JJMICROELECTRONICS

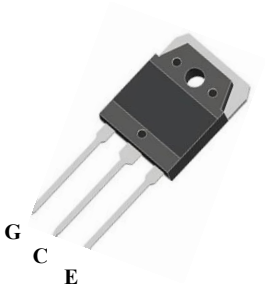
1350V 20A Trench and Field Stop IGBT

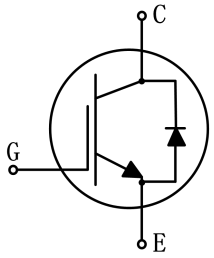
JJT20N135UH

Key performance:

- V_{CE}=1350V
- I_C=15A@T_C=100℃
- $V_{CE(sat)}$=1.8V

TO-3P





Features:

- Trench and field-stop technology
- Low collector to emitter saturation voltage
- Easy parallel switching capability
- High ruggedness performance
- RoHS compliant

Applications:

- Induction cooking
- Resonant converters

Package parameters

Type	Marking	Package	Packaging Method
JJT20N135UH	T20135UH	TO-3P	Tube

Maximum ratings

Symbol	Parameter	Values	Unit
V_{CES}	Collector-emitter voltage	1350	V
V_{GES}	Gate-emitter voltage	±20	V
I_C	Continuous collector current (T_C=25℃)	40	A
	Continuous collector current (T_C=100℃)	20	A
I_{CM}	Pulsed collector current, t_p limited by T_{vjmax}	80	A
I_F	Diode continuous forward current (T_C=100℃)	20	A
I_{FM}	Diode maximum current, t_p limited by T_{vjmax}	80	A
P_{tot}	Power dissipation (T_C=25℃)	340	W
	Power dissipation (T_C=100℃)	170	W
T_{vj}	Operating junction temperature range	-40 to +175	℃
T_{stg}	Storage temperature range	-55 to +150	℃

Thermal characteristics

Symbol	Parameter	Values		Unit
		Typ.	Max.	
$R_{th(j-c)}$	Thermal resistance, junction to case for IGBT	-	0.44	K/ W
$R_{th(j-c)}$	Thermal resistance, junction to case for Diode	-	0.51	K/ W
$R_{th(j-a)}$	Thermal resistance, junction to ambient	-	40	K/ W

Electrical characteristics of IGBT (T_{vj}=25℃ unless otherwise specified)

Static characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
BV_{CES}	Collector-emitter breakdown voltage	V_{GE}=0V, I_C=250μA	1350	-	-	V
I_{CES}	Collector-emitter leakage current	V_{CE}=1350V, V_{GE}=0V	-	-	250	μA
I_{GES}	Gate leakage current, forward	V_{GE}=20V, V_{CE}=0V	-	-	100	nA
	Gate leakage current, reverse	V_{GE}=-20V, V_{CE}=0V	-	-	-100	nA
$V_{GE(th)}$	Gate-emitter threshold voltage	V_{GE}=V_{CE}, I_C=1mA	5.6	6.1	6.6	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_{GE}=15 V, I_C=15A	-	1.8	-	V
		V_{GE}=15V, I_C=15A, T_{vj}=175℃	-	2.3	-	V

Dynamic characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
C_{ies}	Input capacitance	V_{CE}=30V V_{GE}=0V f=1MHz	-	1270	-	pF
C_{oes}	Output capacitance		-	48	-	pF
C_{res}	Reverse transfer capacitance		-	10	-	pF
Q_g	Total gate charge	V_{CC}=1080V V_{GE}=15V I_C=15A	-	76	-	nC

Switching characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
$t_{d(off)}$	Turn-off delay time	V_{CC}=600V V_{GE}=0/15V I_C=15A R_G=10Ω Inductive load	-	145	-	ns
t_f	Fall time		-	151	-	ns
E_{off}	Turn-off energy		-	0.8	-	mJ
$t_{d(off)}$	Turn-off delay time	V_{CC}=600V V_{GE}=0/15V I_C=15A R_G=10Ω, T_{vj}=175℃ Inductive load	-	186	-	ns
t_f	Fall time		-	285	-	ns
E_{off}	Turn-off energy		-	1.4	-	mJ

Electrical characteristics of Diode (T_{vj}=25℃ unless otherwise specified)

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
V_F	Diode forward voltage	I_F=15A	-	1.5	-	V
		I_F=15A,T_{vj}=175℃	-	1.4	-	V

Typical performance characteristics

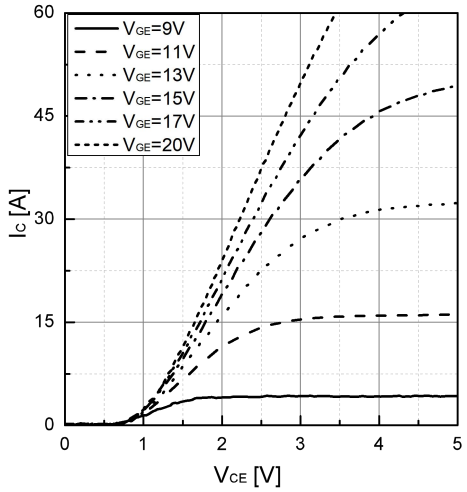


Fig 1. Typical output characteristic (T_{vj}=25℃)

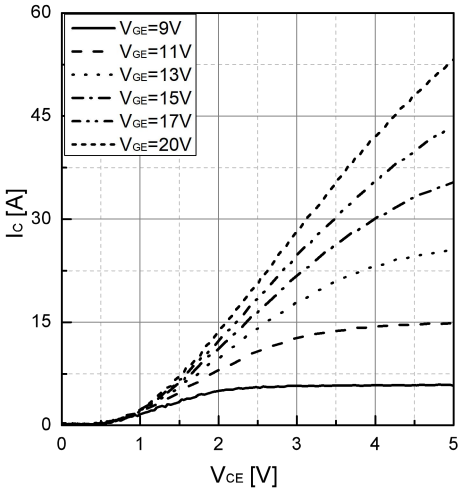


Fig 2. Typical output characteristic(T_{vj}=175℃)

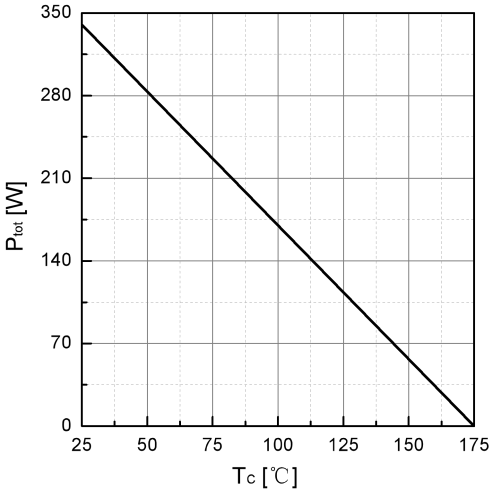


Fig 3. Power dissipation as a function of T_C

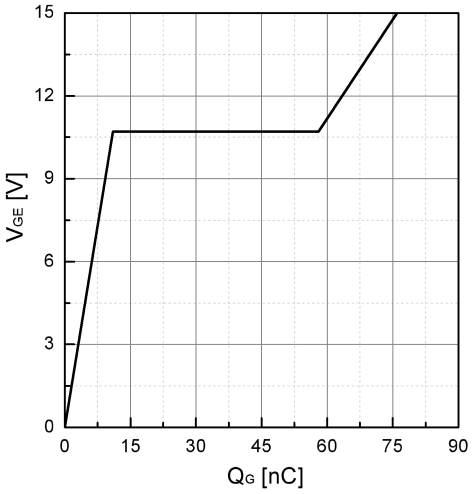


Fig 4. Typical Gate charge

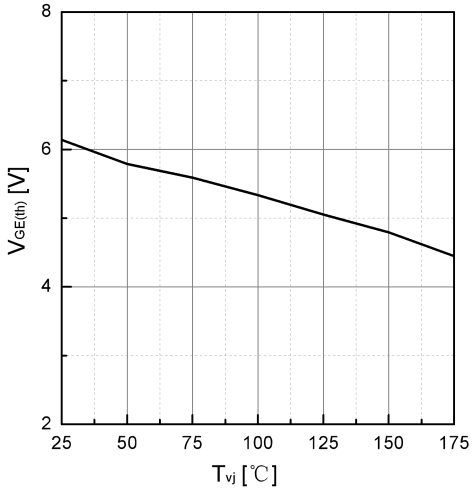


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj} (I_C=1mA)

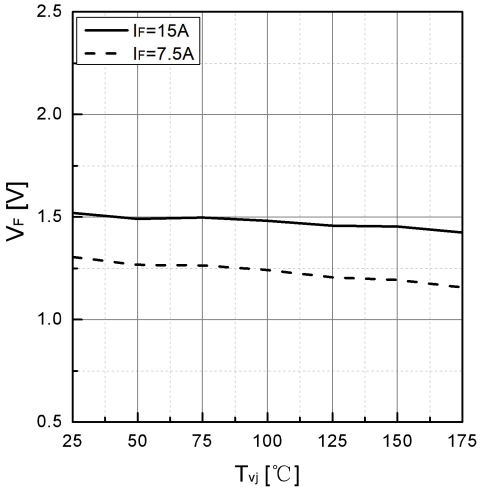


Fig 6. Typical V_F as a function of T_{vj}

Typical performance characteristics

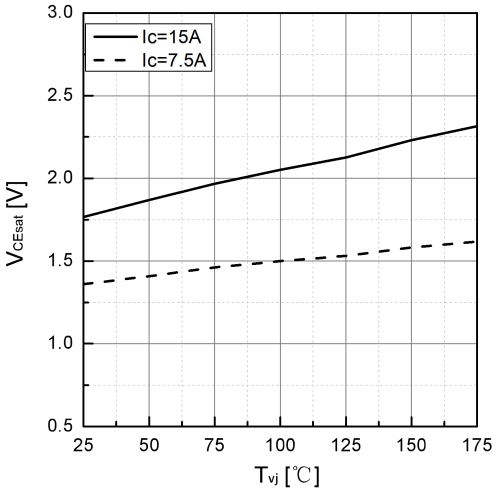


Fig 7. Typical V_{CEsat} as a function of T_{vj}

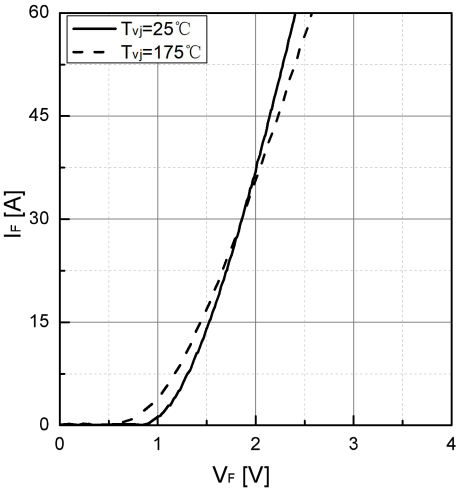


Fig 8. Typical I_F as a function of V_F

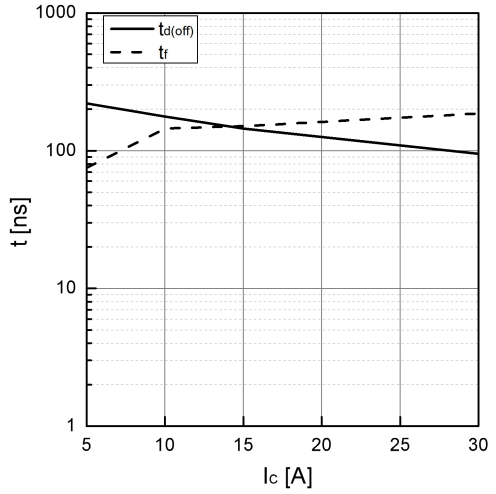


Fig 9. Typical switching time as a function of I_C

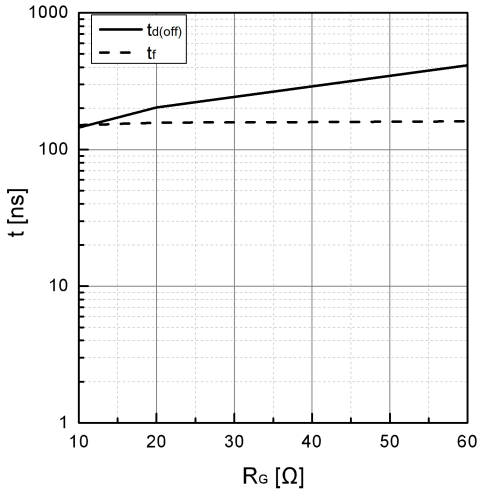


Fig 10. Typical switching times as a function of R_G

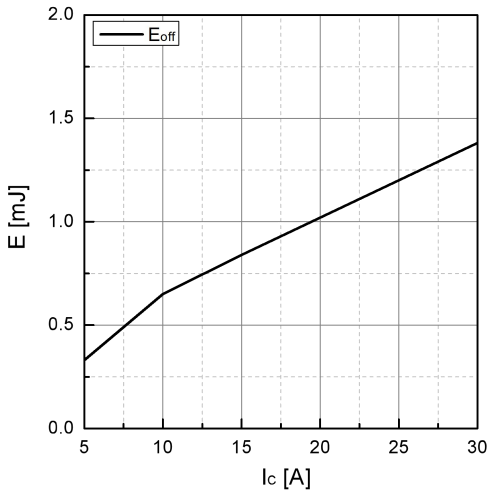


Fig 11. Typical switching energy losses as a function of I_C

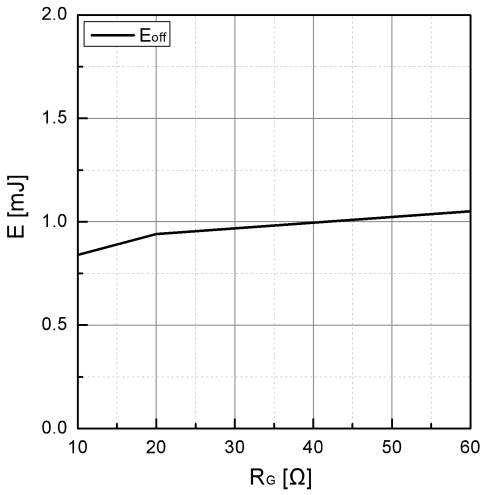


Fig 12. Typical switching energy losses as a function of R_G

Typical performance characteristics

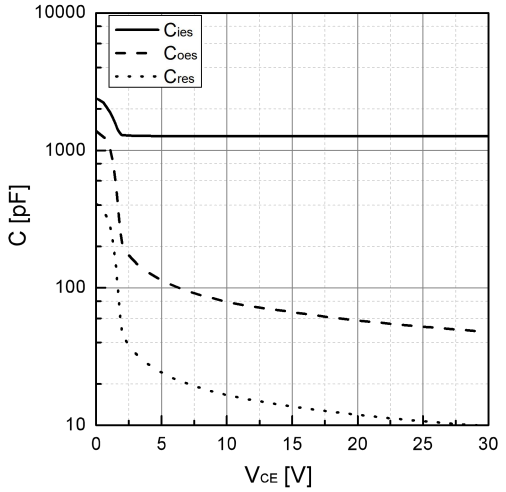


Fig 13. Typical capacitance as a function of V_{CE} (f=1Mhz, V_{GE}=0V)

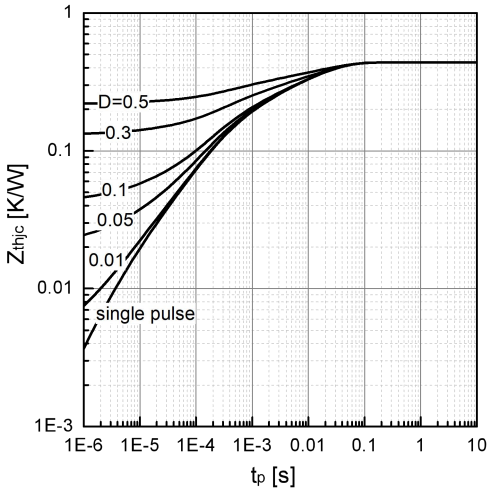
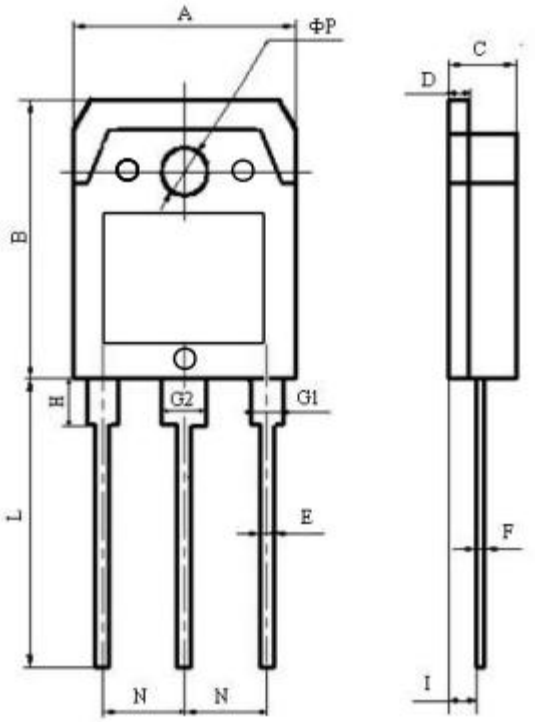


Fig 14. Transient thermal impedance of IGBT

Package dimension

TO-3P



Items	Values(mm)	
	MIN	MAX
A	15.00	16.00
B	19.20	20.60
C	4.60	5.00
D	1.40	1.60
E	0.90	1.10
F	0.50	0.70
G1	2.00	2.20
G2	3.00	3.20
H	3.00	3.70
I	2.30	2.50
L*	19.00	21.00
N	5.25	5.65
ϕ P	3.10	3.30

Revision history

Date	Revision	Changes
2025-05-05	Rev 1.0	Release of the datasheet.

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