



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_{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-247

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

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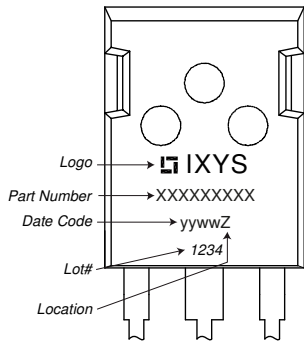
Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					600	V
V_{RRM}	max. repetitive reverse blocking voltage					600	V
I_R	reverse current, drain current	$V_R = 600\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		25	μA
		$V_R = 600\text{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



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Package TO-247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			70	A
T_{VJ}	virtual junction temperature		-55		150	°C
T_{op}	operation temperature		-55		125	°C
T_{stg}	storage temperature		-55		150	°C
Weight				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*

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

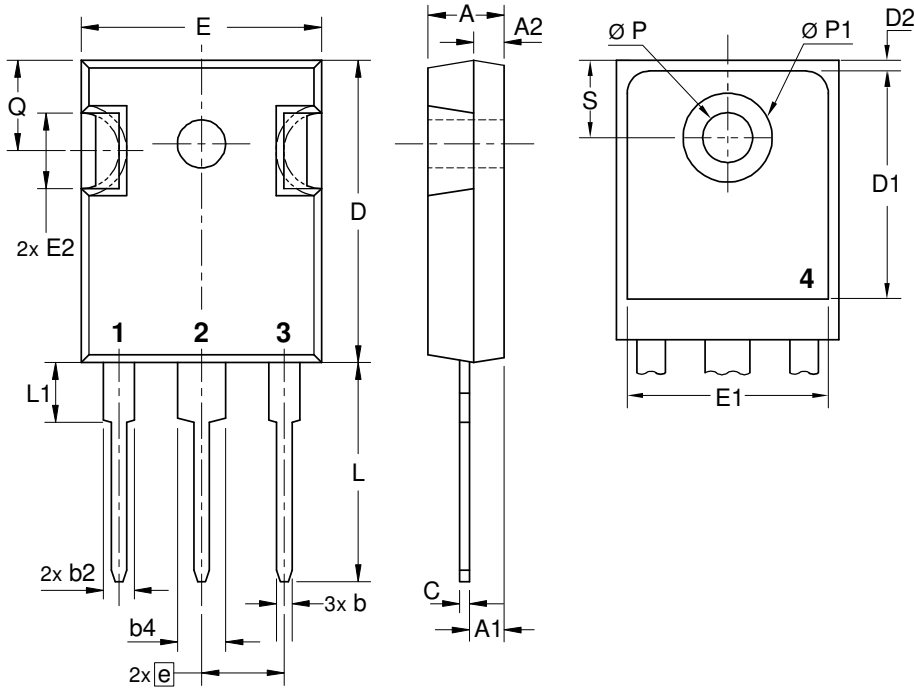


Fast Diode

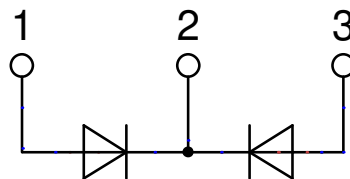
$V_{0\ max}$	threshold voltage	1.12	V
$R_{0\ max}$	slope resistance *	46	mΩ



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	0.244	5.38	6.19
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



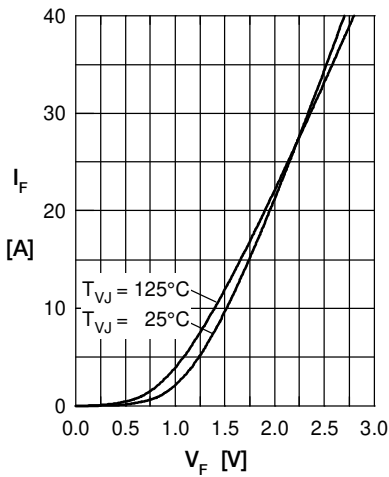
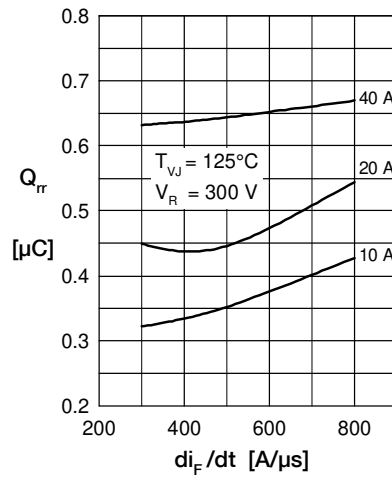
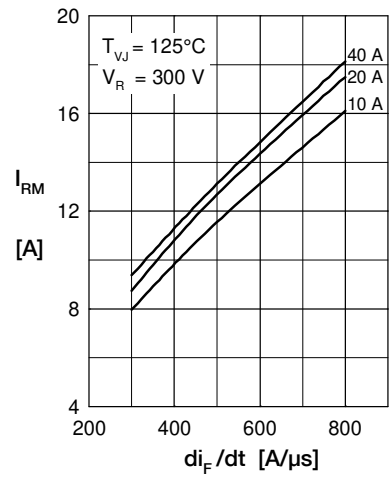
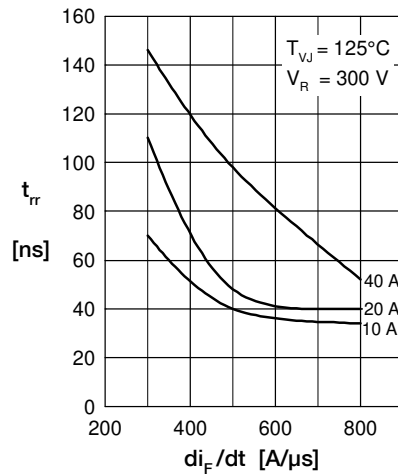
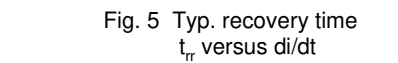
Fast Diode

 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

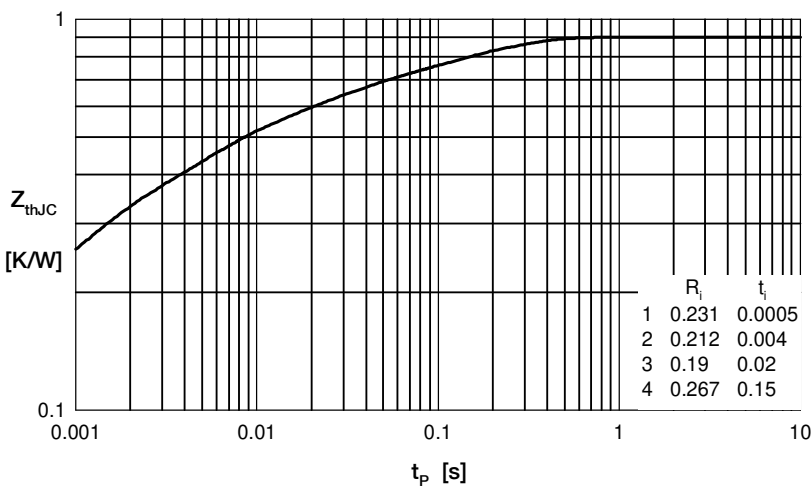
 Fig. 6 Typ. recovery energy E_{rec} versus di/dt


Fig. 7 Typ. transient thermal impedance junction to case