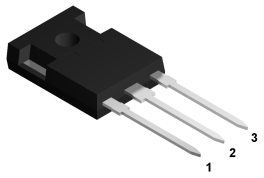
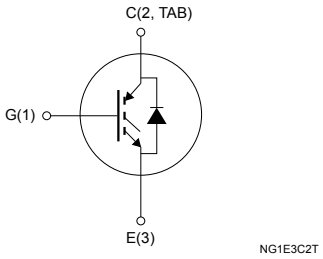
STGWA35IH135DLF2

Datasheet

Trench gate field-stop, 1350 V, 35 A, soft-switching IH2 series IGBT in a TO-247 long leads package



TO-247 long leads



Features

- Designed for soft commutation only
- Maximum junction temperature: T_J = 175 °C
- Low $V_{CE(sat)}$ = 1.75 V (typ.) @ I_C = 30 A
- Very low V_F and soft-recovery co-packaged diode
- Minimized tail current
- Tight parameter distribution
- Low thermal resistance
- Positive temperature coefficient

Applications

- Induction heating
- Resonant converters
- Microwave ovens

Description

The newest IGBT 1350 V IH2 soft-switching series has been developed using an advanced proprietary trench gate field-stop structure, whose performance is optimized both in conduction and in switching energy losses for soft-switching applications. A freewheeling diode with a very low drop forward voltage is co-packaged. The result is a product specifically designed to maximize efficiency for any resonant and soft-switching applications.

Product status link
STGWA35IH135DLF2

Product summary	
Order code	STGWA35IH135DLF2
Temperature range	G35IH135DLF2
Package	TO-247 long leads
Packing	Tube

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Gate-source voltage	1350	V
I_C	Continuous collector current at T_C = 25 °C	70	A
	Continuous collector current at T_C = 100 °C	35	
I_{CP}(1)	Pulsed collector current	140	A
V_{GE}	Gate-emitter voltage	±20	V
I_F	Continuous forward current at T_C = 25 °C	70	A
	Continuous forward current at T_C = 100 °C	35	
I_{FP}(1)	Pulsed forward current	140	A
P_{TOT}	Total power dissipation at T_C = 25 °C	365	W
T_{stg}	Storage temperature range	-55 to 150	°C
T_J	Operating junction temperature range	-55 to 175	°C

1. *Pulse width is limited by maximum junction temperature.*

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case IGBT	0.41	°C/W
	Thermal resistance junction-case diode	1.47	
R_{thJA}	Thermal resistance junction-ambient	50	

2 Electrical characteristics

T_C = 25 °C unless otherwise specified

Table 3. Static characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)CES}$	Collector-emitter breakdown voltage	V_{GE} = 0 V, I_C = 1 mA	1350			V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_{GE} = 15 V, I_C = 30 A		1.75		V
		V_{GE} = 15 V, I_C = 30 A, T_J = 125 °C		1.95		
		V_{GE} = 15 V, I_C = 30 A, T_J = 175 °C		2.05		
		V_{GE} = 15 V, I_C = 60 A		2.30		
V_F	Forward on-voltage	I_F = 30 A		1.20		V
		I_F = 30 A, T_J = 125 °C		1.20		
		I_F = 30 A, T_J = 175 °C		1.25		
		I_F = 60 A		1.55		
$V_{GE(th)}$	Gate threshold voltage	V_{CE} = V_{GE}, I_C = 1 mA	5	6	7	V
I_{CES}	Collector cut-off current	V_{GE} = 0 V, V_{CE} = 1350 V			25	µA
I_{GES}	Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = ±20 V			±250	nA

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_{ies}	Input capacitance	V_{CE} = 25 V, f = 1 MHz, V_{GE} = 0 V	-	3140	-	pF
C_{oes}	Output capacitance		-	125	-	pF
C_{res}	Reverse transfer capacitance		-	77	-	pF
Q_g	Total gate charge	V_{CC} = 600 V, I_C = 30 A, V_{GE} = 0 to 15 V (see Figure 3. Gate charge test circuit)	-	255	-	nC
Q_{ge}	Gate-emitter charge		-	30	-	nC
Q_{gc}	Gate-collector charge		-	124	-	nC

Table 5. Switching characteristics (inductive load)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off delay time	V_{CC} = 600 V, I_C = 30 A, R_G = 10 Ω, V_{GE} = 15 V (see Figure 1. Test circuit for inductive load switching)	-	252	-	ns
t_f	Current fall time		-	111	-	ns
E_{off} (1)	Turn-off switching energy		-	1.42	-	mJ

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off delay time	V_{CC} = 600 V, I_C = 30 A,	-	300	-	ns
t_f	Current fall time	R_G = 10 Ω, V_{GE} = 15 V,	-	247	-	ns
E_{off}(1)	Turn-off switching energy	T_J = 175 °C (see Figure 1. Test circuit for inductive load switching)	-	2.46	-	µJ

1. *Including the tail of the collector current.*

Table 6. IGBT switching characteristics (snubbed inductive load)

Symbol	Parameter	Test conditions(1)	Min.	Typ.	Max.	Unit
E_{off}(2)	Turn-off switching energy	V_{CC} = 900 V, R_G = 10 Ω, I_C = 60 A, L = 500 µH, C_{snub} = 330 nF	-	0.95	-	mJ
		V_{CC} = 900 V, R_G = 10 Ω, I_C = 60 A, L = 500 µH, C_{snub} = 330 nF, T_J = 175 °C	-	1.87	-	

1. *See Figure 2. Test circuit for snubbed inductive load switching*
2. *Including the tail of the collector current.*

3 Test circuits

Figure 1. Test circuit for inductive load switching

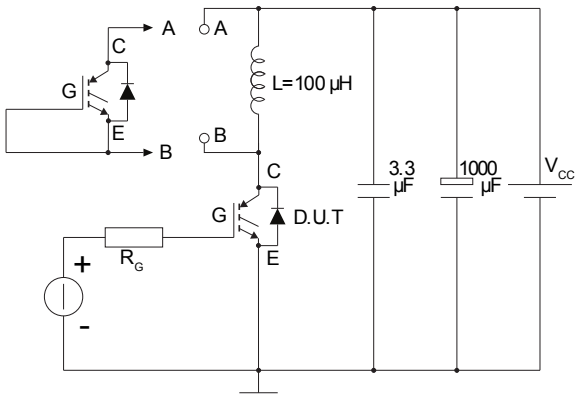


Figure 2. Test circuit for snubbed inductive load switching

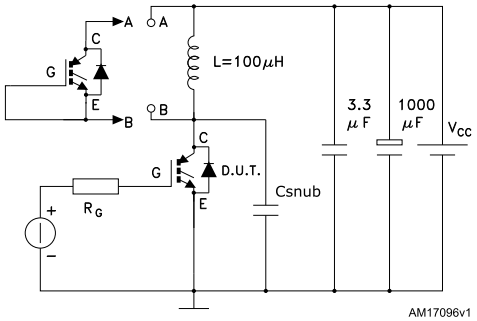


Figure 3. Gate charge test circuit

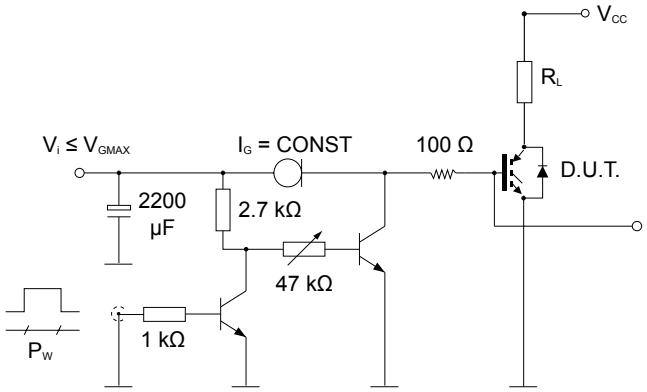
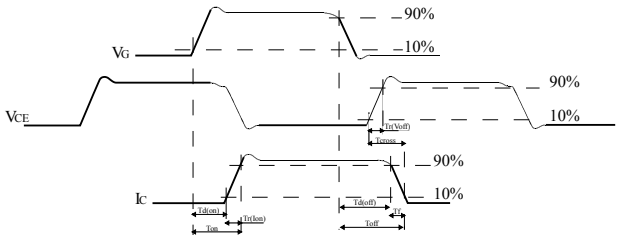


Figure 4. Switching waveform



4 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

4.1 TO-247 long leads package information

Figure 5. TO-247 long leads package outline

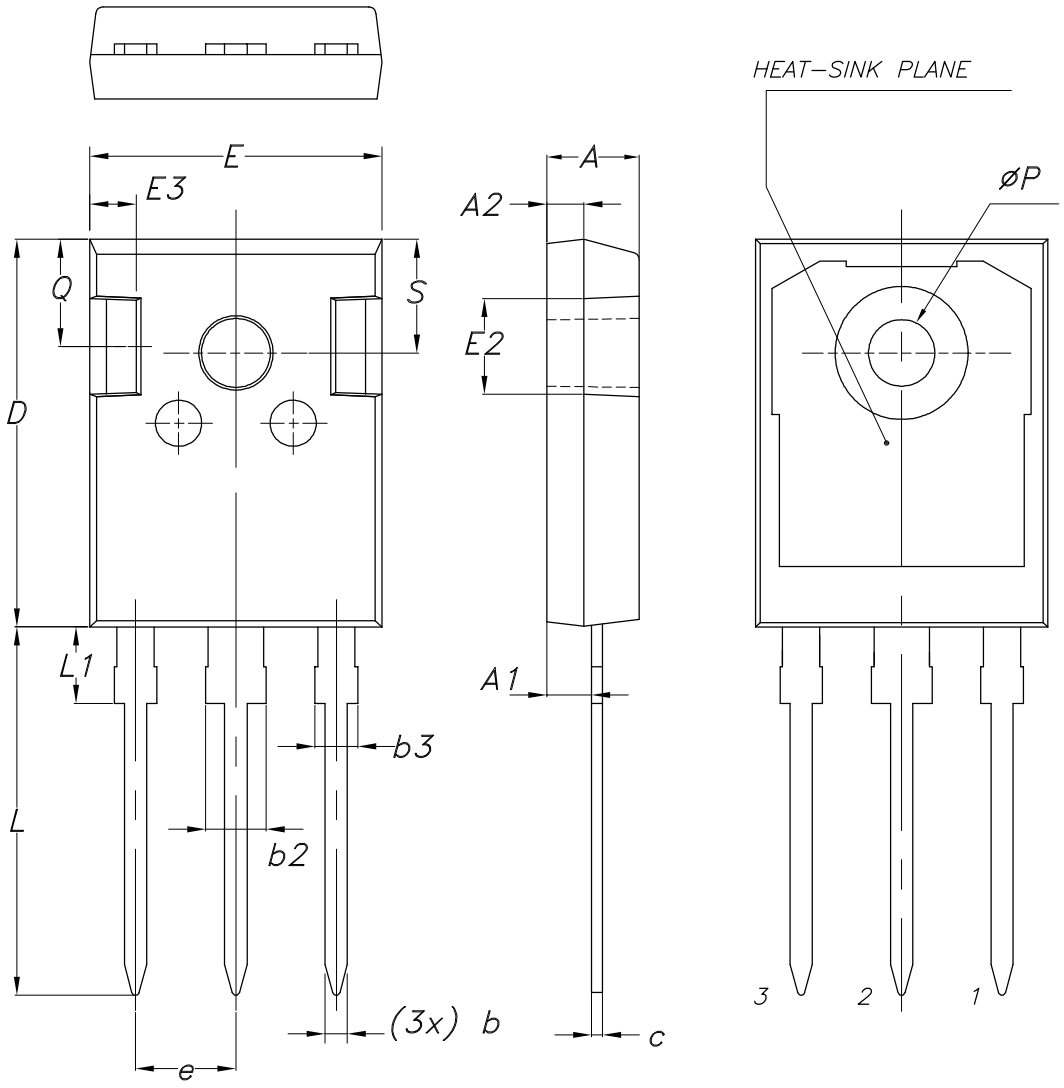


Table 7. **TO-247 long leads package mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
b	1.16		1.26
b2			3.25
b3			2.25
c	0.59		0.66
D	20.90	21.00	21.10
E	15.70	15.80	15.90
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	5.34	5.44	5.54
L	19.80	19.92	20.10
L1			4.30
P	3.50	3.60	3.70
Q	5.60		6.00
S	6.05	6.15	6.25

Revision history

Table 8. **Document revision history**

Date	Version	Changes
19-Apr-2018	1	Initial release. The document status is preliminary data.

Contents