\text{A}$, $T_j=150^\circ\text{C}$		-	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.

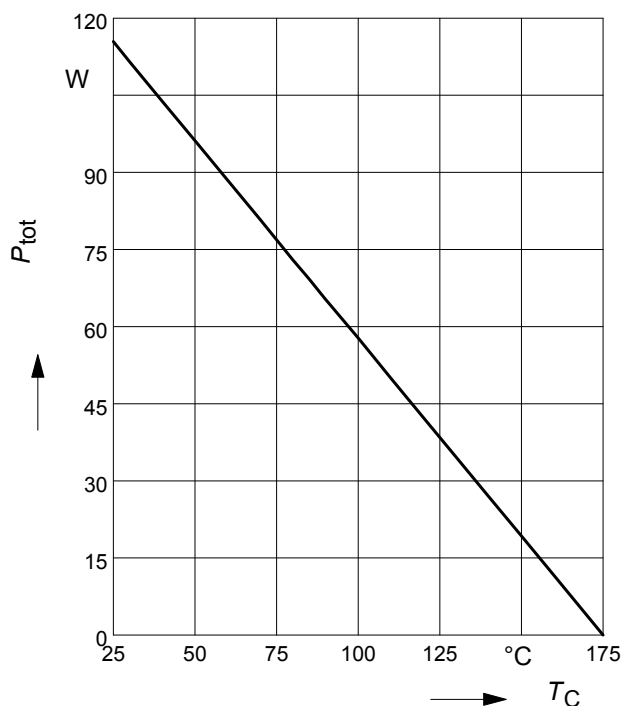
Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Reverse recovery time $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=25^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=125^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=150^{\circ}C$	t_{rr}	- - -	120 164 170	- - -	ns
Peak reverse current $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=25^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=125^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=150^{\circ}C$	I_{rrm}	- - -	17 19.5 21.5	- - -	A
Reverse recovery charge $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=25^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=125^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=150^{\circ}C$	Q_{rr}	- - -	970 1580 1770	- - -	nC
Reverse recovery softness factor $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=25^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=125^{\circ}C$ $V_R=400V$, $I_F=23A$, $di_F/dt=1000A/\mu s$, $T_j=150^{\circ}C$	S	- - -	4.4 4.8 5	- - -	

1 Power dissipation

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

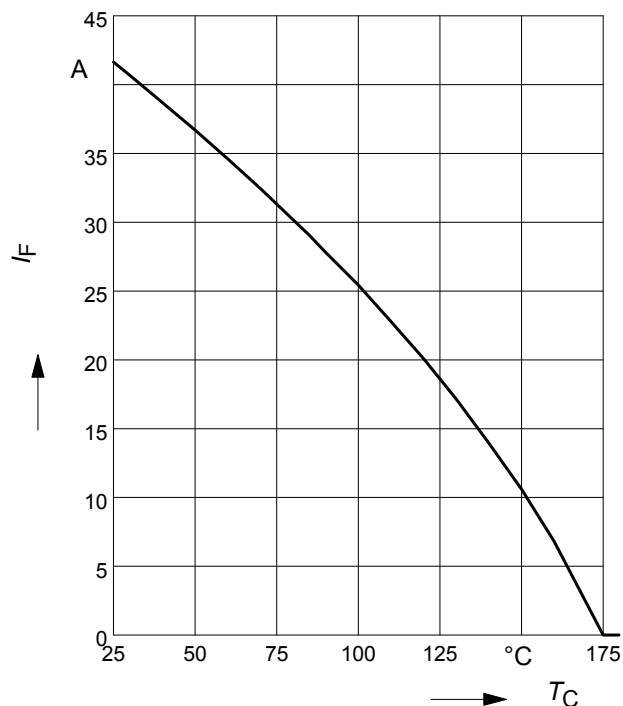
parameter: $T_j \leq 175^\circ\text{C}$



2 Diode forward current

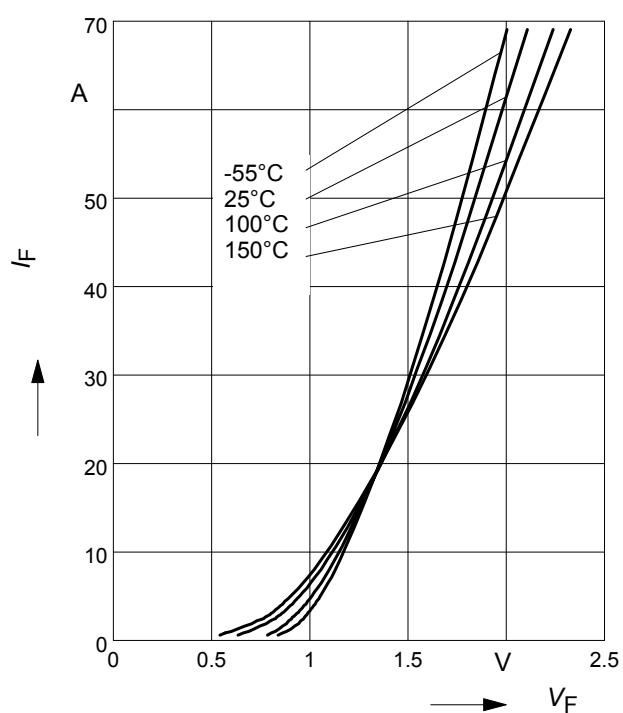
$$I_F = f(T_C)$$

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



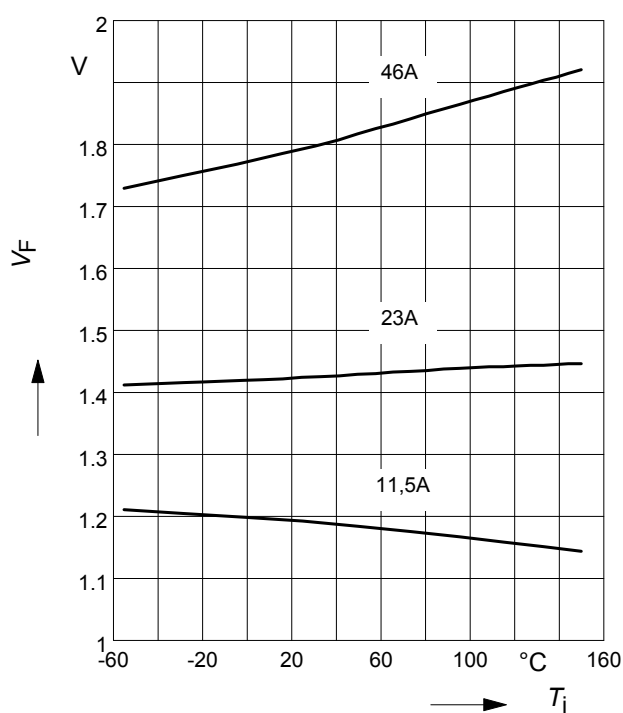
3 Typ. diode forward current

$$I_F = f(V_F)$$



4 Typ. diode forward voltage

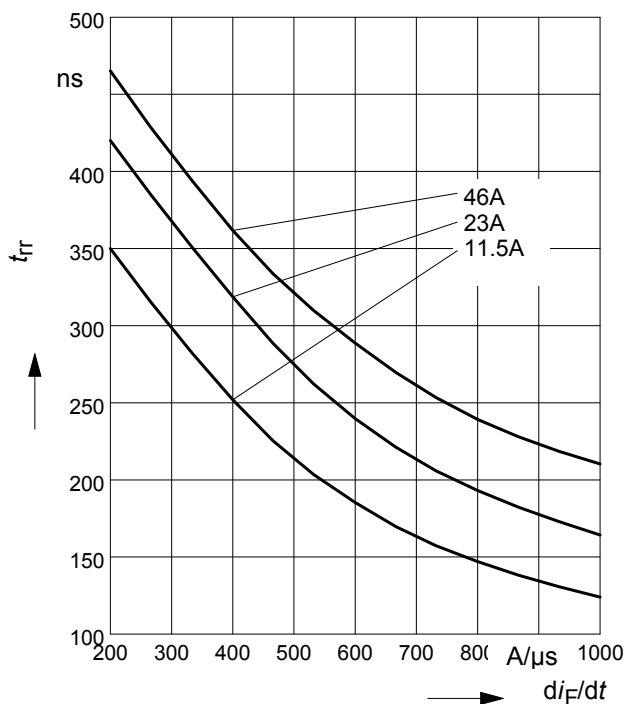
$$V_F = f(T_j)$$



5 Typ. reverse recovery time

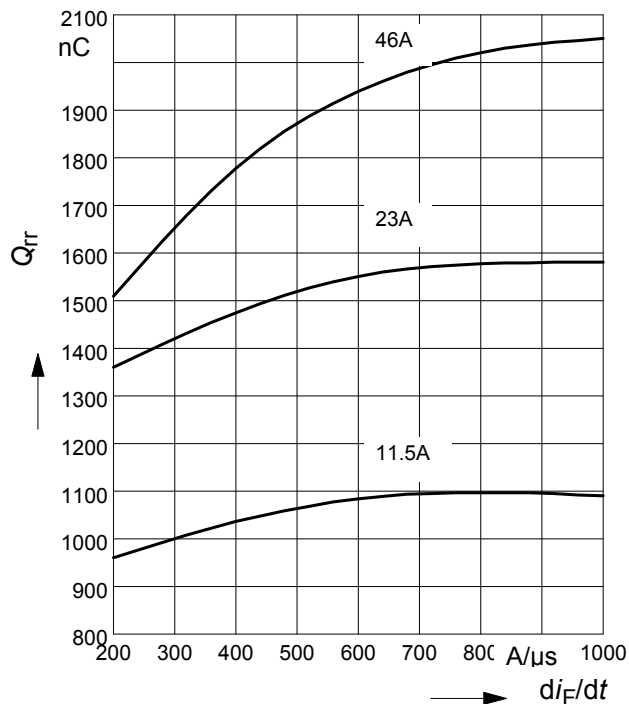
$$t_{rr} = f(dI_F/dt)$$

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


6 Typ. reverse recovery charge

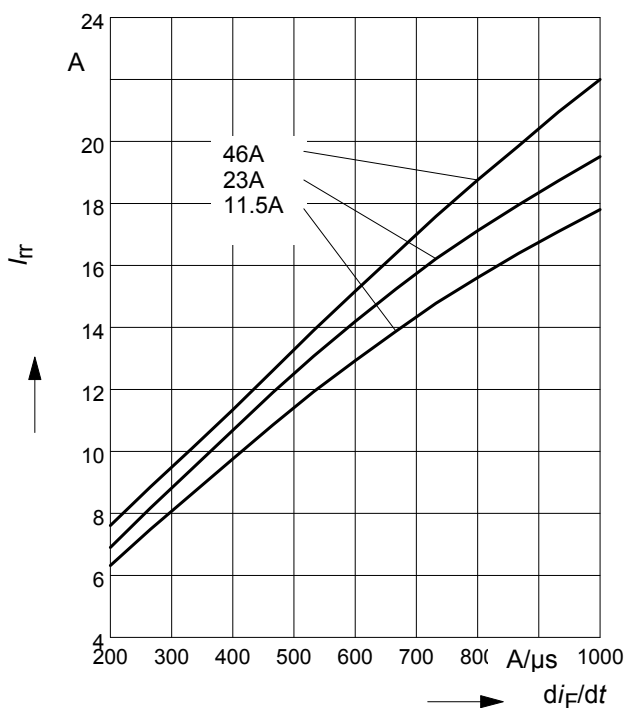
$$Q_{rr} = f(dI_F/dt)$$

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


7 Typ. reverse recovery current

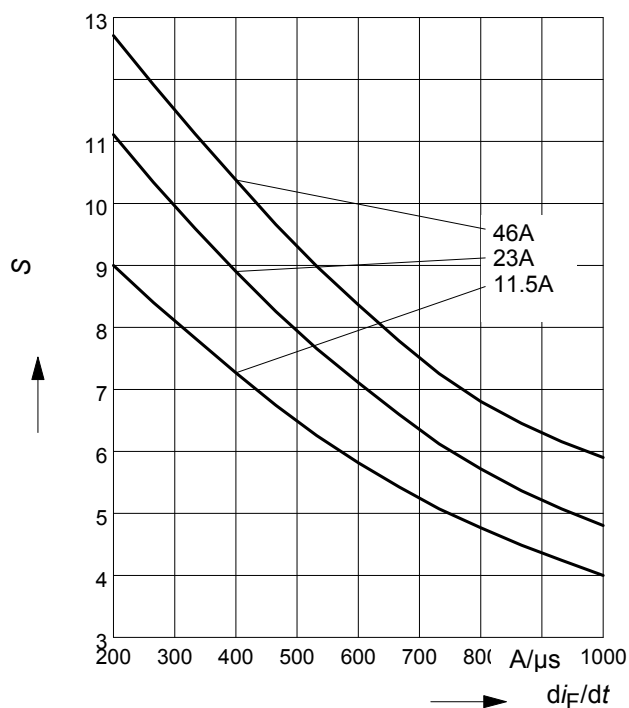
$$I_{rr} = f(dI_F/dt)$$

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


8 Typ. reverse recovery softness factor

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

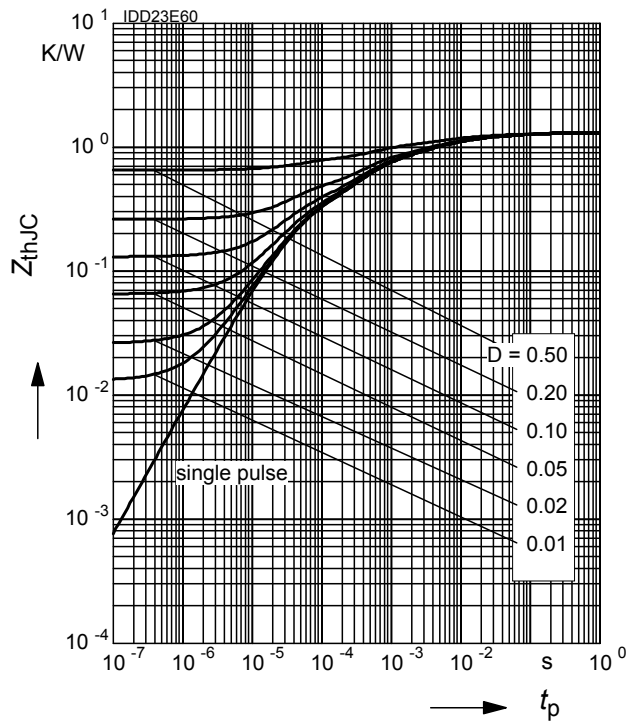
parameter: $V_R = 400V$, $T_j = 125^\circ C$

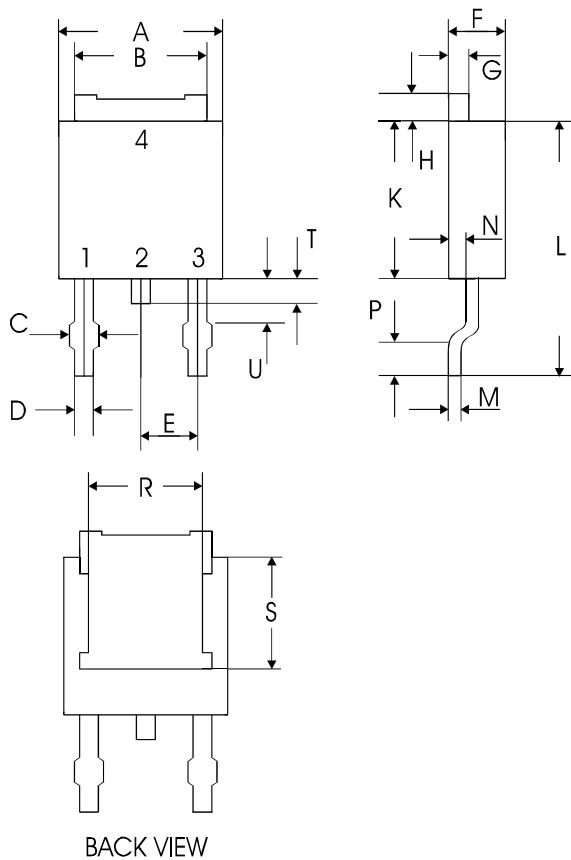


9 Max. transient thermal impedance

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

parameter : $D = t_p/T$




PG-TO252 (D-Pak)

symbol	dimensions			
	[mm]		inch	
	min	max	min	max
A	6.40	6.73	0.2520	0.2650
B	5.25	5.50	0.2067	0.2165
C	(0.65)	(1.15)	(0.0256)	(0.0453)
D	0.63	0.89	0.0248	0.0350
E	2.28		0.2520	
F	2.19	2.39	0.0862	0.0941
G	0.76	0.98	0.0299	0.0386
H	0.90	1.21	0.0354	0.0476
K	5.97	6.23	0.2350	0.2453
L	9.40	10.40	0.3701	0.4094
M	0.46	0.58	0.0181	0.0228
N	0.87	1.15	0.0343	0.0453
P	0.51	-	0.0201	-
R	5.00	-	0.1969	-
S	4.17	-	0.1642	-
T	0.26	1.02	0.0102	0.0402
U	-	-	-	-

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