	<b>JX40N135HWR</b>
	<b>Trench FS Reverse Conducting IGBT</b>

## General Description

JX40N135HWR is an N-channel IGBT, which is produced using JieXin's proprietary. The trench FS (field stop) design and integrated Free Wheeling Diode offer lower  $V_{CEsat}$ , superior switching performances and high avalanche ruggedness.

## Features

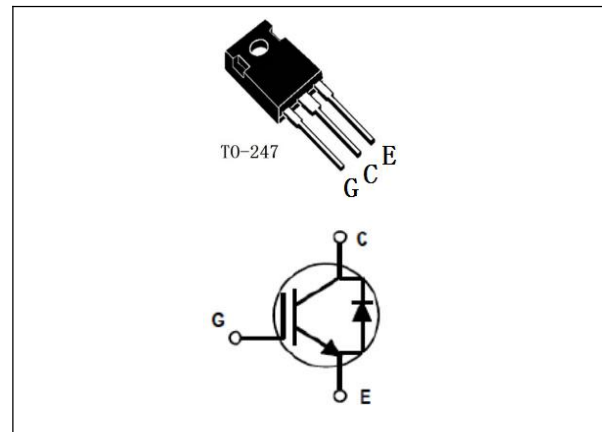
- Trench FS Technology
- RC-IGBT with monolithic body diode
- Optimized for Low Case Temperature in IH Cooker Application
- Positive temperature coefficient in  $V_{CEsat}$

## Applications

- Inductive cooking
- Inverterized microwave ovens
- Soft switching applications

## Key Performance

$V_{CES}$	1350	V
$I_C$	40	A
$V_{CEsat}$	2.1	V
$V_{GE(th)}$	6.0	V
$E_{off}$	1.4	mJ



## Absolute maximum ratings ( $T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-emitter voltage	1350	V
$V_{GES}$	Gate- Emitter Voltage	$\pm 25$	V
$I_C$	DC collector current@ $T_c = 25^\circ\text{C}$	80	A
	DC collector current@ $T_c = 100^\circ\text{C}$	40	A
$I_{Cpuls}$	Pulsed collector current, tp limited by $T_{vjmax}$	120	A
$I_F$	Diode forward current@ $T_c = 100^\circ\text{C}$	40	A
$I_{Fpuls}$	Diode pulsed current, tp limited by $T_{vjmax}$	120	A
$P_D$	Power dissipation @ $T_c = 25^\circ\text{C}$	178	W
	Power dissipation @ $T_c = 100^\circ\text{C}$	71	W
$T_J$	Maximum operating junction temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage temperature	-55 to +150	$^\circ\text{C}$
$T_L$	Maximum Temperature for Soldering	270	$^\circ\text{C}$

## Thermal characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	IGBT thermal resistance, junction-case	0.65	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Diode thermal resistance, junction-case	0.65	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	$^\circ\text{C}/\text{W}$

Electrical characteristics (  $T_j=25^\circ\text{C}$  unless otherwise specified )

Static Characteristic						
Symbol	Parameter	Tests conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{CES}$	Collector-emitter breakdown voltage	$V_{GE}=0V, I_{CE}=0.5mA$	1350	-	-	V
$V_{CEsat}$	Collector-emitter saturation voltage	$V_{GE}=15V, I_C=40A$	-	2.1	2.5	V
$V_F$	Diode forward voltage	$V_{GE}=0V, I_F=40A$	-	-	3.2	V
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=0.25mA, V_{CE}=V_{GE}$	5.0	6.0	7.0	V
$I_{CES}$	Zero gate voltage collector current	$V_{CE}=1350V, V_{GE}=0V$	-	-	1	mA
$I_{GES(F)}$	Gate-emitter leakage forward current	$V_{CE}=0V, V_{GE}=+20V$	-	-	+500	nA
$I_{GES(R)}$	Gate-emitter leakage reverse current	$V_{CE}=0V, V_{GE}=-20V$	-	-	-500	nA
$g_{fs}$	Transconductance	$V_{CE}=20V, I_C=40.0A$	-	10	-	S
$R_g$	Integrated gate resistor			none		$\Omega$

Dynamic Characteristic						
Symbol	Parameter	Tests conditions	Value			Unit
			Min.	Typ.	Max.	
$C_{ies}$	Input capacitance	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	2950	-	pF
$C_{oes}$	Output capacitance		-	110	-	pF
$C_{res}$	Reverse transfer capacitance		-	70	-	pF
$Q_G$	Gate charge	$V_{CC}=960V, I_C=40.0A,$ $V_{GE}=15V$	-	260	-	nC
$L_E$	Internal emitter inductance		-	13	-	nH

Switching Characteristic, Inductive Load						
Symbol	Parameter	Tests conditions	Value			Unit
			Min.	Typ.	Max.	
$t_{d(off)}$	Turn-off delay time	$V_{CC}=600V, I_C=40A,$ $V_{GE}=0/15V,$ $R_G=15\Omega$ $L_{load}=500\mu H$	-	110	-	ns
$t_f$	Fall time		-	130	-	ns
$E_{off}$	Turn-off energy		-	1.4	-	mJ

## Characteristics Cure

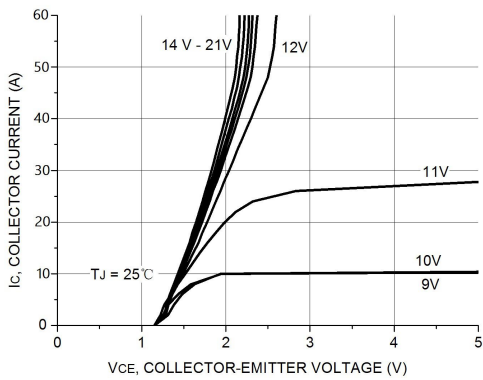


Figure 1. Typical Output Characteristics

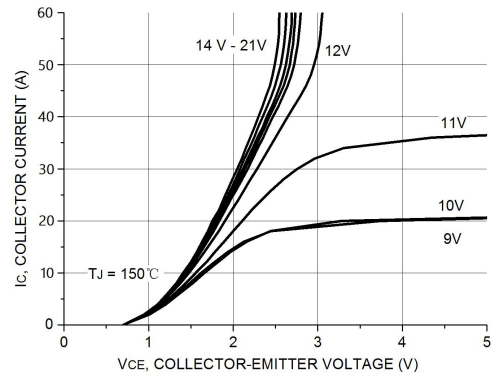


Figure 2. Typical Output Characteristics

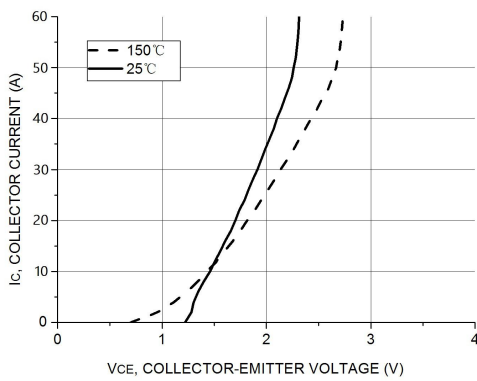


Figure 3. Typical Output Characteristics

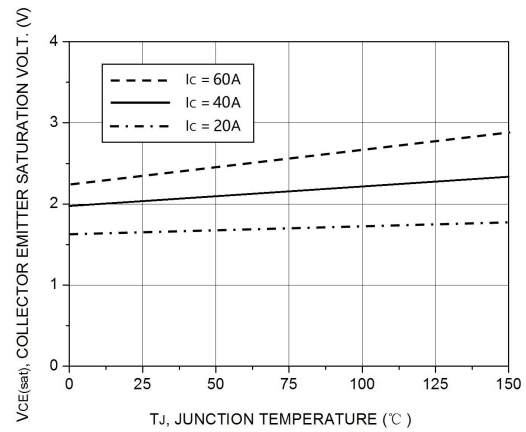


Figure 4. Typical Saturation Voltage vs.  $T_j$

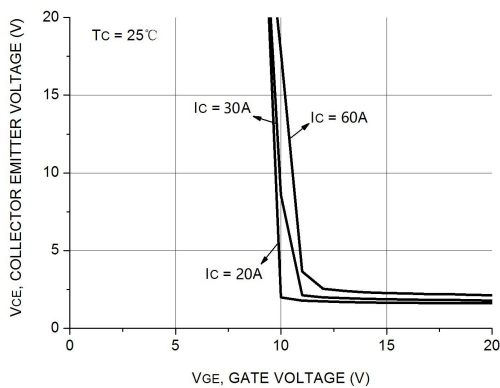


Figure 5. Saturation Voltage v. s. Gate Emitter Voltage

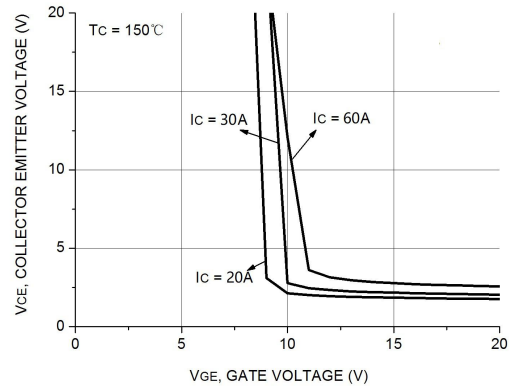
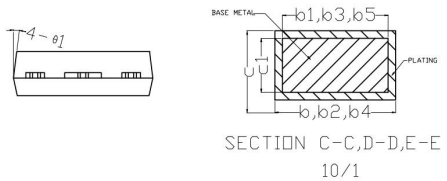
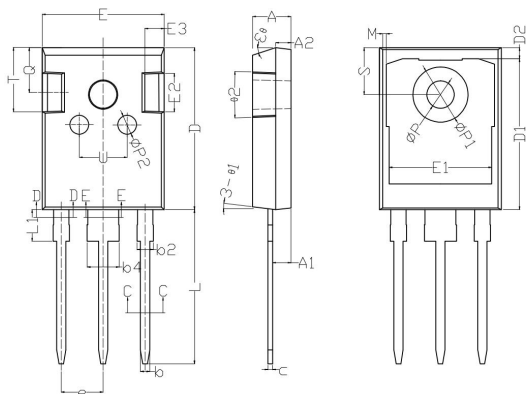


Figure 6. Saturation Voltage v. s. Gate Emitter Voltage

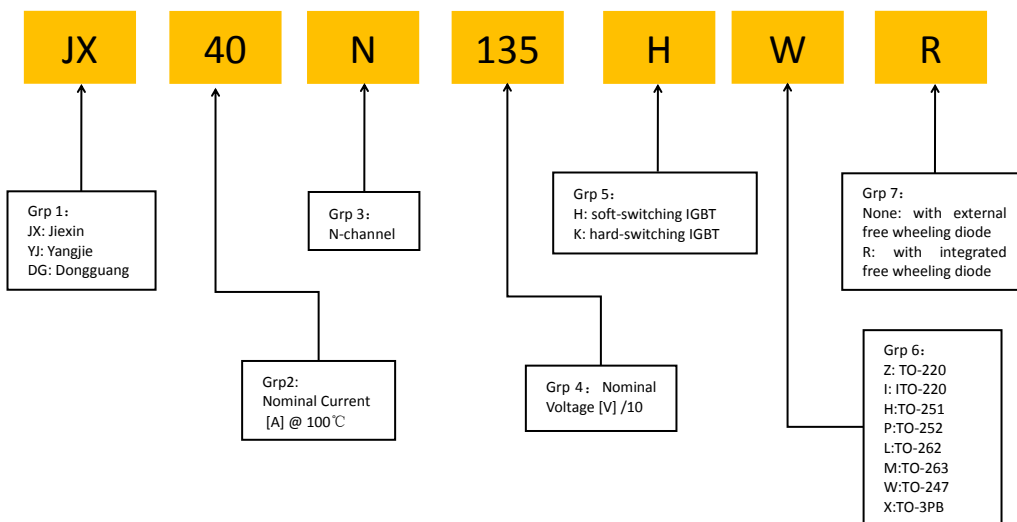
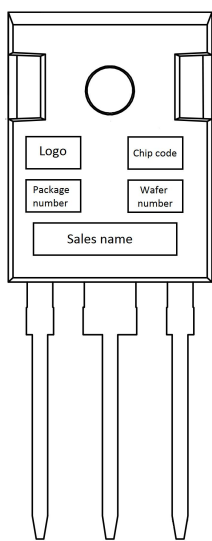
## Package information



### COMMON DIMENSIONS

SYMBOL	MIN	NDM	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	1.21	1.26
b1	1.15	1.20	1.25
b2	1.95	2.10	2.15
b3	1.94	2.09	2.14
b4	3.10	3.15	3.20
b5	3.09	3.14	3.19
c	0.59	0.61	0.66
c1	0.58	0.60	0.65
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	5.44BSC		
L	19.80	19.92	20.10
L1	—	—	4.30
M	0.35	0.50	0.75
øP	3.50	3.60	3.70
øP1	7.00	7.20	7.40
øP2	2.40	2.50	2.60
Q	5.60	5.80	6.00
S	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	—	6.40
ø1	5°	7°	9°
ø2	3°	5°	8°
ø3	13°	16°	19°

## Marking Pattern and Sales Name



## Warnings

- Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximum ratings of the device.
- When installing the heatsink, please pay attention to the torsional moment and the smoothness of the heatsink.
- IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
- This publication is made by Jiexin semiconductor and subject to regular change without notice.