

Fast Switching Diode

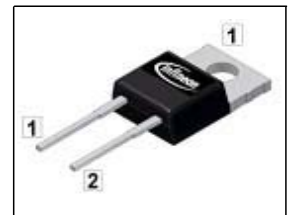
Features

- 1200 V diode technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21
- Qualified according to JEDEC for target applications

Product Summary

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

PG-TO220-2



Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDP12E120	PG-TO220-2	-	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}	96	W
$T_C=25\text{ °C}$		46	
$T_C=90\text{ °C}$			
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			

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	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	62	
@ 6 cm ² cooling area ¹⁾		-	35	-	

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
$V_R=1200\text{V}$, $T_j=25^\circ\text{C}$		-	-	100	
$V_R=1200\text{V}$, $T_j=150^\circ\text{C}$		-	-	1000	
Forward voltage drop	V_F				V
$I_F=12\text{A}$, $T_j=25^\circ\text{C}$		-	1.65	2.15	
$I_F=12\text{A}$, $T_j=150^\circ\text{C}$		-	1.7	-	

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.

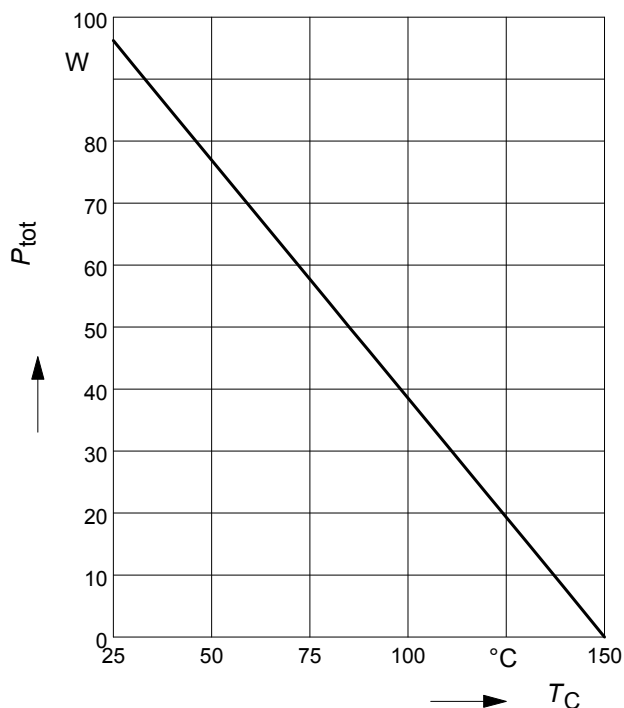
Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

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

1 Power dissipation

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

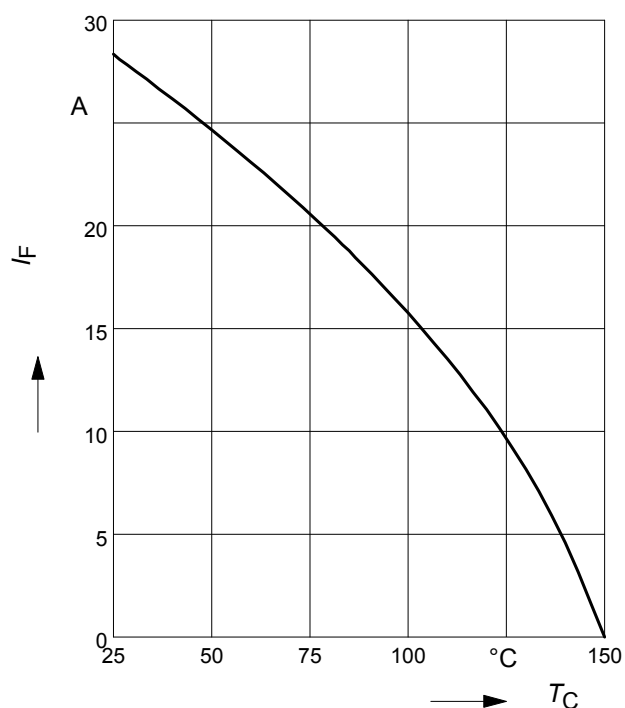
parameter: $T_j \leq 150^\circ\text{C}$



2 Diode forward current

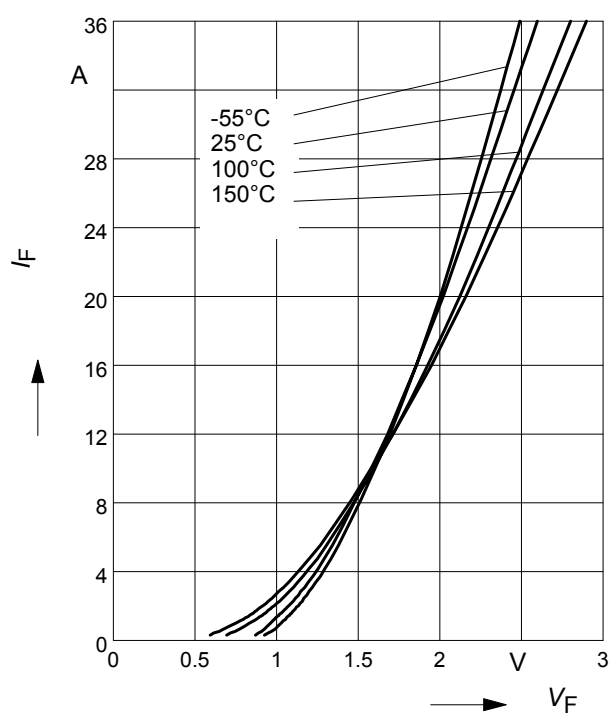
$$I_F = f(T_C)$$

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



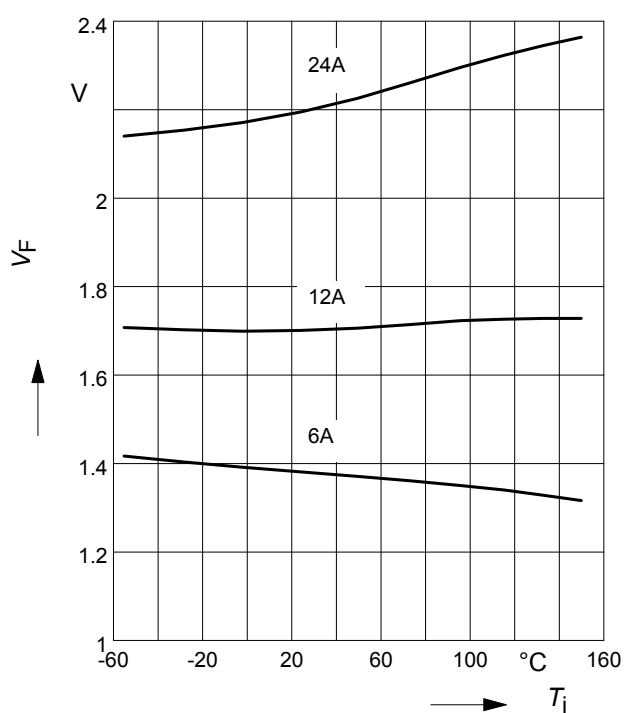
3 Typ. diode forward current

$$I_F = f(V_F)$$



4 Typ. diode forward voltage

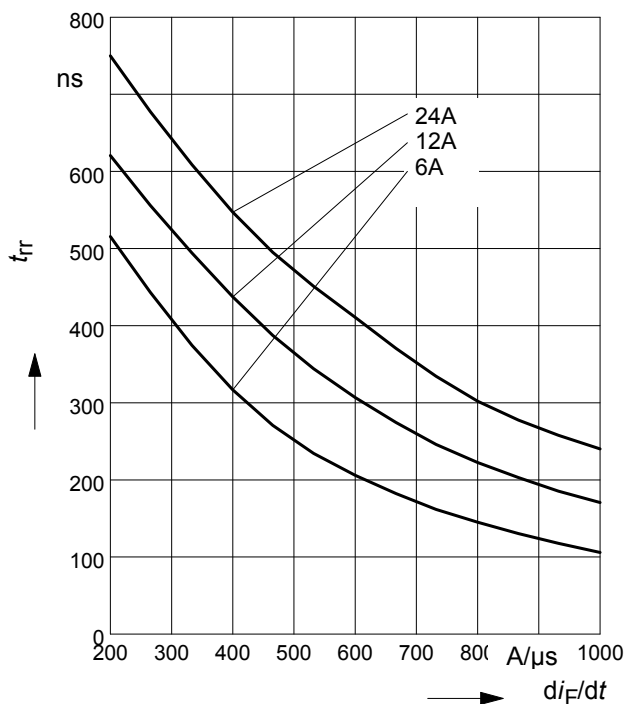
$$V_F = f(T_j)$$



5 Typ. reverse recovery time

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

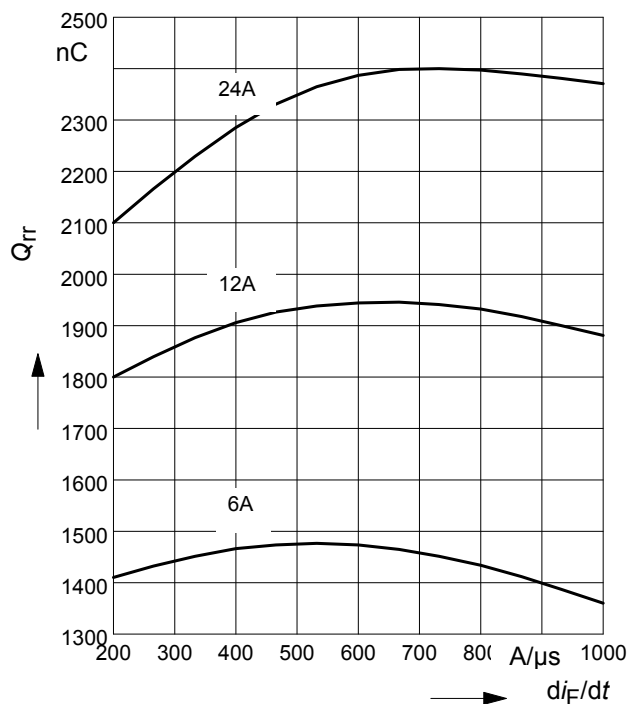
parameter: $V_R = 800V$, $T_j = 125^\circ C$



6 Typ. reverse recovery charge

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

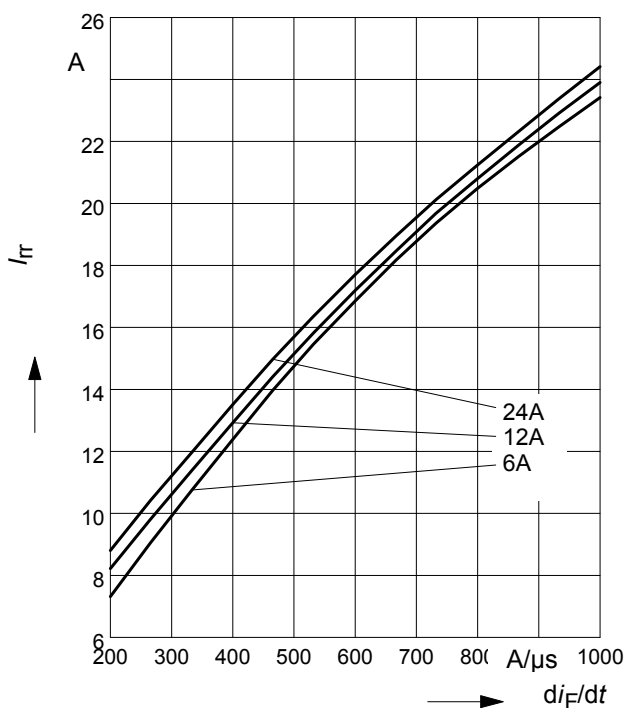
parameter: $V_R = 800V$, $T_j = 125^\circ C$



7 Typ. reverse recovery current

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

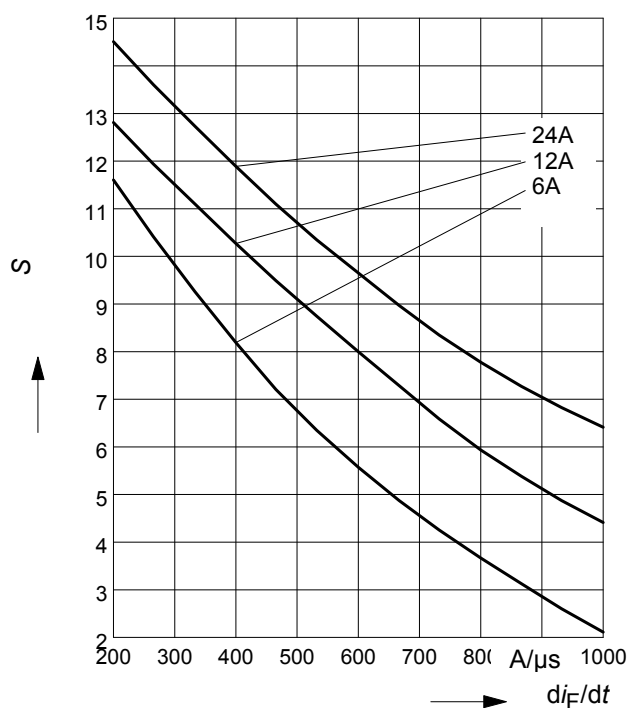
parameter: $V_R = 800V$, $T_j = 125^\circ C$



8 Typ. reverse recovery softness factor

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

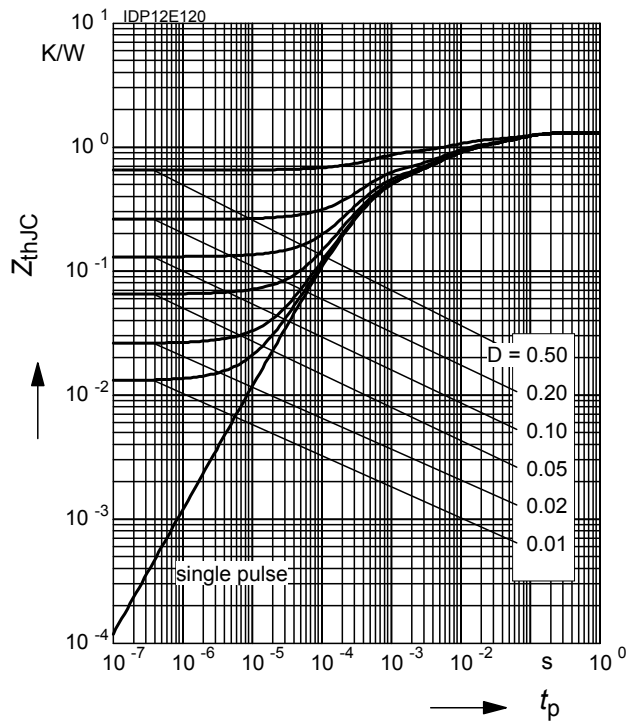
parameter: $V_R = 800V$, $T_j = 125^\circ C$



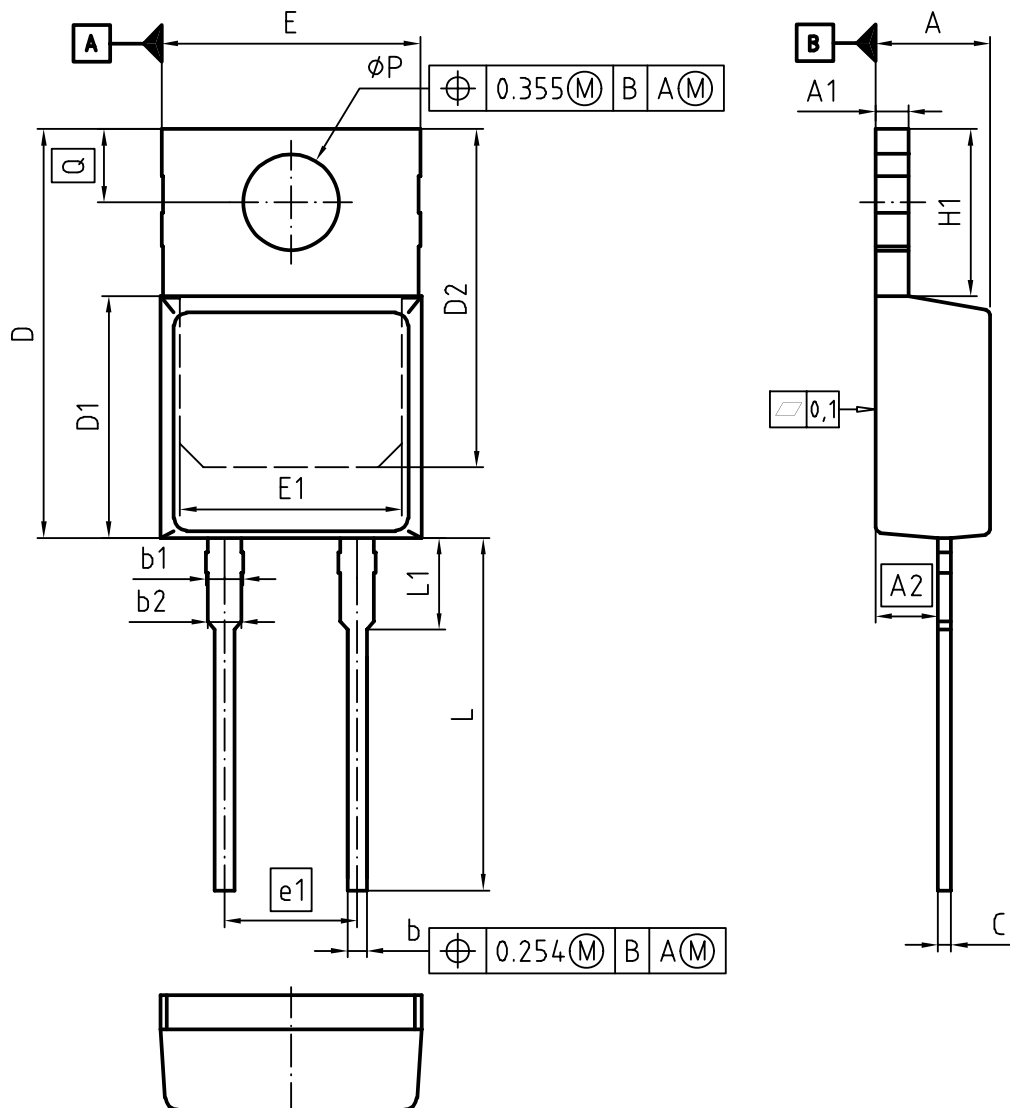
9 Max. transient thermal impedance

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

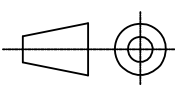
parameter : $D = t_p/T$



TO-220-2



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.50	0.169	0.177
A1	1.17	1.37	0.046	0.054
A2	2.30	2.50	0.091	0.098
b	0.65	0.85	0.026	0.033
b1	1.19	1.69	0.047	0.066
b2	1.19	1.39	0.047	0.055
c	0.40	0.60	0.016	0.024
D	15.35	15.95	0.604	0.628
D1	9.05	9.45	0.356	0.372
D2	12.30	13.05	0.484	0.514
E	9.80	10.20	0.386	0.402
E1	7.25	8.60	0.285	0.339
e1	5.08		0.200	
N	2		2	
H1	5.90	6.90	0.232	0.272
L	13.00	14.00	0.512	0.551
L1	3.30	3.70	0.130	0.146
φP	3.55	3.70	0.140	0.146
Q	2.60	3.00	0.102	0.118

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