

HiPerFRED

$$V_{RRM} = 600V$$

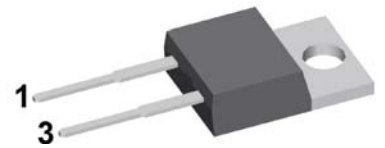
$$I_{FAV} = 15A$$

$$t_{rr} = 25ns$$

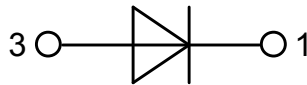
High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Single Diode

Part number

DSEP15-06B



Backside: cathode

**Features / Advantages:**

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I_{rm} -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I_{rm} reduces:
 - Power dissipation within the diode
 - Turn-on loss in the commutating switch

Applications:

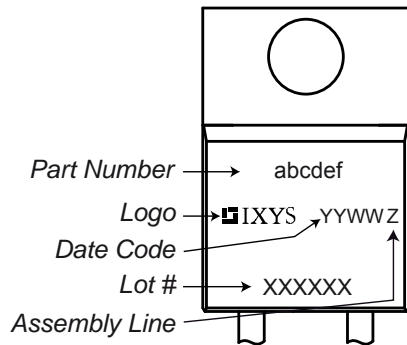
- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: TO-220

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

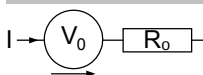
Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					600	V
V_{RRM}	max. repetitive reverse blocking voltage					600	V
I_R	reverse current, drain current	$V_R = 600\text{ V}$	$T_{VJ} = 25^\circ\text{C}$			100	μA
		$V_R = 600\text{ V}$	$T_{VJ} = 150^\circ\text{C}$			0.5	mA
V_F	forward voltage drop	$I_F = 15\text{ A}$	$T_{VJ} = 25^\circ\text{C}$			2.54	V
						2.99	V
		$I_F = 30\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.59	V
						2.04	V
I_{FAV}	average forward current	$T_C = 130^\circ\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^\circ\text{C}$			15	A
V_{FO}	threshold voltage					0.98	V
r_F	slope resistance						28
		} for power loss calculation only					
R_{thJC}	thermal resistance junction to case					1.6	K/W
R_{thCH}	thermal resistance case to heatsink				0.50		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		95	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		110	A
C_J	junction capacitance	$V_R = 400\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		12	pF
I_{RM}	max. reverse recovery current			$T_{VJ} = 25^\circ\text{C}$		2.5	A
				$T_{VJ} = 100^\circ\text{C}$		4.5	A
t_{rr}	reverse recovery time		$I_F = 15\text{ A}; V_R = 300\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$		25	ns
				$T_{VJ} = 100^\circ\text{C}$		70	ns
E_{AS}	non-repetitive avalanche energy	$I_{AS} = 1\text{ A}$ $L = 180\ \mu\text{H}$		$T_{VJ} = 25^\circ\text{C}$		0.1	mJ
I_{AR}	repetitive avalanche current	$V_A = 1.5 \cdot V_R$ typ.: $f = 10\text{ kHz}$				0.1	A

Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{stg}	storage temperature		-55		150	°C
T_{vj}	virtual junction temperature		-55		175	°C
Weight				2		g
M_D	mounting torque		0.4		0.6	Nm
F_C	mounting force with clip		20		60	N

Product Marking


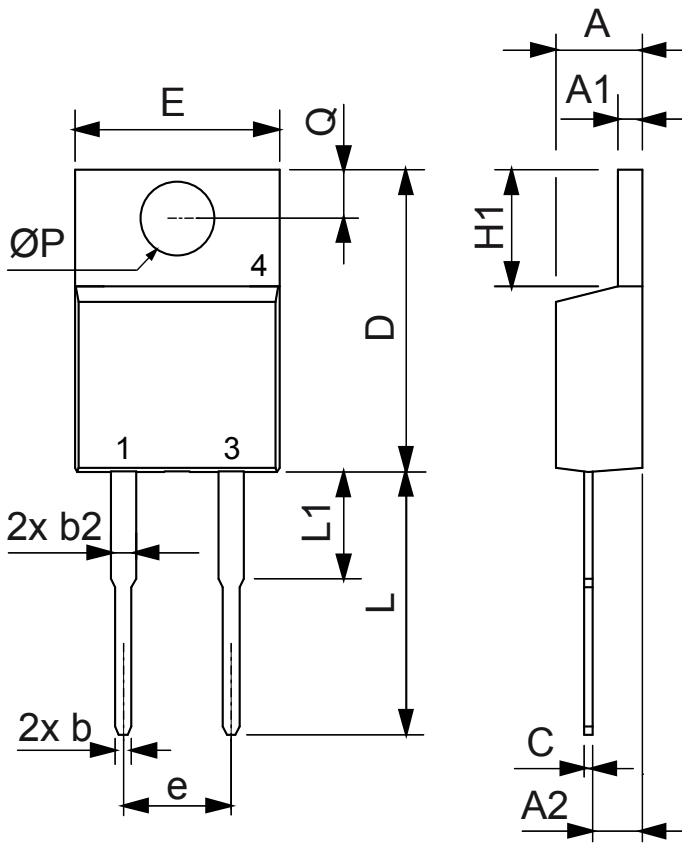
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP15-06B	DSEP15-06B	Tube	50	492639

Similar Part	Package	Voltage class
DSEP15-06A	TO-220AC (2)	600

Equivalent Circuits for Simulation
** on die level*
 $T_{vj} = 175^\circ\text{C}$

Fast Diode

$V_{0\max}$	threshold voltage	0.98	V
$R_{0\max}$	slope resistance *	25	mΩ

Outlines TO-220



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
C	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
e	5.08	BSC	0.200	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
$\varnothing P$	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



Fast Diode

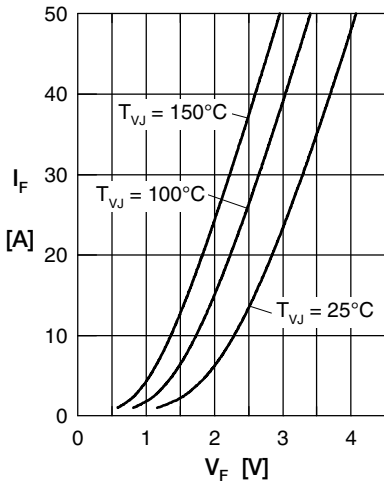


Fig. 1 Forward current I_F versus V_F

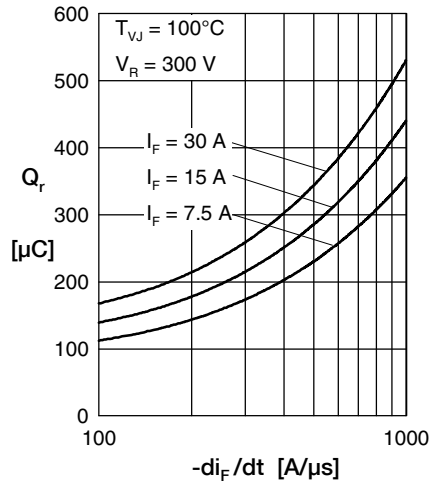


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

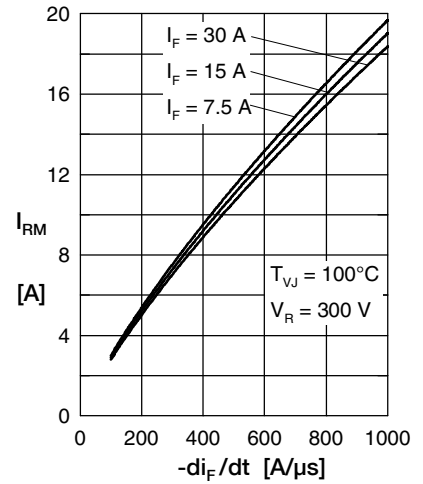


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

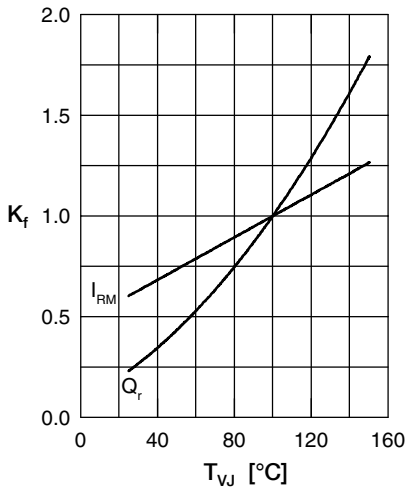


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

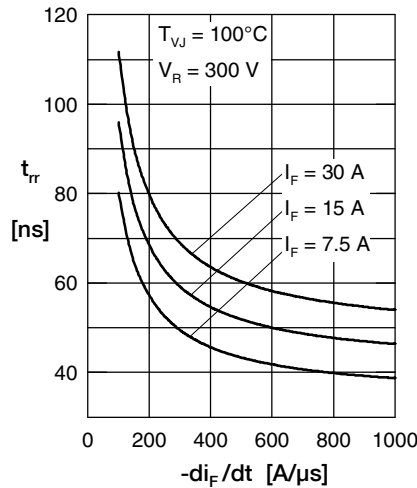


Fig. 5 Typ. recovery time t_{tr} versus $-di_F/dt$

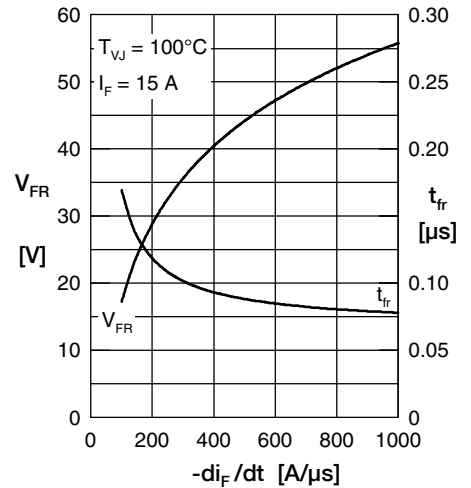


Fig. 6 Typ. peak forward voltage V_{FR} and t_{tr} versus di_F/dt

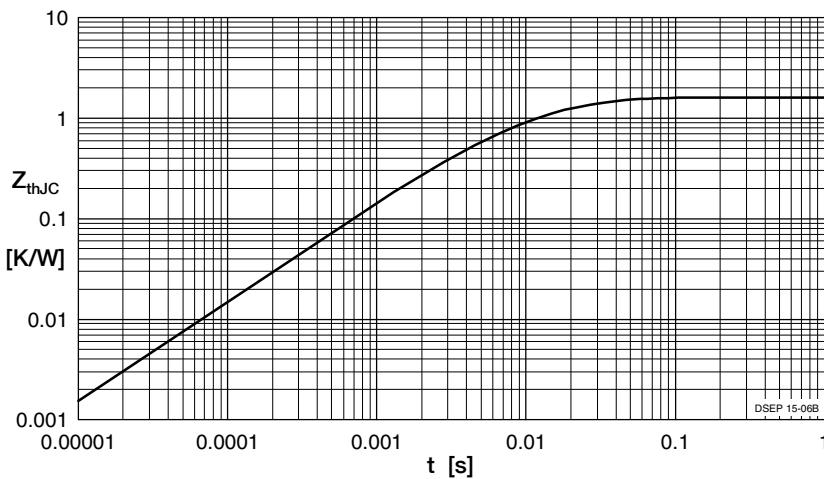


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.908	0.0052
2	0.350	0.0003
3	0.342	0.017