杰芯半导体 Jiexin Semiconductor

JX15N135HWR

Trench FS Reverse Conducting IGBT

General Description

JX15N135HWR 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

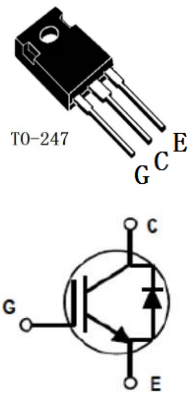
- Trench FS Technology
- RC-IGBT with monolithic body diode
- Optimized for Low Case Temperature in IH Cooker Application
- Positive temperature coefficient in V_{CEsat}

Applications

- Inductive cooking
- Inverterized microwave ovens
- Soft switching applications

Key Performance

V_{CES}	1350	V
I_C	15	A
V_{CEsat}	2.1	V
$V_{GE(th)}$	6.0	V
E_{off}	0.38	mJ



Absolute maximum ratings (T_j=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage	1350	V
V_{GES}	Gate- Emitter Voltage	±20	V
I_C	DC collector current@T_C = 25 °C	30	A
	DC collector current@T_C = 100°C	15	A
I_{Cpuls}	Pulsed collector current, tp limited by T_{vjmax}	45	A
I_F	Diode forward current@T_C = 100 °C	15	A
I_{Fpuls}	Diode pulsed current, tp limited by T_{vjmax}	45	A
P_D	Power dissipation @ T_C = 25°C	156	W
	Power dissipation @T_C = 100 °C	62	W
T_J	Maximum operating junction temperature	150	°C
T_{stg}	Storage temperature	-55 to +150	°C
T_L	Maximum Temperature for Soldering	270	°C

Thermal characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	IGBT thermal resistance, junction-case	0.8	°C/W
$R_{\theta JC}$	Diode thermal resistance, junction-case	0.8	°C/W
$R_{\theta JA}$	Thermal Resistance,Junction toAmbient	40	°C/W

Electrical characteristics (T_j=25°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=15A	-	2.1	2.5	V
V_F	Diode forward voltage	V_{GE}=0V, I_F=15A	-	-	3.0	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=15.0A	-	15	-	S
R_g	Integrated gate resistor			none		Ω

Dynamic Characteristic						
Symbol	Parameter	Tests conditions	Value			Unit
			Min.	Typ.	Max.	
C_{ies}	Input capacitance	V_{CE}=25V, V_{GE}=0V, f=1MHz	-	1450	-	pF
C_{oes}	Output capacitance		-	40	-	pF
C_{res}	Reverse transfer capacitance		-	25	-	pF
Q_G	Gate charge	V_{CC}=960V, I_C=15.0A, V_{GE}=15V	-	86	-	nC
L_E	Internal emitter inductance		-	14	-	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=15A, V_{GE}=0/15V, R_G= 10Ω L_{load}=500uH	-	70	-	ns
t_f	Fall time		-	110	-	ns
E_{off}	Turn-off energy		-	0.38	-	mJ
$t_{d(off)}$	Turn-off delay time	V_{CC}=600V, I_C=30A, V_{GE}=0/15V, R_G= 10Ω L_{load}=500uH	-	63	-	ns
t_f	Fall time		-	210	-	ns
E_{off}	Turn-off energy		-	0.70	-	mJ

Characteristics Cure

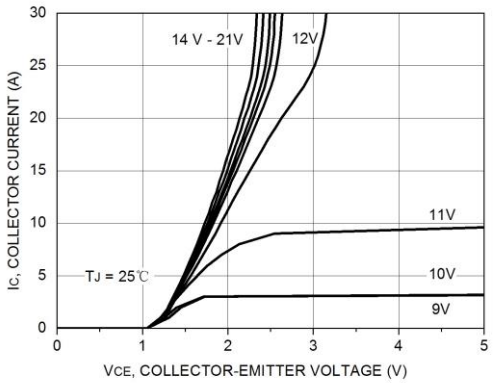


Figure 1. Typical Output Characteristics

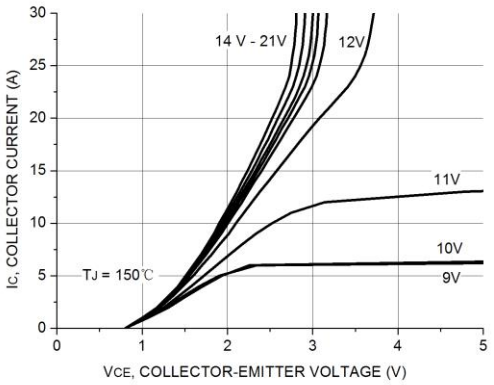


Figure 2. Typical Output Characteristics

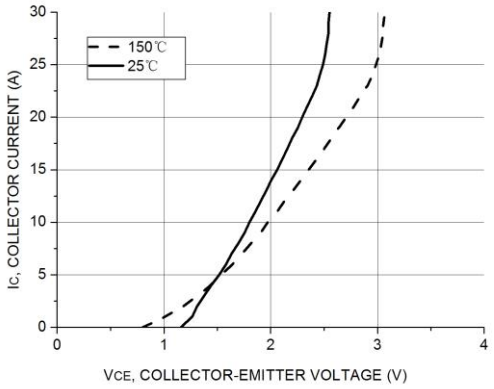


Figure 3. Typical Output Characteristics

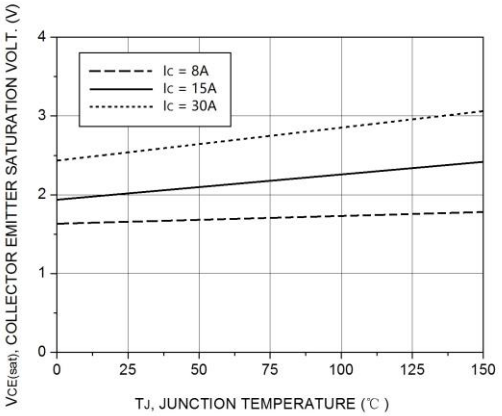


Figure 4. Typical Saturation Voltage vs.T_J

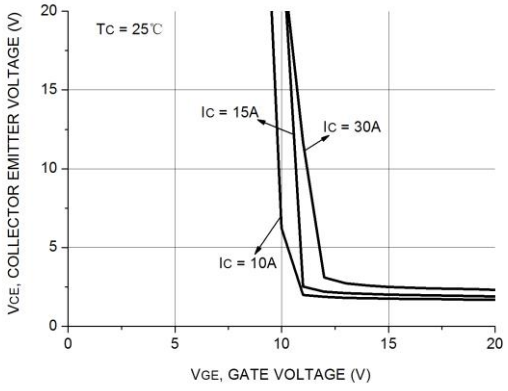


Figure 5. Saturation Voltage v. s. Gate Emitter Voltage

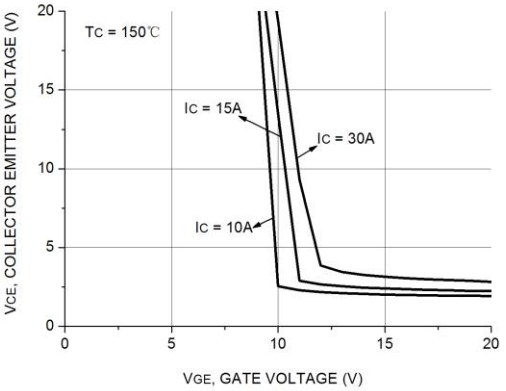


Figure 6. Saturation Voltage v. s. Gate Emitter Voltage

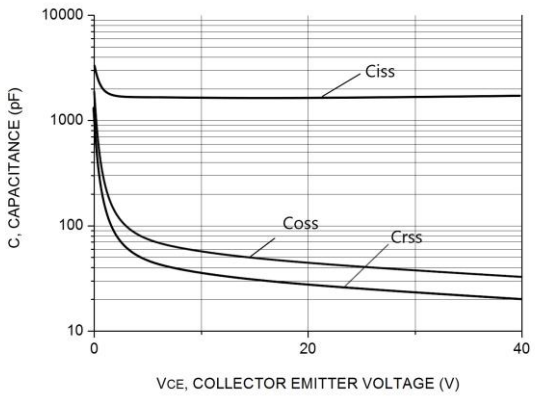


Figure 7. Typical Capacitance Characteristics

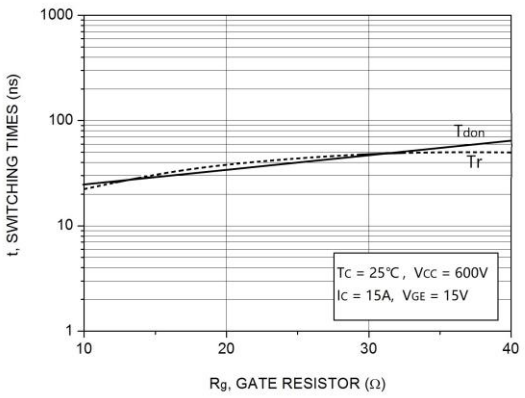


Figure 8. Typical Turn-On Characteristics v. s. R_g

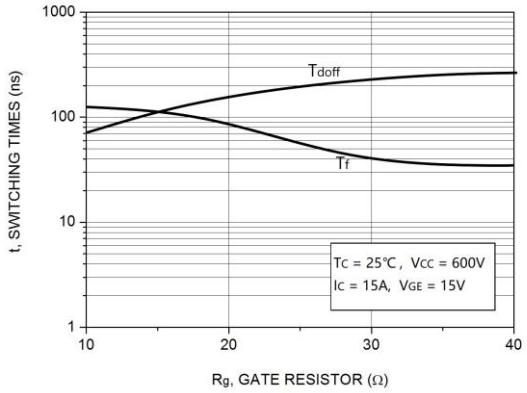


Figure 9. Typical Turn-Off Characteristics v. s. R_g

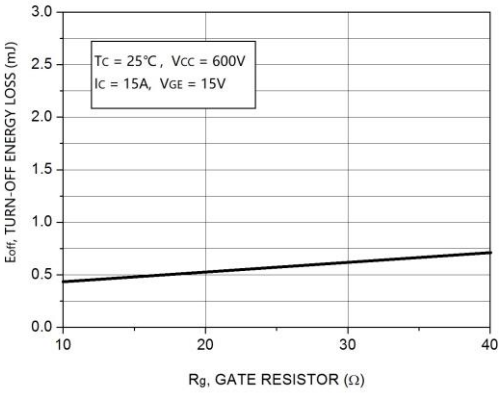


Figure 10. Typical E_{off} Characteristics v. s. R_g

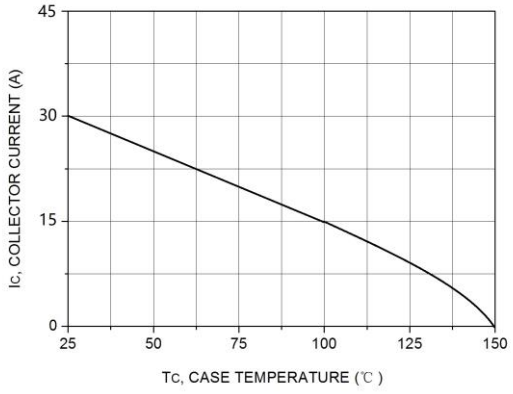


Figure 11. Collector Current v. s. Case Temperature

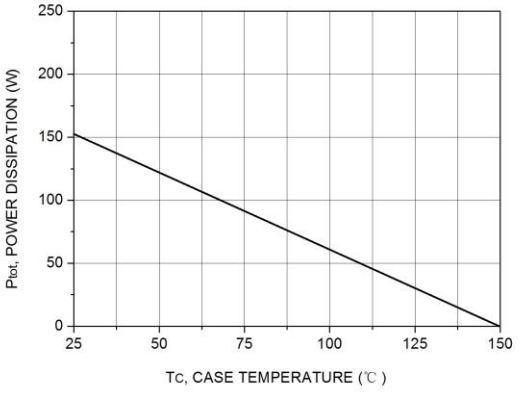


Figure 12. Power Dissipation v. s. Case Temperature

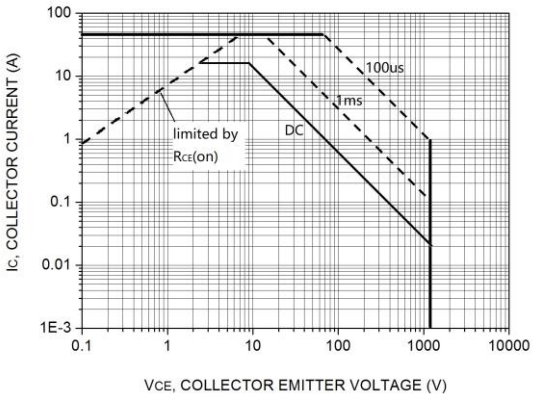


Figure 13. Typical IGBT FBSOA

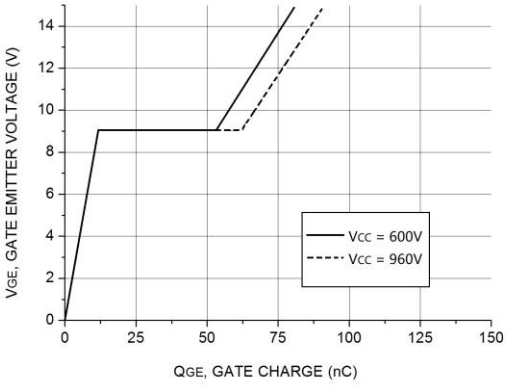


Figure 14. Typical Gate Charge

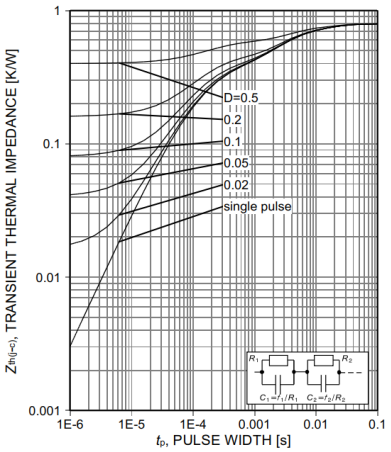
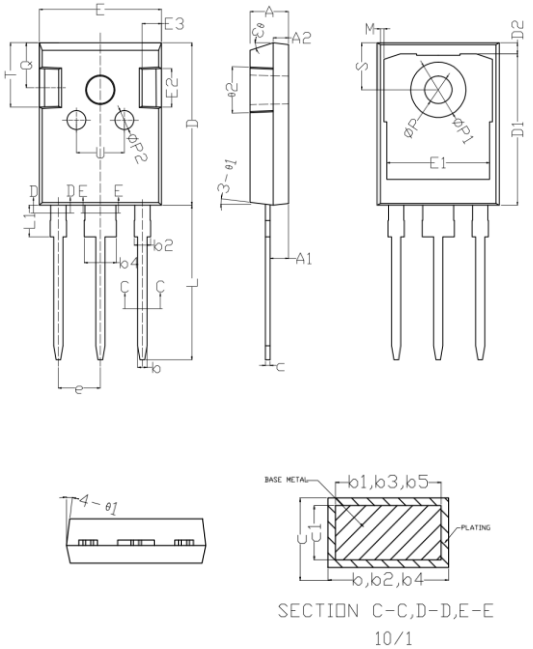


Figure 15. IGBT Transient Thermal Resistance

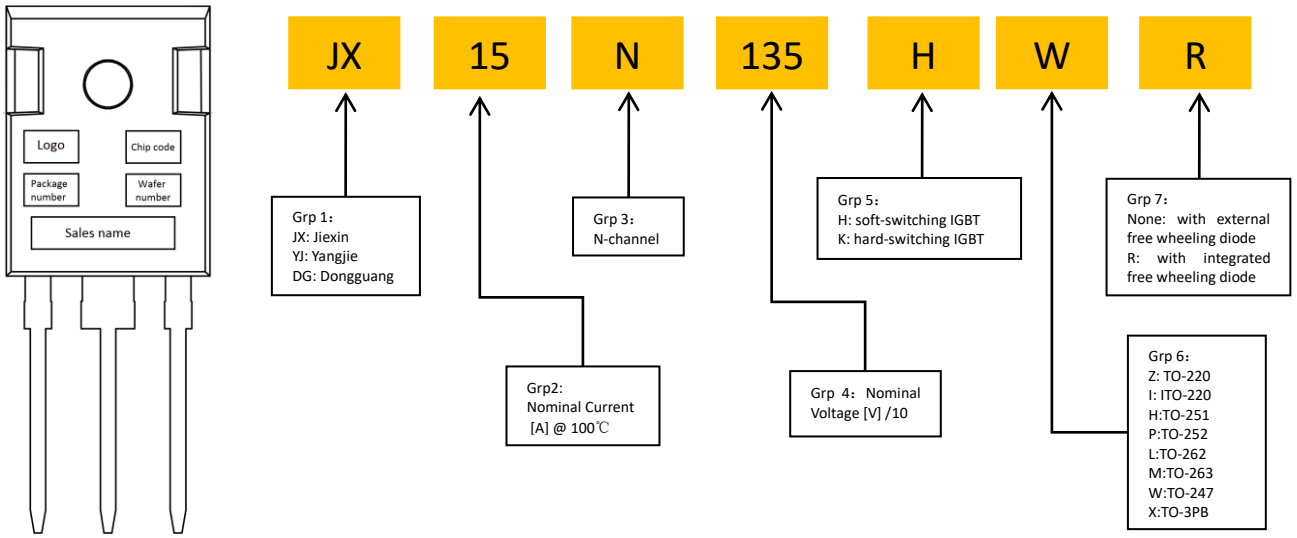
Package information



COMMON DIMENSIONS

SYMBOL	MIN	NOM	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
θ1	5°	7°	9°
θ2	3°	5°	8°
θ3	13°	16°	19°

Marking Pattern and Sales Name



Warnings

1. Exceeding the maximun 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 maximun ratings of the device.
2. When installing the heatsink , please pay attention to the torsional moment and the smoothness of the heatsink.
3. 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.
4. This publication is made by Jiexin semiconductor and subject to regular change without notice.