



preliminary

# Sonic Fast Recovery Diode

$V_{RRM} = 600\text{ V}$   
 $I_{FAV} = 2 \times 20\text{ A}$   
 $t_{rr} = 40\text{ ns}$

High Performance Fast Recovery Diode  
 Low Loss and Soft Recovery  
 Common Cathode

Part number

**DHG40C600HB**



Backside: cathode



**Features / Advantages:**

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I<sub>rm</sub>-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I<sub>rm</sub> 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-247**

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

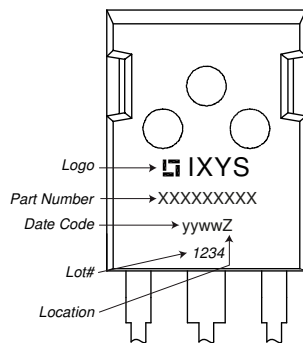
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Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
$I_R$	reverse current, drain current	$V_R = 600 V$	$T_{VJ} = 25^{\circ}C$		25	$\mu A$	
		$V_R = 600 V$	$T_{VJ} = 125^{\circ}C$		1.5	mA	
$V_F$	forward voltage drop	$I_F = 20 A$	$T_{VJ} = 25^{\circ}C$		2.24	V	
		$I_F = 40 A$			3.15	V	
		$I_F = 20 A$	$T_{VJ} = 125^{\circ}C$		2.19	V	
		$I_F = 40 A$			3.21	V	
$I_{FAV}$	average forward current	$T_C = 95^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}C$		20	A	
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		1.12	V	
$r_F$	slope resistance				49	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				0.9	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.3		K/W	
$P_{tot}$	total power dissipation		$T_C = 25^{\circ}C$		140	W	
$I_{FSM}$	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		150	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	} $I_F = 20 A; V_R = 300 V$ $-di_F / dt = 450 A/\mu s$	$T_{VJ} = 25^{\circ}C$		8	A	
			$T_{VJ} = 125^{\circ}C$		12	A	
$t_{rr}$	reverse recovery time		$T_{VJ} = 25^{\circ}C$		40	ns	
			$T_{VJ} = 125^{\circ}C$		60	ns	

Package TO-247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal <sup>1)</sup>			70	A
$T_{VJ}$	virtual junction temperature		-55		150	°C
$T_{op}$	operation temperature		-55		125	°C
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				6		g
$M_D$	mounting torque		0.8		1.2	Nm
$F_C$	mounting force with clip		20		120	N

**Product Marking**

**Part description**

D = Diode  
 H = Sonic Fast Recovery Diode  
 G = extreme fast  
 40 = Current Rating [A]  
 C = Common Cathode  
 600 = Reverse Voltage [V]  
 HB = TO-247AD (3)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DHG40C600HB	DHG40C600HB	Tube	30	505145

Similar Part	Package	Voltage class
DHG40C600PB	TO-220AB (3)	600

**Equivalent Circuits for Simulation**

\* on die level

 $T_{VJ} = 150^{\circ}\text{C}$ 

**Fast Diode**

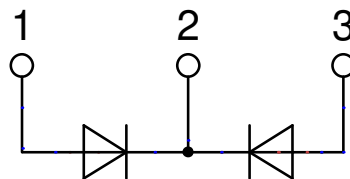
$V_{0 \max}$	threshold voltage	1.12	V
$R_{0 \max}$	slope resistance *	46	mΩ



**Outlines TO-247**



Sym.	Inches		Millimeter	
	min.	max.	min.	max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819	0.845	20.79	21.45
E	0.610	0.640	15.48	16.24
E2	0.170	0.216	4.31	5.48
e	0.215 BSC		5.46 BSC	
L	0.780	0.800	19.80	20.30
L1	-	0.177	-	4.49
Ø P	0.140	0.144	3.55	3.65
Q	0.212		5.38	
S	0.242 BSC		6.14 BSC	
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	-	13.07	-
D2	0.020	0.053	0.51	1.35
E1	0.530	-	13.45	-
Ø P1	-	0.29	-	7.39



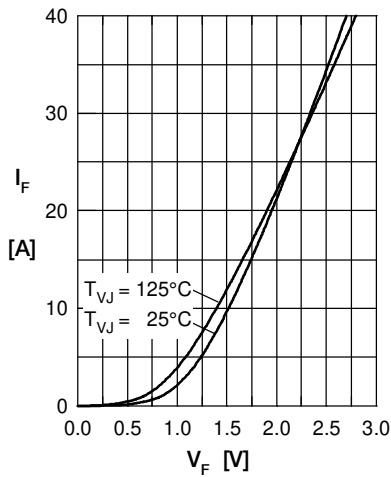
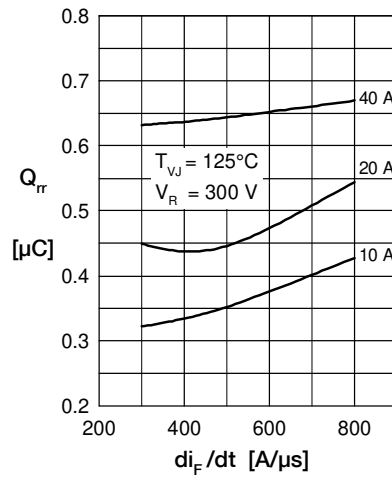
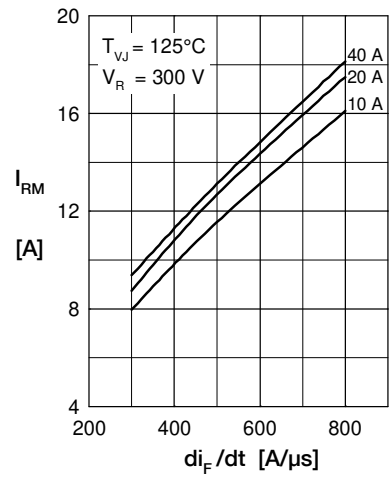
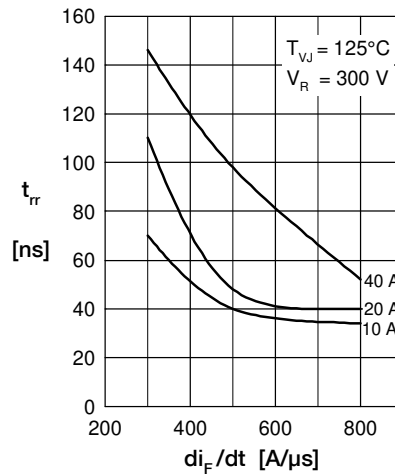
**Fast Diode**

 Fig. 1 Typ. Forward current versus  $V_F$ 

 Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $di/dt$ 

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

 Fig. 4 Dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$ 

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

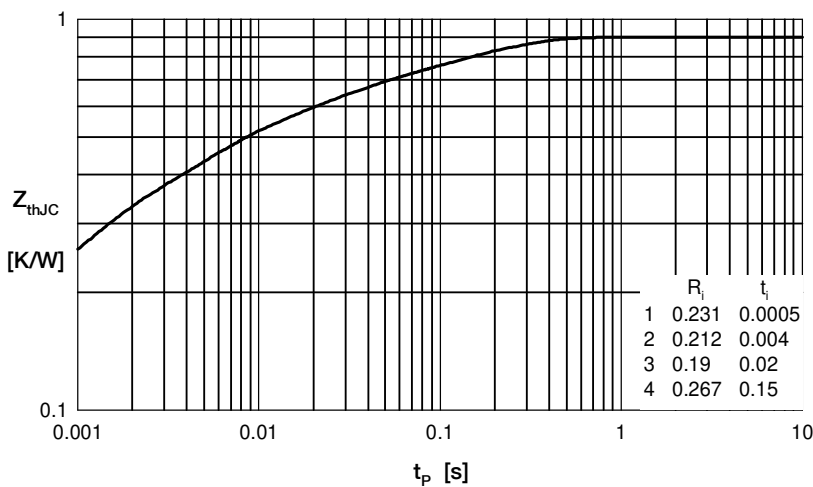
 Fig. 6 Typ. recovery energy  $E_{rec}$  versus  $di/dt$ 


Fig. 7 Typ. transient thermal impedance junction to case