

HiPerFRED

$$V_{RRM} = 600V$$

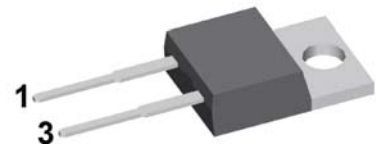
$$I_{FAV} = 15A$$

$$t_{rr} = 35ns$$

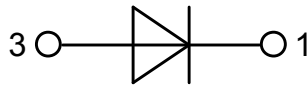
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Single Diode

Part number

DSEP15-06A



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)

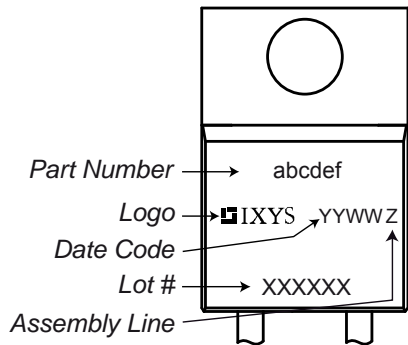
Package: TO-220

- 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			$T_{VJ} = 25^{\circ}C$		600	V
V_{RRM}	max. repetitive reverse blocking voltage			$T_{VJ} = 25^{\circ}C$		600	V
I_R	reverse current, drain current	$V_R = 600 V$		$T_{VJ} = 25^{\circ}C$		100	μA
		$V_R = 600 V$		$T_{VJ} = 150^{\circ}C$		0.5	mA
V_F	forward voltage drop	$I_F = 15 A$		$T_{VJ} = 25^{\circ}C$		2.04	V
						$I_F = 30 A$	
		$I_F = 15 A$		$T_{VJ} = 150^{\circ}C$		1.35	V
						$I_F = 30 A$	
I_{FAV}	average forward current	$T_C = 140^{\circ}C$ rectangular	d = 0.5	$T_{VJ} = 175^{\circ}C$		15	A
V_{FO}	threshold voltage	} for power loss calculation only		$T_{VJ} = 175^{\circ}C$		0.99	V
r_F	slope resistance					15	m Ω
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			$T_C = 25^{\circ}C$		95	W
I_{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; $V_R = 0 V$		$T_{VJ} = 45^{\circ}C$		110	A
C_J	junction capacitance	$V_R = 400 V$ f = 1 MHz		$T_{VJ} = 25^{\circ}C$		12	pF
I_{RM}	max. reverse recovery current	} $I_F = 15 A; V_R = 300 V$ $-di_F/dt = 200 A/\mu s$		$T_{VJ} = 25^{\circ}C$		5	A
				$T_{VJ} = 100^{\circ}C$		7	A
t_{rr}	reverse recovery time		$T_{VJ} = 25^{\circ}C$		35	ns	
		$T_{VJ} = 100^{\circ}C$		95	ns		
E_{AS}	non-repetitive avalanche energy	$I_{AS} = 1 A$ L = 180 μH		$T_{VJ} = 25^{\circ}C$		0.1	mJ
I_{AR}	repetitive avalanche current	$V_A = 1.5 \cdot V_R$ typ.: f = 10 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



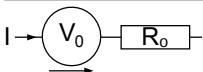
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP15-06A	DSEP15-06A	Tube	50	473529

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

Equivalent Circuits for Simulation

* on die level

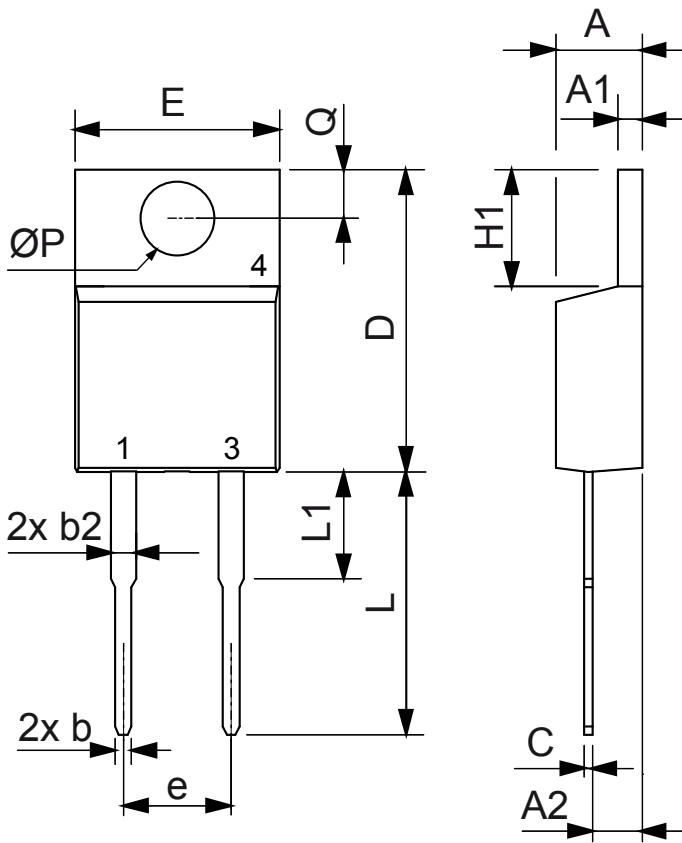
$T_{vj} = 175^{\circ}C$



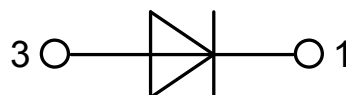
Fast Diode

$V_{0\ max}$	threshold voltage	0.99	V
$R_{0\ max}$	slope resistance *	12	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

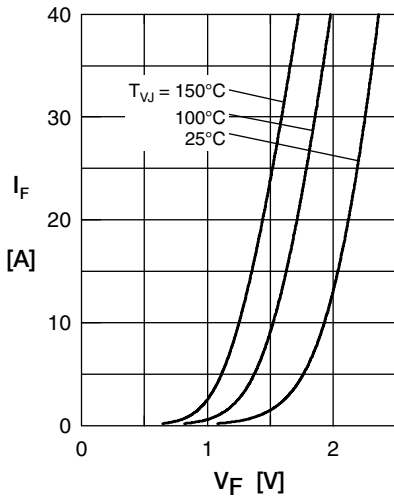


Fig. 1 Forward current I_F versus V_F

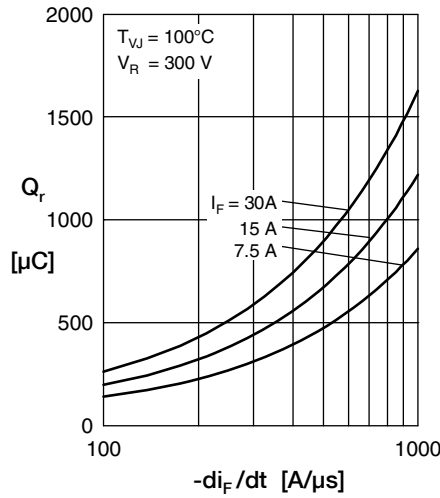


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

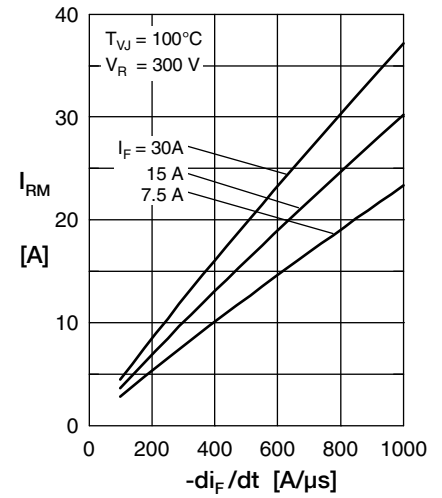


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

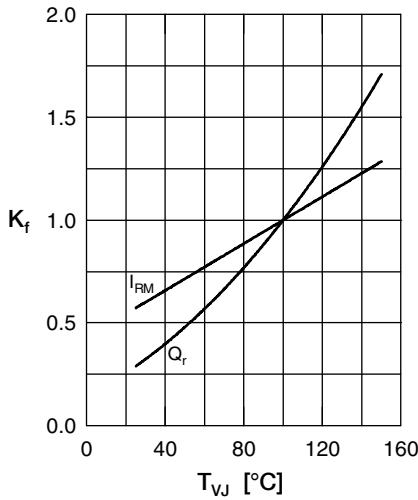


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

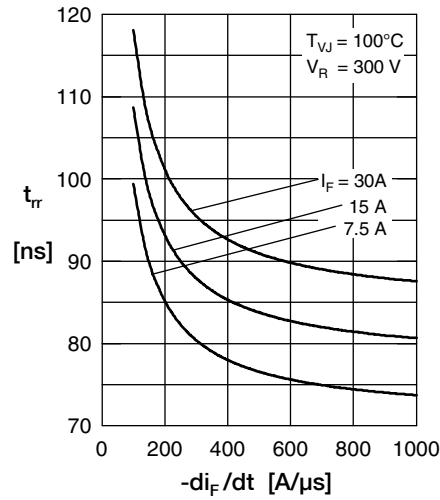


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

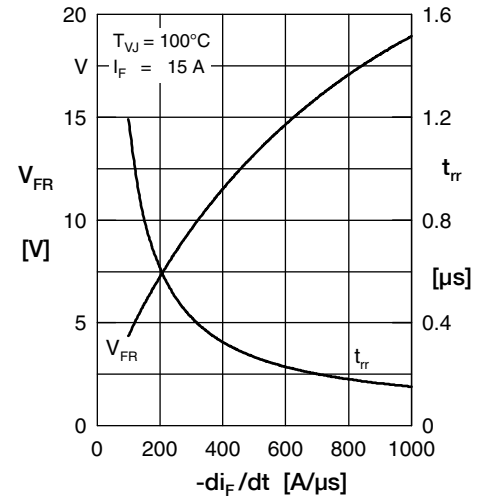


Fig. 6 Typ. peak forward voltage V_{FR} and t_{rr} versus di_F/dt

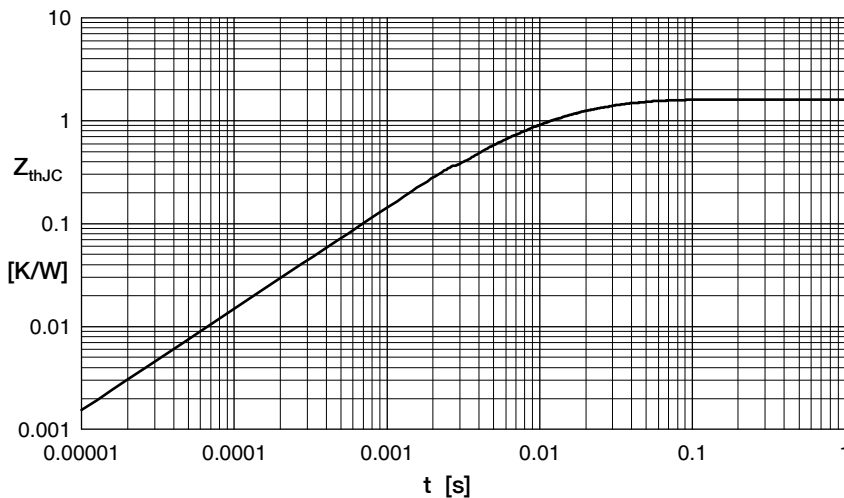


Fig. 7 Transient thermal impedance junction to case

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