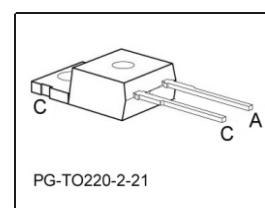


Fast Switching EmCon Diode
Feature

- 1200 V EmCon technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC⁽⁰⁾ for target applications

Product Summary

V_{RRM}	1200	V
I_F	12	A
V_F	1.65	V
T_{jmax}	150	°C



Type	Package	Marking	Pin 1	PIN 2	
IDH12E120	PG-TO220-2-21	D12E120	C	A	-

Maximum Ratings, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	1200	V
Continuous forward current	I_F	12	A
$T_C=25\text{ °C}$		28	
$T_C=90\text{ °C}$		17	
Surge non repetitive forward current	I_{FSM}	63	
$T_C=25\text{ °C}$, $t_p=10\text{ ms}$, sine halfwave			
Maximum repetitive forward current	I_{FRM}	42.5	
$T_C=25\text{ °C}$, t_p limited by T_{jmax} , $D=0.5$			
Power dissipation	P_{tot}		W
$T_C=25\text{ °C}$		96	
$T_C=90\text{ °C}$		46	
Operating and storage temperature	T_j, T_{stg}	-55...+150	°C
Soldering temperature	T_S	260	°C
wavesoldering, 1.6mm (0.063 in.) from case for 10s			

⁰ J-STD20 and JESD22

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	1.3	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Reverse leakage current	I_R				μA
$V_R=1200\text{V}, T_j=25\text{°C}$		-	-	100	
$V_R=1200\text{V}, T_j=150\text{°C}$		-	-	1000	
Forward voltage drop	V_F				V
$I_F=12\text{A}, T_j=25\text{°C}$		-	1.65	2.15	
$I_F=12\text{A}, T_j=150\text{°C}$		-	1.7	-	

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.

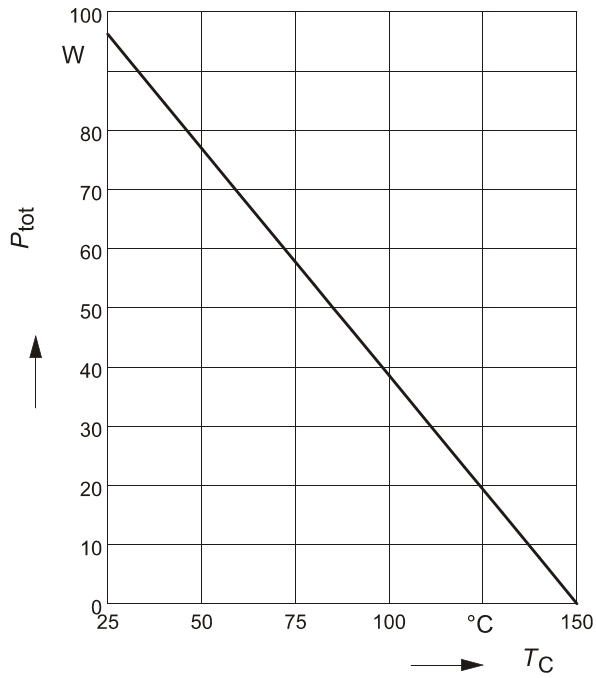
Electrical Characteristics, at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Reverse recovery time	t_{rr}				ns
$V_R=800\text{V}$, $I_F=12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	150	-	
$V_R=800\text{V}$, $I_F=12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	215	-	
$V_R=800\text{V}$, $I_F=12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	225	-	
Peak reverse current	I_{rrm}				A
$V_R=800\text{V}$, $I_F = 12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	17	-	
$V_R=800\text{V}$, $I_F = 12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	20.9	-	
$V_R=800\text{V}$, $I_F = 12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	21.5	-	
Reverse recovery charge	Q_{rr}				nC
$V_R=800\text{V}$, $I_F=12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	1200	-	
$V_R=800\text{V}$, $I_F = 12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	1840	-	
$V_R=800\text{V}$, $I_F = 12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	2025	-	
Reverse recovery softness factor	S				
$V_R=800\text{V}$, $I_F=12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	5	-	
$V_R=800\text{V}$, $I_F=12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	5.8	-	
$V_R=800\text{V}$, $I_F=12\text{A}$, $di_F/dt=800\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	5.9	-	

1 Power dissipation

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

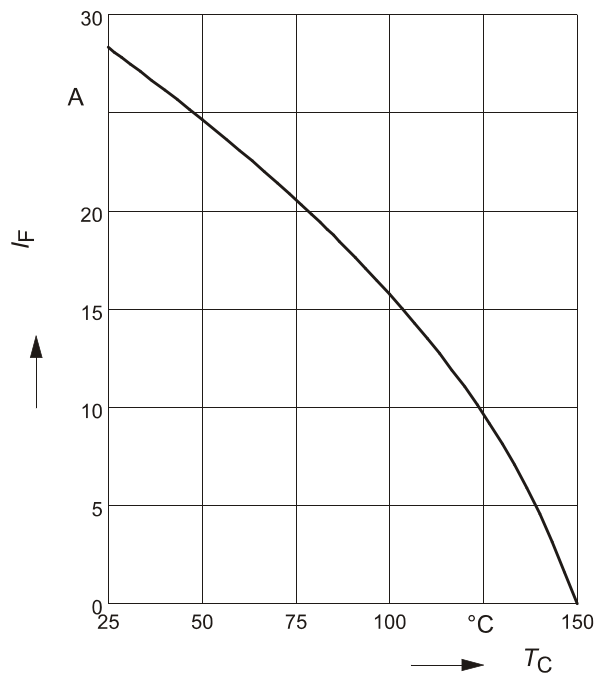
parameter: $T_j \leq 150^\circ\text{C}$



2 Diode forward current

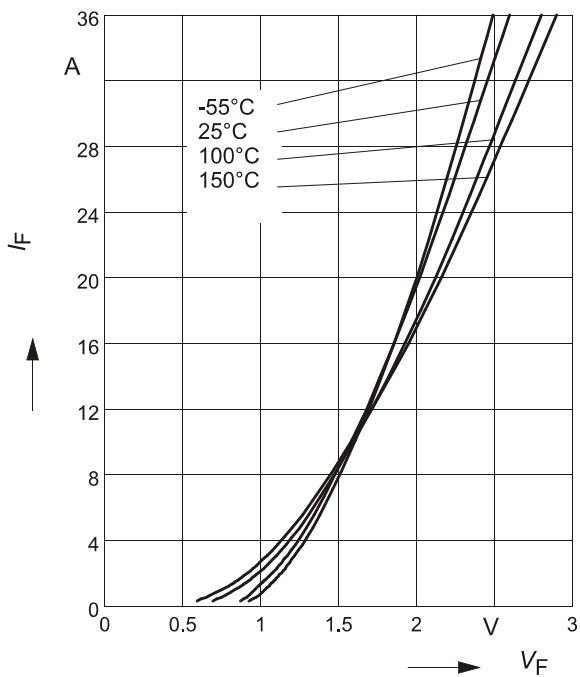
$$I_F = f(T_C)$$

parameter: $T_j \leq 150^\circ\text{C}$



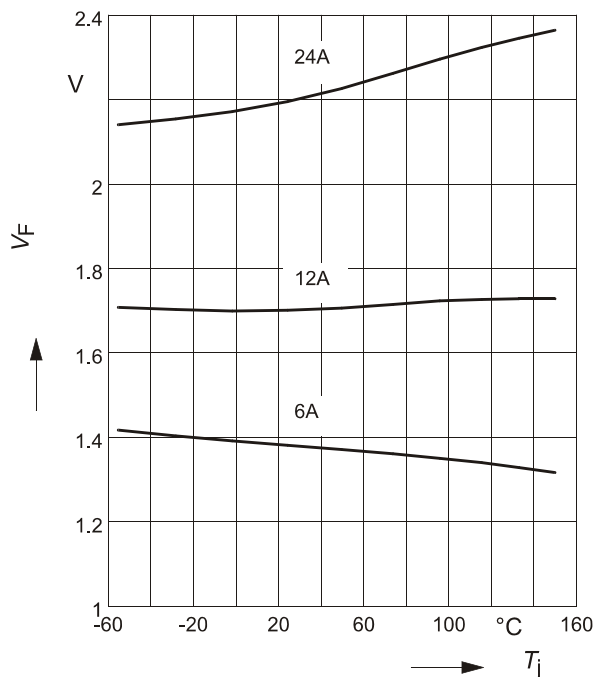
3 Typ. diode forward current

$$I_F = f(V_F)$$



4 Typ. diode forward voltage

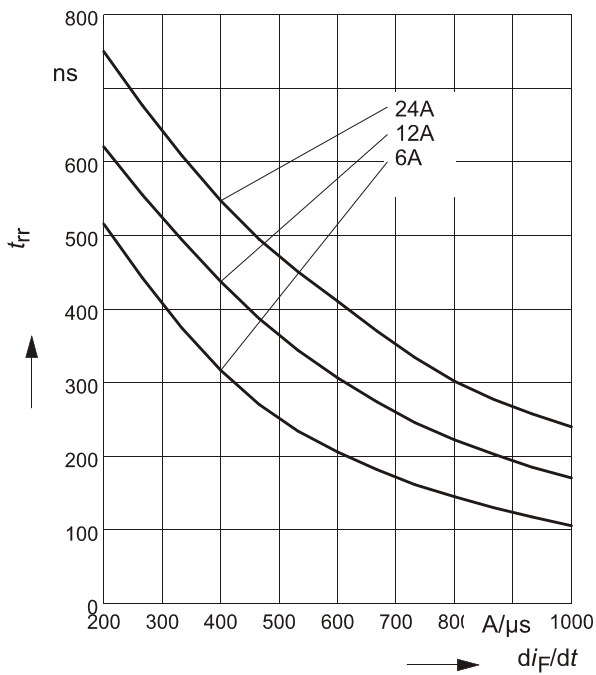
$$V_F = f(T_j)$$



5 Typ. reverse recovery time

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

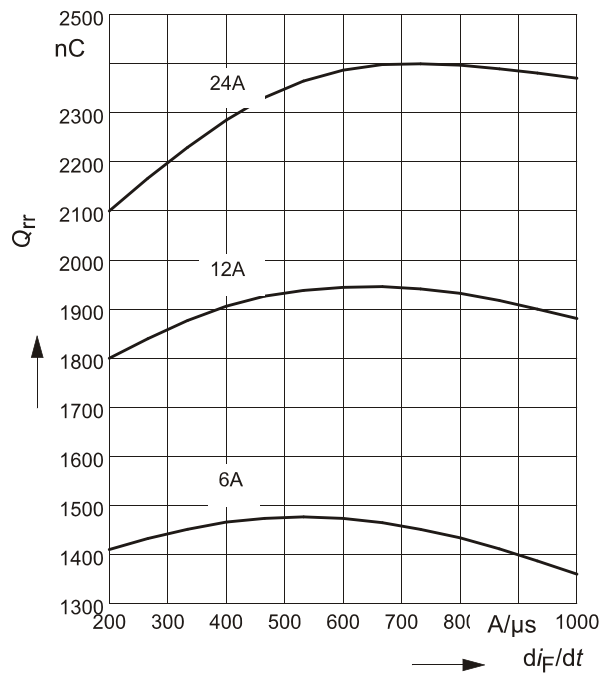
parameter: $V_R = 800V, T_j = 125^\circ C$



6 Typ. reverse recovery charge

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

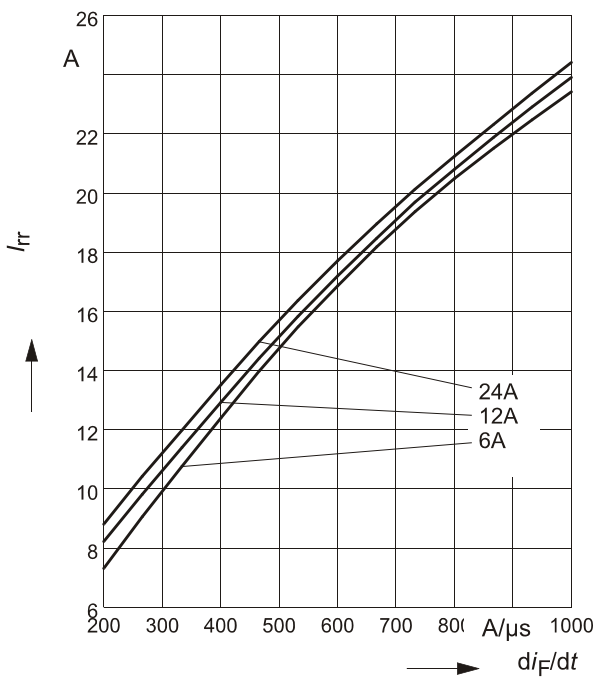
parameter: $V_R = 800V, T_j = 125^\circ C$



7 Typ. reverse recovery current

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

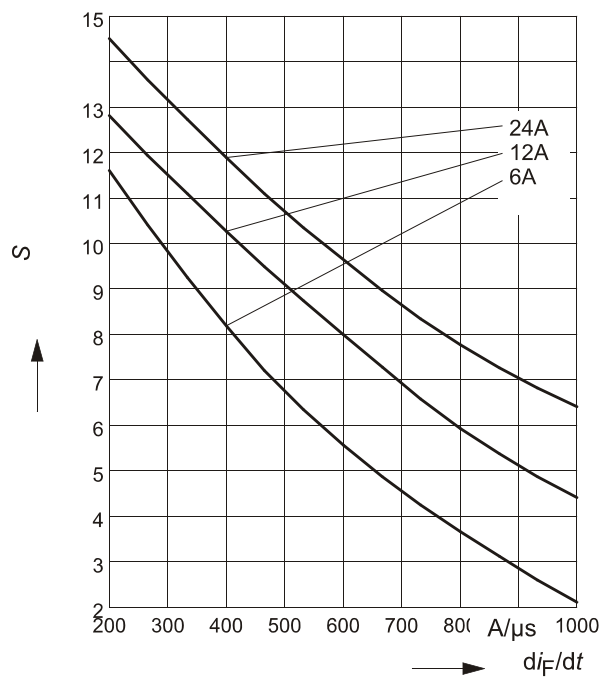
parameter: $V_R = 800V, T_j = 125^\circ C$



8 Typ. reverse recovery softness factor

$S = f(di_F/dt)$

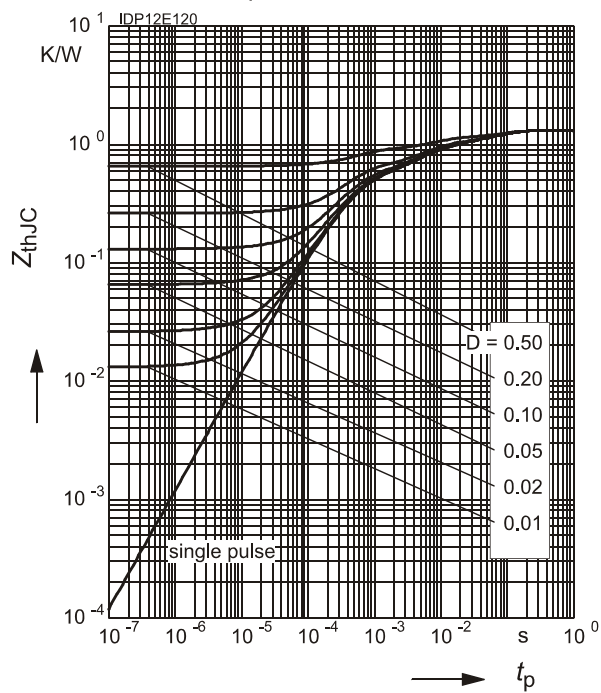
parameter: $V_R = 800V, T_j = 125^\circ C$



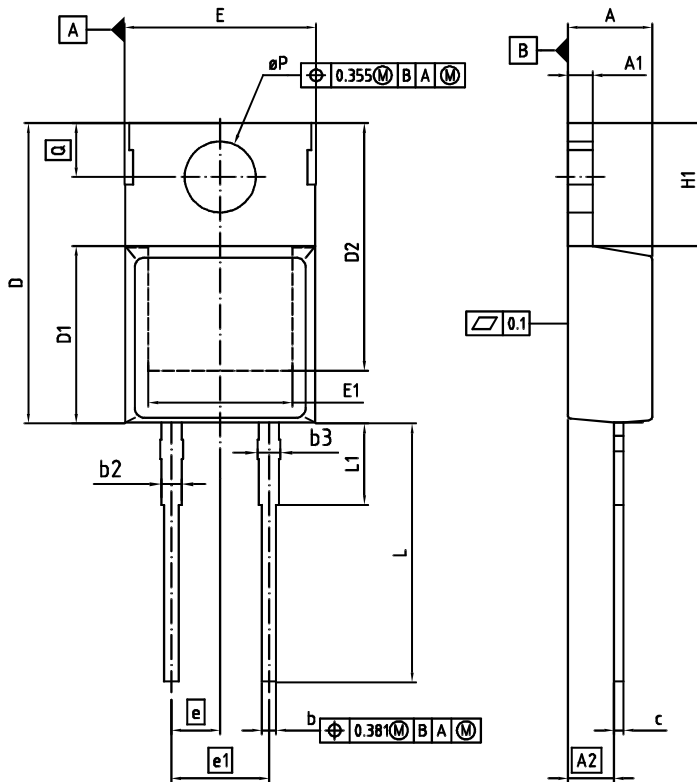
9 Max. transient thermal impedance

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

parameter : $D = t_p/T$



PG-TO220-2-21



symbol	dimensions			
	[mm]		[inch]	
	min	max	min	max
A	4.191	4.699	0.165	0.185
A1	1.219	1.321	0.048	0.052
A2	2.387	2.489	0.094	0.098
b	0.635	0.889	0.025	0.035
b2	1.143	1.397	0.045	0.055
b3	1.143	1.651	0.045	0.065
c	0.331	0.635	0.013	0.025
D	15.113	15.621	0.595	0.615
D1	9.017	9.271	0.355	0.365
D2	13.737	14.245	0.541	0.561
E	9.677	9.931	0.381	0.391
E1	8.28	8.788	0.324	0.346
e	2.54		0.1	
e1	5.029	5.131	0.198	0.202
H1	6.096	6.35	0.24	0.25
L	12.802	13.31	0.504	0.524
L1	3.048	3.302	0.12	0.13
P	3.632	3.734	0.143	0.147
Q	2.54	3.048	0.1	0.12

Published by
Infineon Technologies AG
Am Campeon 1-12,
D-85579 Neubiberg
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