

STTH60R04

Ultrafast recovery diode

Main product characteristics

I _{F(AV)}	60 A
V _{RRM}	400 V
Тj	175° C
V _F (typ)	0.95 V
t _{rr (typ)}	31 ns

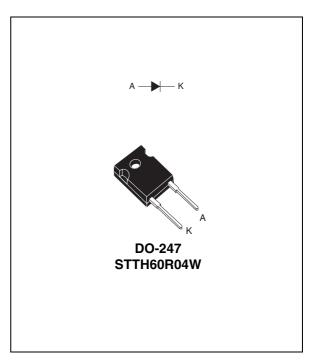
Features and benefits

- Very low switching losses
- High frequency and/or high pulsed current operation
- High junction temperature

Description

The STTH60R04 series uses ST's new 400 V planar Pt doping technology. The STTH60R04 is specially suited for switching mode base drive and transistor circuits.

Available in a through-the-hole package, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection.



Order codes

Part Number	Marking
STTH60R04W	STTH60R04W

Table 1. Absolute ratings (limiting values at 25° C, unless otherwise specified)

Symbol	ol Parameter				Unit
V _{RRM}	Repetitive peak reverse voltage			400	V
V _{RSM}	Non repetitive peak reverse voltage	Non repetitive peak reverse voltage			
I _{F(RMS)}	RMS forward current				А
I _{F(AV)}	Average forward current, $\delta = 0.5$ T _c = 110° C		60	А	
I _{FRM}	Repetitive peak forward current $t_p = 5 \ \mu s \ F = 1 \ kHz \ square$		375	А	
I _{FSM}	Surge non repetitive forward current t _p = 10 ms Sinusoidal				А
T _{stg}	Storage temperature range			-65 to +175	°C
Тj	Operating junction temperature range			-40 to +175	°C

1 Characteristics

Table 2.	Thermal	parameters
		parametere

Symbol	Parameter	Value	Unit
R _{th(j-c)}	Junction to case	0.7	°C/W

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min	Тур	Max	Unit
I _B ⁽¹⁾	Reverse leakage current	T _j = 25° C	V - V			60	
'R` ′	IR ⁽¹⁾ Reverse leakage current	T _j = 125° C	$V_{R} = V_{RRM}$		60	600	μA
		T _j = 25° C				1.5	
V _F ⁽²⁾ Forward voltage drop	$T_j = 100^\circ C$	I _F = 60 A		1.05	1.3	V	
		$T_j = 150^\circ C$]		0.95	1.2	

1. Pulse test: $t_p = 5 \text{ ms}, \delta < 2 \%$

2. Pulse test: t_p = 380 μ s, δ < 2 %

To evaluate the conduction losses use the following equation:

 $P = 0.9 \text{ x } I_{F(AV)} + 0.005 \text{ x } I_{F}{}^{2}_{(RMS)}$

Table 4.Dynamic characteristics

Symbol	Parameter	Test conditions	Min	Тур	Max	Unit
		$I_F = 1 \text{ A}, dI_F/dt = -50 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}, T_j = 25^{\circ} \text{ C}$			80	
t _{rr}	Reverse recovery time	$I_F = 1 \text{ A}, dI_F/dt = -100 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}, T_j = 25^{\circ} \text{ C}$		40	55	ns
	$I_F = 1 \text{ A}, dI_F/dt = -200 \text{ A}/\mu\text{s}, V_R = 30 \text{ V}, T_j = 25^{\circ} \text{ C}$		31	45		
I _{RM}	Reverse recovery current	$I_F = 60 \text{ A}, dI_F/dt = -200 \text{ A}/\mu\text{s}, V_R = 320 \text{ V}, T_j = 125^{\circ} \text{ C}$		11	16	A
S	Softness factor	$I_F = 60 \text{ A}, dI_F/dt = -200 \text{ A}/\mu\text{s}, V_R = 320 \text{ V}, T_j = 125^{\circ} \text{ C}$		0.4		
t _{fr}	Forward recovery time	$\label{eq:IF} \begin{array}{l} I_{F} = 60 \ A, \ dI_{F}/dt = 100 \ A/\mu s \\ V_{FR} = 1.1 \ x \ V_{Fmax}, \ T_{j} = 25^\circ \ C \end{array}$		800		ns
V _{FP}	Forward recovery voltage	$\begin{array}{l} I_{\text{F}} = 60 \text{ A} & \text{d}I_{\text{F}}/\text{d}t = 100 \text{ A}/\mu\text{s} \\ T_{\text{j}} = 25^{\circ} \text{ C} \end{array}$		3.2		V



Zth_(j-c)/Rth_(j-c)

Single pulse DO-247

1.0

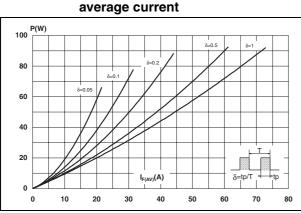
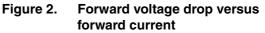


Figure 1. Conduction losses versus average current



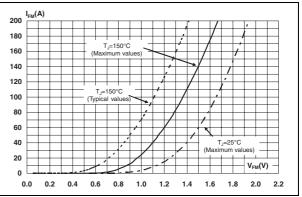
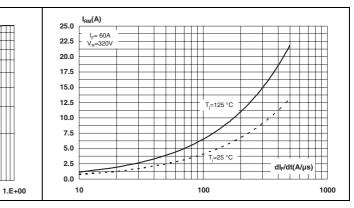


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration





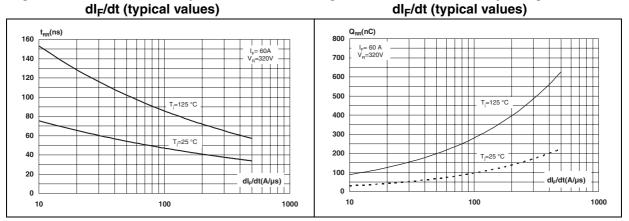
 0.1
 1.E-03
 1.E-02
 1.E-01
 1.

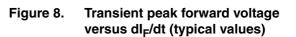
 Figure 5.
 Reverse recovery time versus

tp(s)

Figure 6. Reverse re

Reverse recovery charges versus dl_F/dt (typical values)





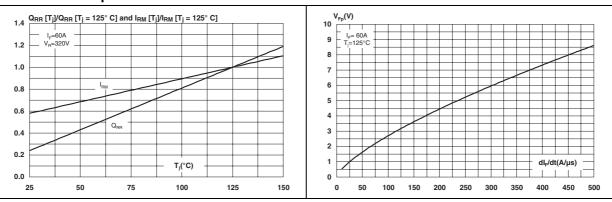
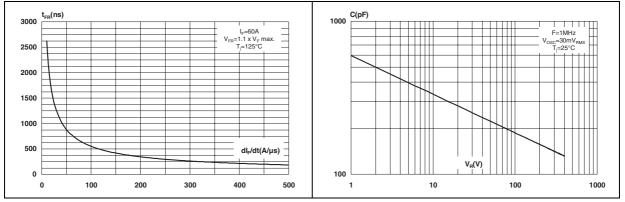


Figure 9. Forward recovery time versus dl_F/dt Figure 10. Juncti (typical values) revers

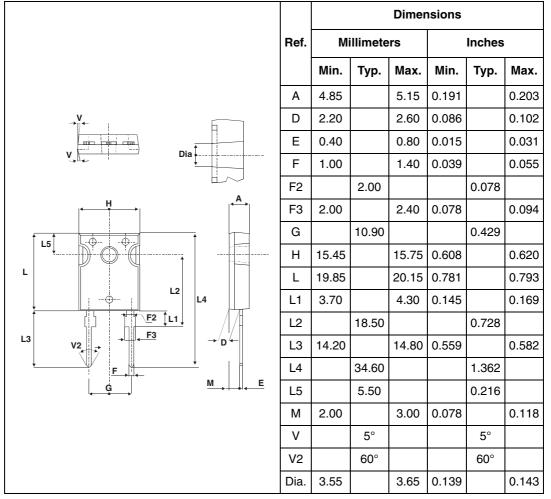
Junction capacitance versus reverse voltage applied (typical values)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm
- Maximum torque value: 1.0 Nm

Table 5. DO-247 dimensions



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

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3 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH60R04W	STTH60R04W	DO-247	4.40 g	30	Tube

4 Revision history

Date	Revision	Description of Changes
31-Mar-2007	1	First issue



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