Fast Switching EmCon Diode

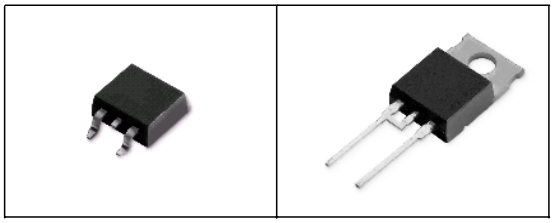
Feature

- 600 V EmCon technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- 175°C operating temperature
- Easy paralleling

Product Summary

V_{RRM}	600	V
I_F	45	A
V_F	1.5	V
T_{jmax}	175	°C

P-TO220-3.SMD P-TO220-2-2.



Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDP45E60	P-TO220-2-2.	Q67040-S4469	D45E60	C	A	-
IDB45E60	P-TO220-3.SMD	Q67040-S4375	D45E60	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
Continous forward current	I_F		A
T_C=25°C		71	
T_C=90°C		47	
Surge non repetitive forward current T_C=25°C, t_p=10 ms, sine halfwave	I_{FSM}	162	
Maximum repetitive forward current T_C=25°C, t_p limited by T_{jmax}, D=0.5	I_{FRM}	111.5	
Power dissipation	P_{tot}		W
T_C=25°C		187	
T_C=90°C		106	
Operating and storage temperature	T_j , T_{stg}	-55...+175	°C
Soldering temperature 1.6mm(0.063 in.) from case for 10s	T_S	255	°C

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	0.8	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 °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		-	-	3000	
Forward voltage drop	V_F				V
I_F=45A, T_j=25°C		-	1.5	2	
I_F=45A, T_j=150°C		-	1.5	-	

[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.

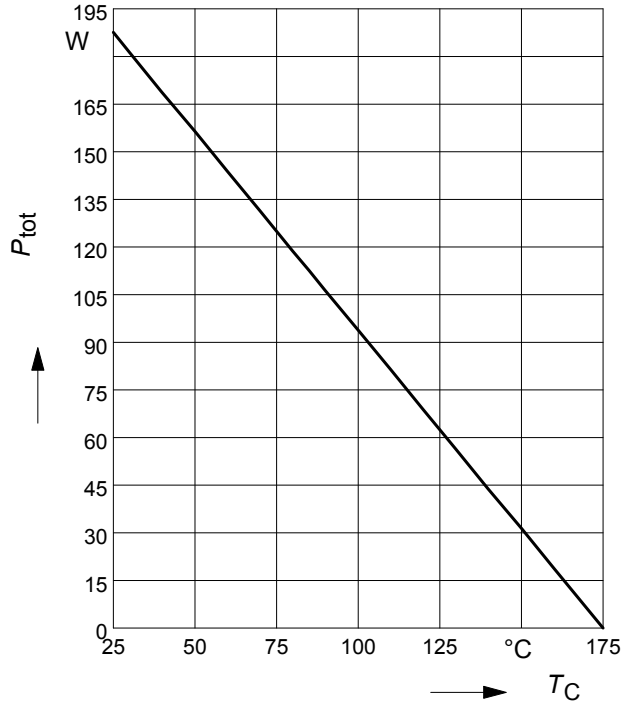
Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Reverse recovery time	t_{rr}				ns
V_R=400V, I_F=45A, di_F/dt=1000A/µs, T_j=25°C		-	140	-	
V_R=400V, I_F=45A, di_F/dt=1000A/µs, T_j=125°C		-	185	-	
V_R=400V, I_F=45A, di_F/dt=1000A/µs, T_j=150°C		-	195	-	
Peak reverse current	I_{rrm}				A
V_R=400V, I_F = 45A, di_F/dt=1000A/µs, T_j=25°C		-	23	-	
V_R=400V, I_F =45A, di_F/dt=1000A/µs, T_j=125°C		-	28.1	-	
V_R=400V, I_F =45A, di_F/dt=1000A/µs, T_j=150°C		-	29	-	
Reverse recovery charge	Q_{rr}				nC
V_R=400V, I_F=45A, di_F/dt=1000A/µs, T_j=25°C		-	1400	-	
V_R=400V, I_F =45A, di_F/dt=1000A/µs, T_j=125°C		-	2650	-	
V_R=400V, I_F =45A, di_F/dt=1000A/µs, T_j=150°C		-	2900	-	
Reverse recovery softness factor	S				
V_R=400V, I_F=45A, di_F/dt=1000A/µs, T_j=25°C		-	3.1	-	
V_R=400V, I_F=45A, di_F/dt=1000A/µs, T_j=125°C		-	4.2	-	
V_R=400V, I_F=45A, di_F/dt=1000A/µs, T_j=150°C		-	4.4	-	

1 Power dissipation

$P_{tot} = f(T_C)$

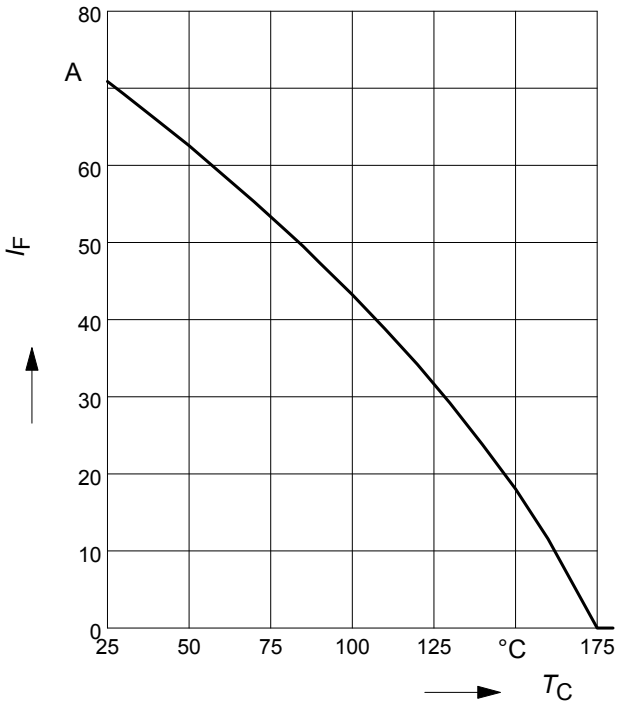
parameter: $T_j \leq 175$ °C



2 Diode forward current

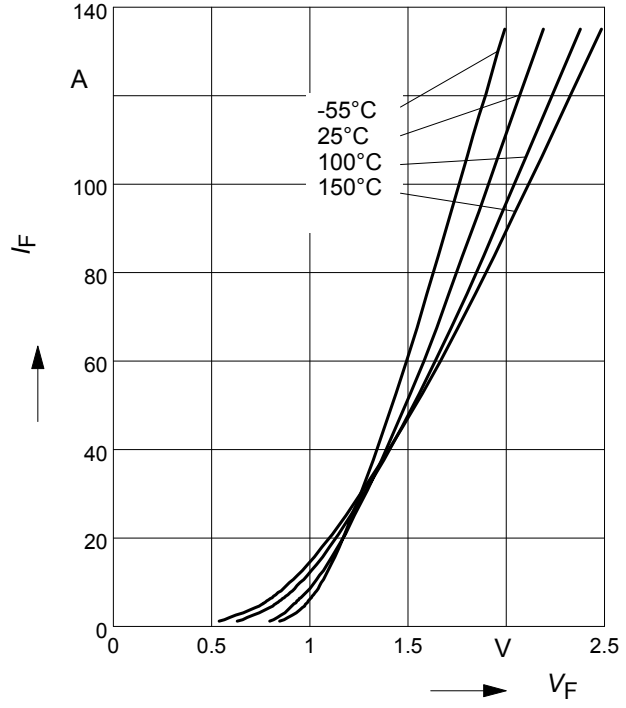
$I_F = f(T_C)$

parameter: $T_j \leq 175$°C



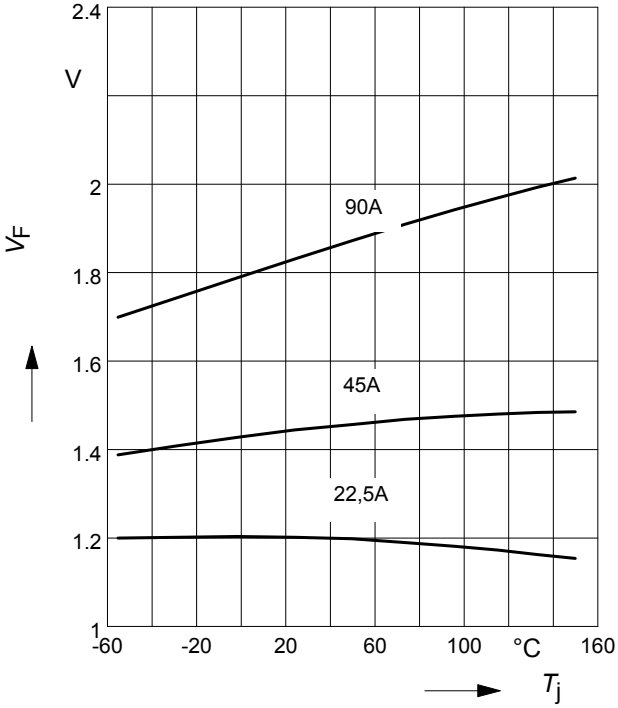
3 Typ. diode forward current

$I_F = f(V_F)$



4 Typ. diode forward voltage

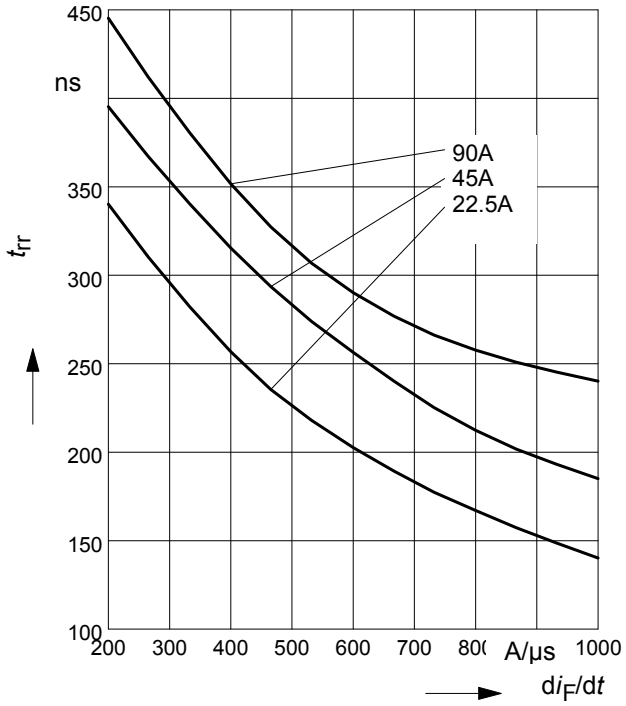
$V_F = f(T_j)$



5 Typ. reverse recovery time

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

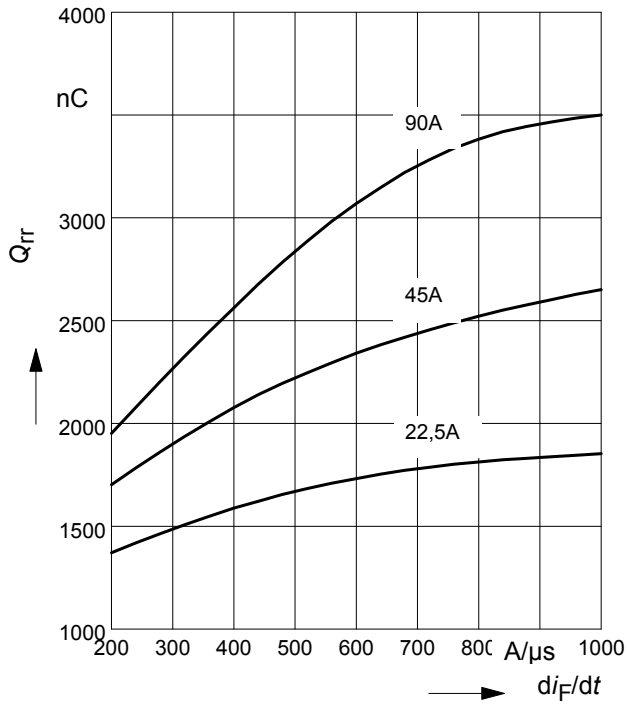
parameter: V_R = 400V, T_j = 125°C



6 Typ. reverse recovery charge

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

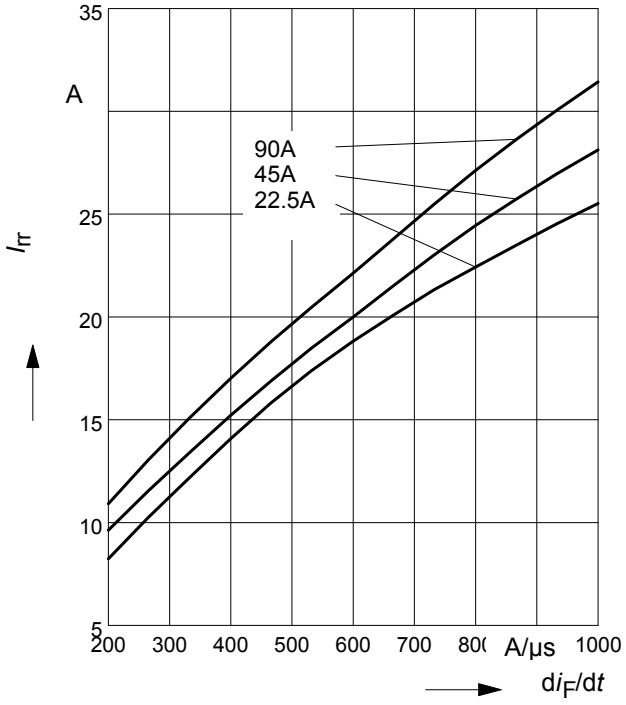
parameter: V_R = 400V, T_j = 125 °C



7 Typ. reverse recovery current

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

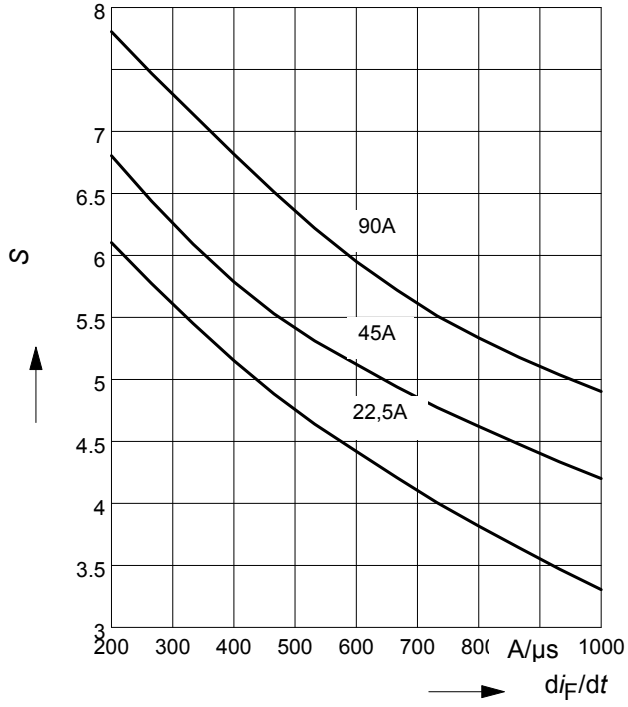
parameter: V_R = 400V, T_j = 125°C



8 Typ. reverse recovery softness factor

S = f(di_F/dt)

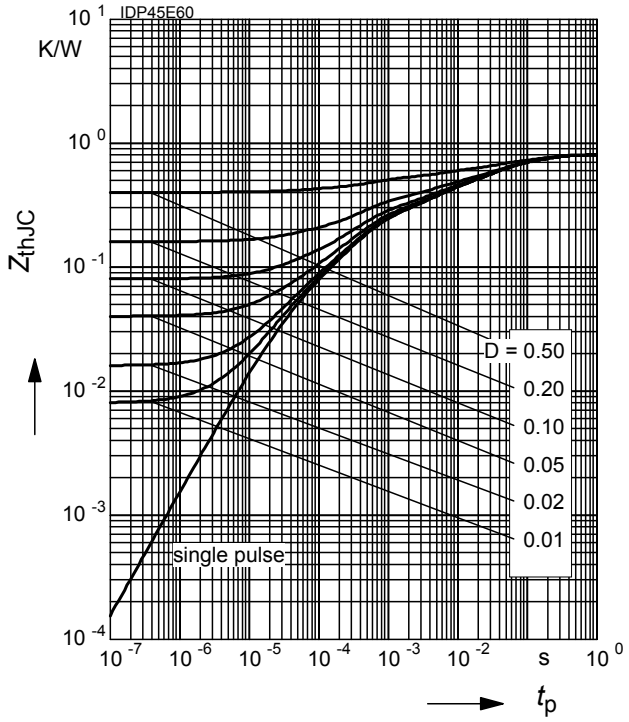
parameter: V_R = 400V, T_j = 125°C



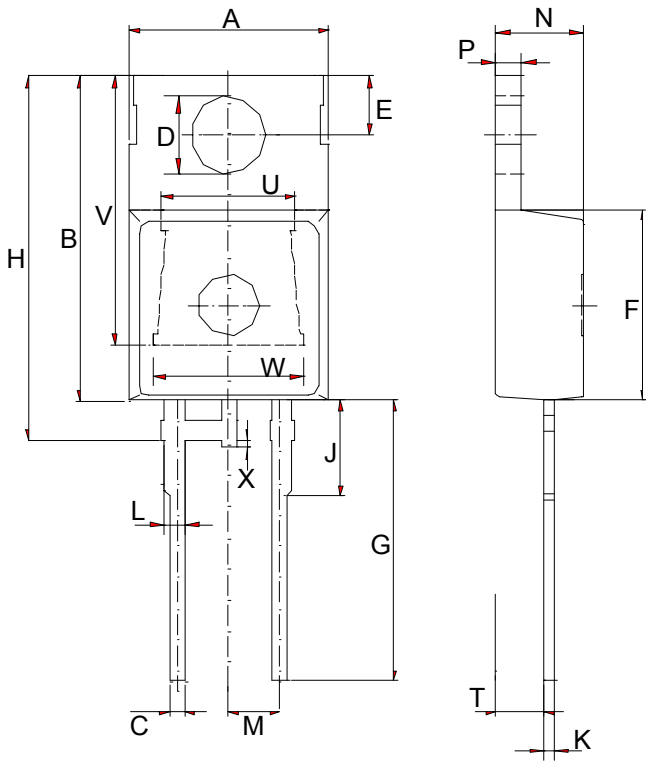
9 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

parameter : $D = t_p/T$

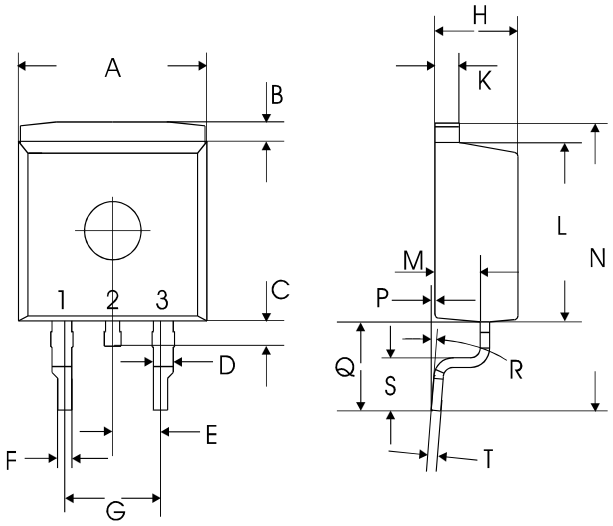


TO-220-2-2

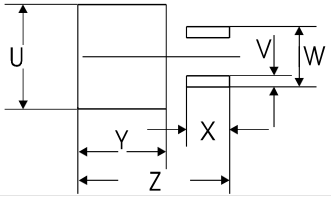


	dimensions			
symbol	[mm]		[inch]	
	min	max	min	max
A	9.70	10.10	0.3819	0.3976
B	15.30	15.90	0.6024	0.6260
C	0.65	0.85	0.0256	0.0335
D	3.55	3.85	0.1398	0.1516
E	2.60	3.00	0.1024	0.1181
F	9.00	9.40	0.3543	0.3701
G	13.00	14.00	0.5118	0.5512
H	17.20	17.80	0.6772	0.7008
J	4.40	4.80	0.1732	0.1890
K	0.40	0.60	0.0157	0.0236
L	1.05 typ.		0.41 typ.	
M	2.54 typ.		0.1 typ.	
N	4.4 typ.		0.173 typ.	
P	1.10	1.40	0.0433	0.0551
T	2.4 typ.		0.095 typ.	
U	6.6 typ.		0.26 typ.	
V	13.0 typ.		0.51 typ.	
W	7.5 typ.		0.295 typ.	
X	0.00	0.40	0.0000	0.0157

TO-220-3-45 (P-TO220SMD)



Footprint
(dif. scale)



symbol	dimensions			
	[mm]		[inch]	
	min	max	min	max
A	9.80	10.00	0.3858	0.3937
B	1.3 typ.		0.0512 typ.	
C	1.25	1.75	0.0492	0.0689
D	0.95	1.15	0.0374	0.0453
E	2.54 typ.		0.1 typ.	
F	0.72	0.85	0.0283	0.0335
G	5.08 typ.		0.2 typ.	
H	4.30	4.50	0.1693	0.1772
K	1.28	1.40	0.0504	0.0551
L	9.00	9.40	0.3543	0.3701
M	2.30	2.50	0.0906	0.0984
N	14.1 typ.		0.5551 typ.	
P	0.00	0.20	0.0000	0.0079
Q	3.30	3.90	0.1299	0.1535
R	8° max		8° max	
S	1.70	2.50	0.0669	0.0984
T	0.50	0.65	0.0197	0.0256
U	10.8 typ.		0.4252 typ.	
V	1.35 typ.		0.0532 typ.	
W	6.43 typ.		0.2532 typ.	
X	4.60 typ.		0.1811 typ.	
Y	9.40 typ.		0.3701 typ.	
Z	16.15 typ.		0.6358 typ.	

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