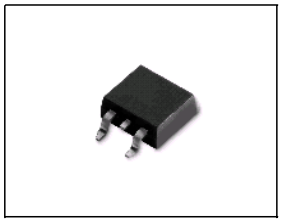
Fast Switching EmCon Diode

Product Summary

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



Feature

- 600 V EmCon technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- 175°C operating temperature
- Easy paralleling
- Qualified according to JEDEC[0)] for target applications

Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDB45E60	PG-TO263-3	-	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
Continuous forward current T_C = 25°C T_C = 90°C	I_F	 71 47	A
Surge non repetitive forward current T_C = 25°C, t_p = 10 ms, sine halfwave	I_{FSM}	162	A
Maximum repetitive forward current T_C = 25°C, t_p limited by $t_{j,max}$, D = 0.5	I_{FRM}	111.5	A
Power dissipation T_C = 25°C T_C = 90°C	P_{tot}	 187 106	W
Operating junction temperature	T_j	-40…+175	°C
Storage temperature	T_{stg}	-55...+150	
Soldering temperature 1.6mm (0.063 in.) from case for 10 s	T_S	260	

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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	-	

[0]J-STD20 and JESD22

[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.

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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	-	

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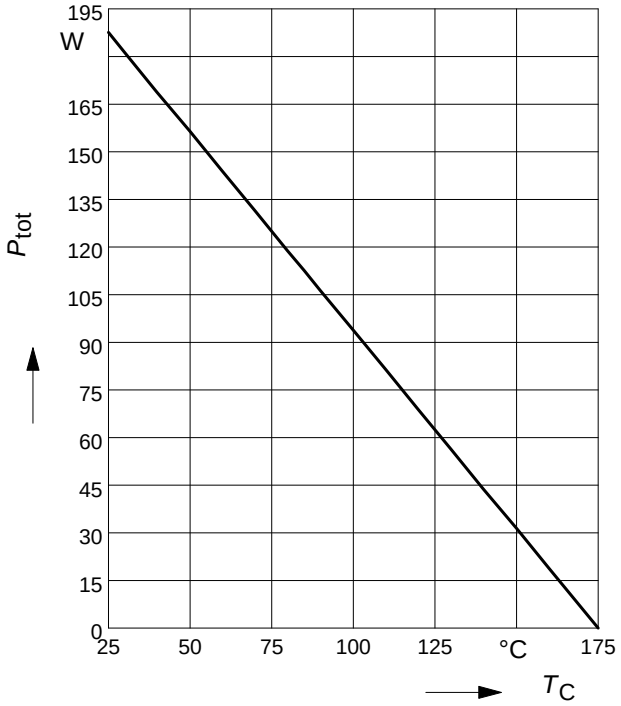
1 Power dissipation

$P_{tot} = f(T_C)$

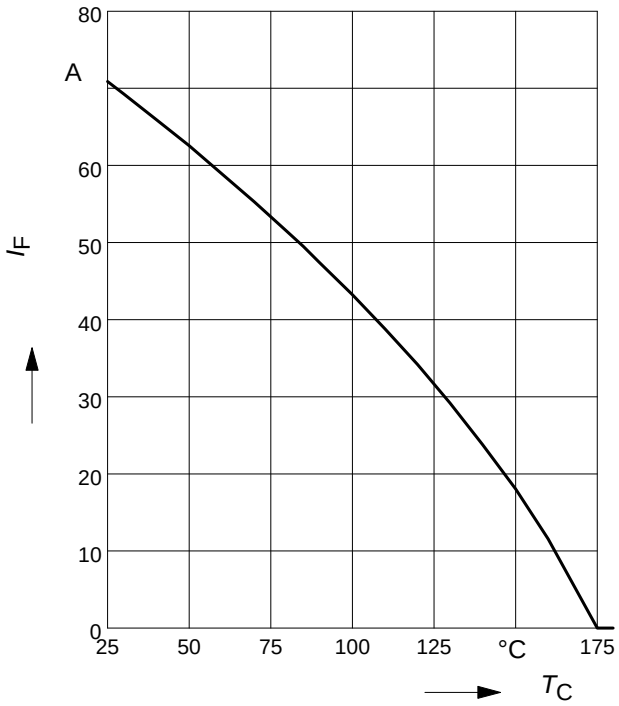
parameter: $T_j \leq 175$ °C



2 Diode forward current

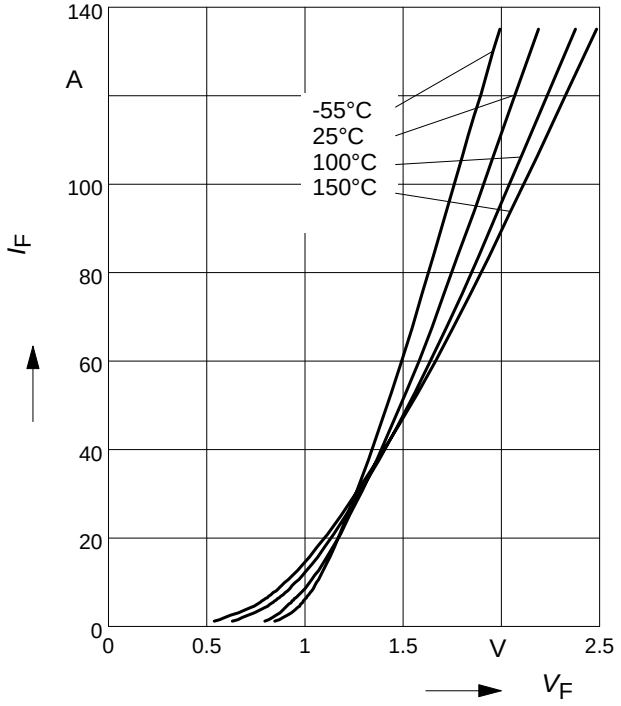
$I_F = f(T_C)$

parameter: $T_j \leq 175$°C



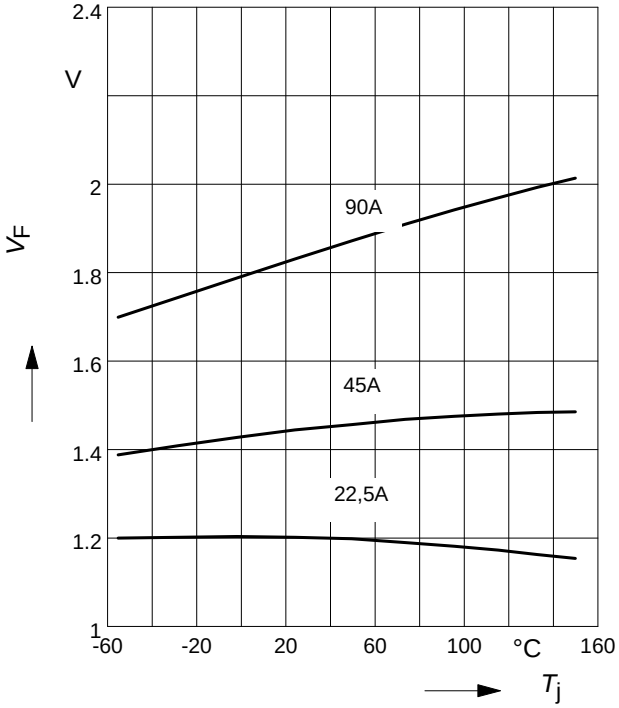
3 Typ. diode forward current

$I_F = f(V_F)$



4 Typ. diode forward voltage

$V_F = f(T_j)$



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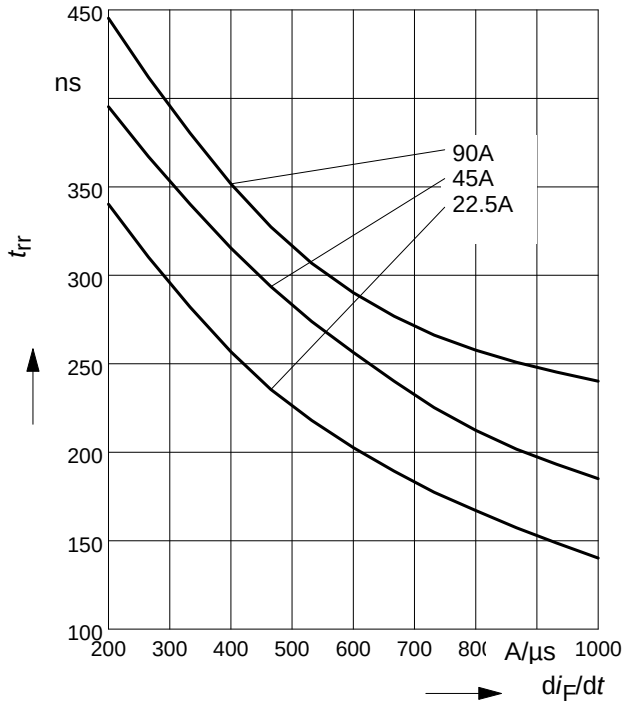
5 Typ. reverse recovery time

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

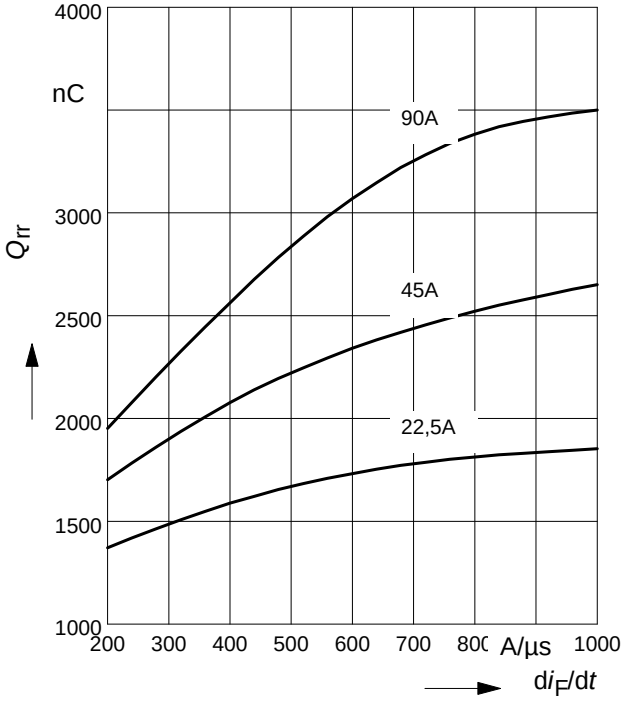
parameter: V_R = 400V, T_j = 125°C



6 Typ. reverse recovery charge

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

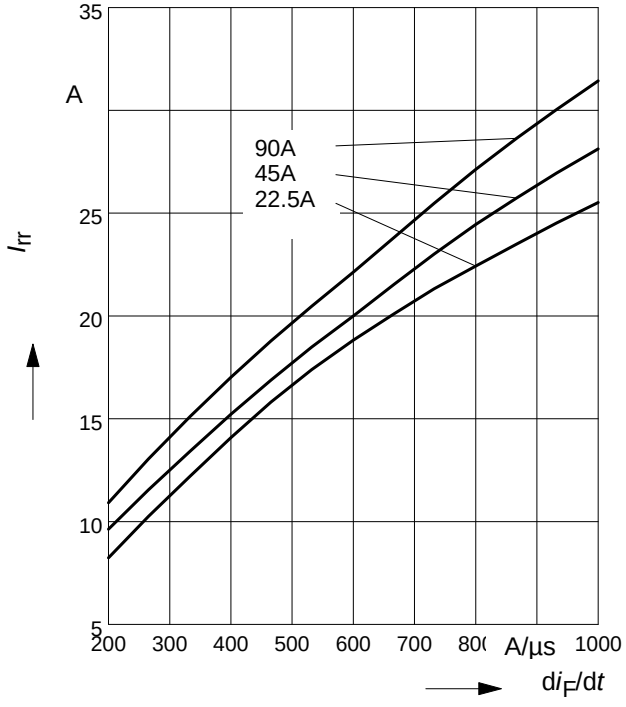
parameter: V_R = 400V, T_j = 125 °C



7 Typ. reverse recovery current

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

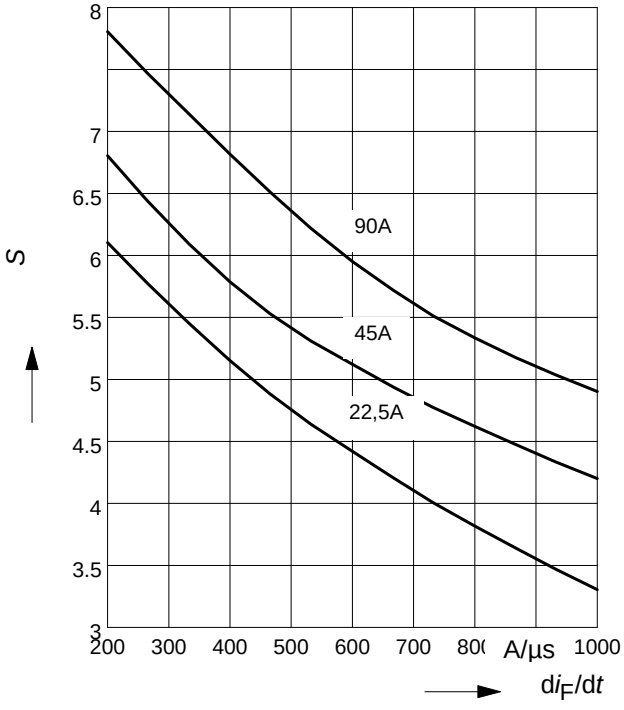
parameter: V_R = 400V, T_j = 125°C



8 Typ. reverse recovery softness factor

S = f(di_F/dt)

parameter: V_R = 400V, T_j = 125°C



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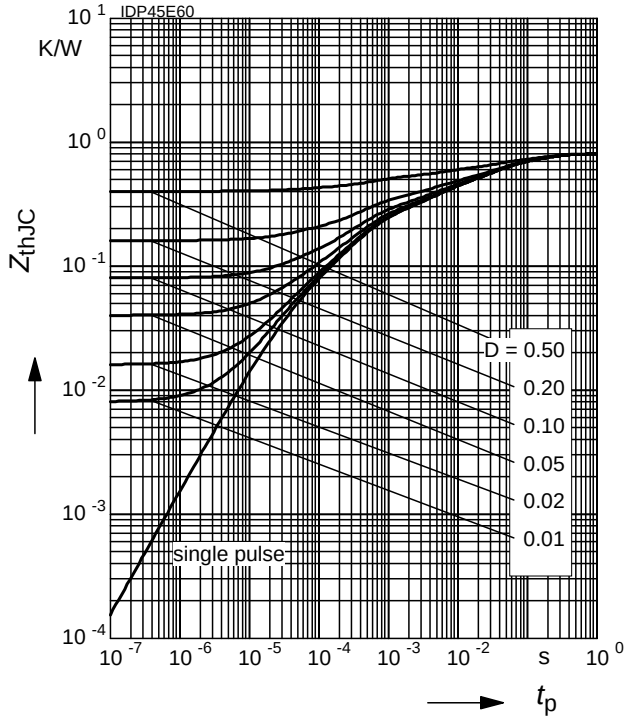
9 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

parameter : $D = t_p/T$



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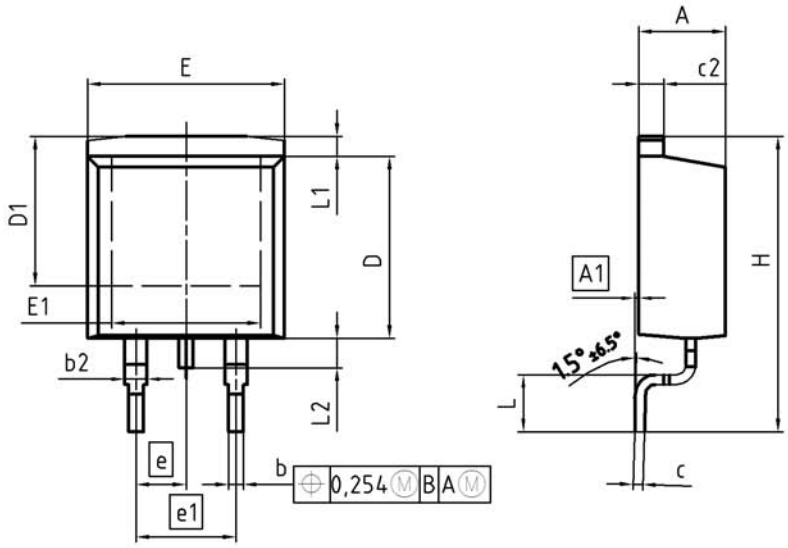

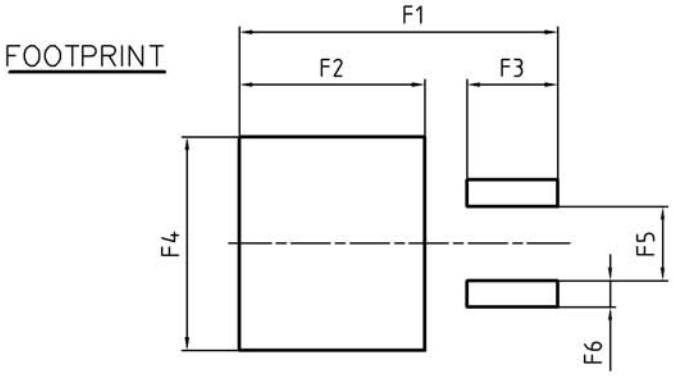

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	0.00	0.25	0.000	0.010
b	0.65	0.85	0.026	0.033
b2	0.95	1.15	0.037	0.045
c	0.33	0.65	0.013	0.026
c2	1.17	1.40	0.046	0.055
D	8.51	9.45	0.335	0.372
D1	7.10	7.90	0.280	0.311
E	9.80	10.31	0.386	0.406
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	2		2	
H	14.61	15.88	0.575	0.625
L	2.29	3.00	0.090	0.118
L1	0.70	1.60	0.028	0.063
L2	1.00	1.78	0.039	0.070
F1	16.05	16.25	0.632	0.640
F2	9.30	9.50	0.366	0.374
F3	4.50	4.70	0.177	0.185
F4	10.70	10.90	0.421	0.429
F5	3.65	3.85	0.144	0.152
F6	1.25	1.45	0.049	0.057

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