JJMICROELECTRONICS

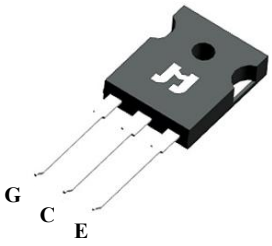
1350V 25A Trench and Field Stop IGBT

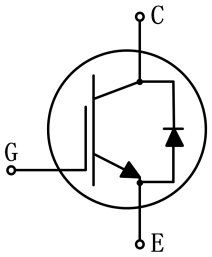
JJT25N135UE

Key performance:

- V_{CE}=1350V
- I_C=25A@T_C=100℃
- $V_{CE(sat)}$=1.65V

TO-247





Features:

- Trench and field-stop technology
- High speed switching
- Positive VCE (sat) temperature coefficient.
- Fast switching and short tail current.
- High ruggedness performance

Applications:

- Induction cooking
- Resonant converters

Package parameters

Type	Marking	Package	Packaging Method
JJT25N135UE	T25135UE	TO-247	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℃)	50	A
	Continuous collector current (T_C=100℃)	25	A
I_{CM}	Pulsed collector current, t_p limited by T_{vjmax}	100	A
I_F	Diode continuous forward current (T_C=100℃)	25	A
I_{FM}	Diode maximum current, t_p limited by T_{vjmax}	100	A
P_{tot}	Power dissipation (T_C=25℃)	283	W
	Power dissipation (T_C=100℃)	142	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	0.53	-	K/ W
$R_{th(j-c)}$	Thermal resistance, junction to case for Diode	1.40	-	K/ W
$R_{th(j-a)}$	Thermal resistance, junction to ambient	32	-	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=1mA	1480	-	-	V
I_{CES}	Collector-emitter leakage current	V_{CE}=1350V, V_{GE}=0V	-	-	100	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	5.0	5.4	6.0	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_{GE}=15 V, I_C=25A	-	1.65	-	V
		V_{GE}=15V, I_C=25A, T_{vj}=175℃	-	2.05	-	V

Dynamic characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
C_{ies}	Input capacitance	V_{CE}=30V V_{GE}=0V f=1MHz	-	4530	-	pF
C_{oes}	Output capacitance		-	47	-	pF
C_{res}	Reverse transfer capacitance		-	20	-	pF
Q_g	Total gate charge	V_{CC}=1080V V_{GE}=15V I_C=25A	-	147	-	nC

Switching characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
$t_{d(on)}$	Turn-on delay time	V_{CC}=600V V_{GE}=0/15V I_C=25A R_G=10Ω Inductive load	-	37	-	ns
t_r	Rise time		-	29	-	ns
$t_{d(off)}$	Turn-off delay time		-	192	-	ns
t_f	Fall time		-	183	-	ns
E_{on}	Turn-on energy		-	1.2	-	mJ
E_{off}	Turn-off energy		-	1.1	-	mJ
E_{ts}	Total switching energy		-	2.3	-	mJ
$t_{d(on)}$	Turn-on delay time	V_{CC}=600V V_{GE}=0/15V I_C=25A R_G=10Ω, T_{vj}=175℃ Inductive load	-	34	-	ns
t_r	Rise time		-	28	-	ns
$t_{d(off)}$	Turn-off delay time		-	203	-	ns
t_f	Fall time		-	231	-	ns
E_{on}	Turn-on energy		-	1.3	-	mJ
E_{off}	Turn-off energy		-	1.6	-	mJ
E_{ts}	Total switching energy		-	2.9	-	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=25A	-	1.75	-	V
		I_F=25A,T_{vj}=175℃	-	1.70	-	V

Typical performance characteristics

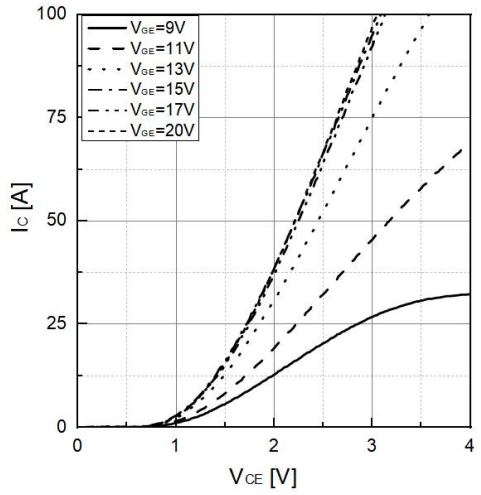


Fig 1. Typical output characteristic (T_{vj}=25℃)

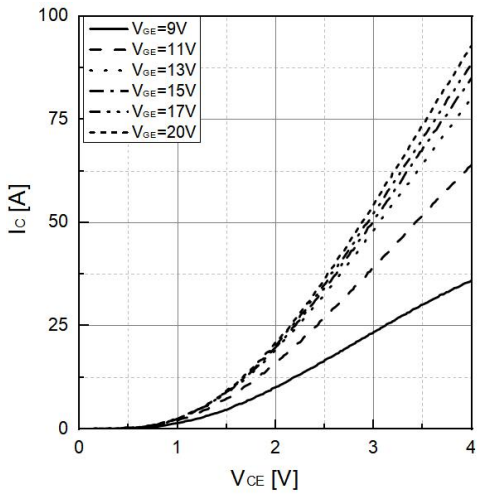


Fig 2. Typical output characteristic(T_{vj}=175℃)

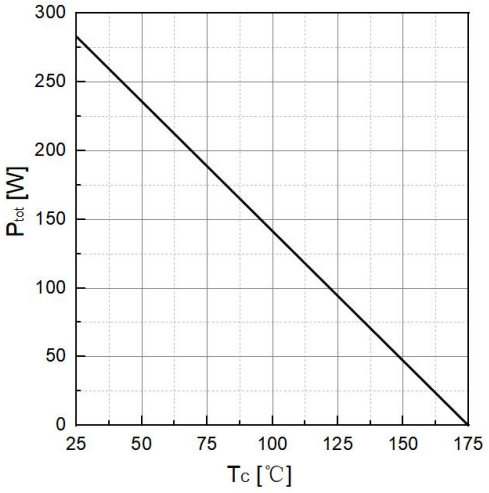


Fig 3. Power dissipation as a function of T_C

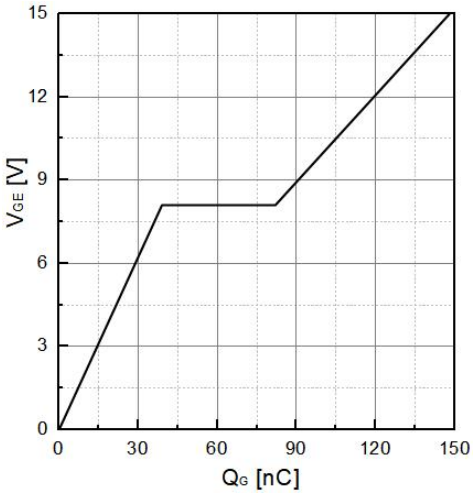


Fig 4. Typical Gate charge

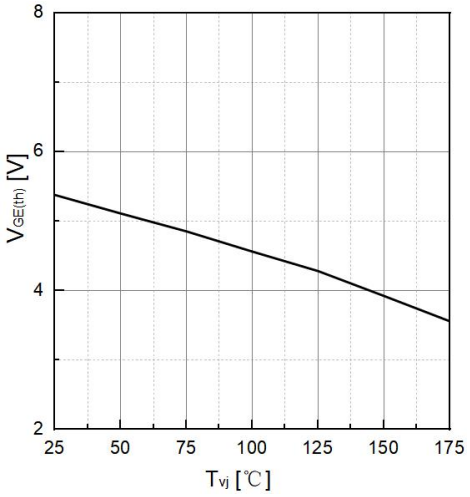


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj} (I_C=1mA)

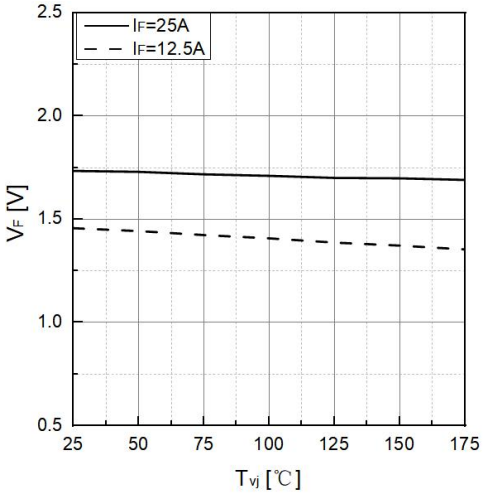


Fig 6. Typical V_F as a function of T_{vj}

Typical performance characteristics

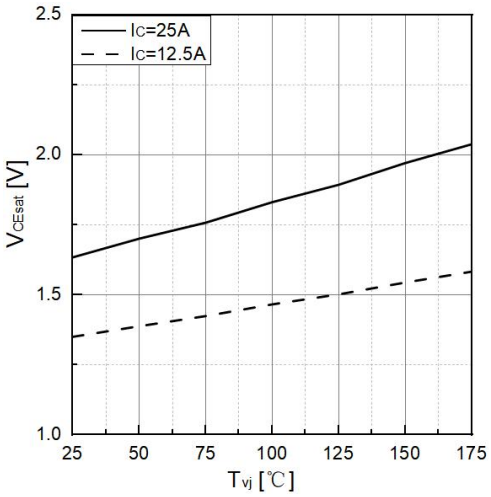


Fig 7. Typical V_{CEsat} as a function of T_{vj}

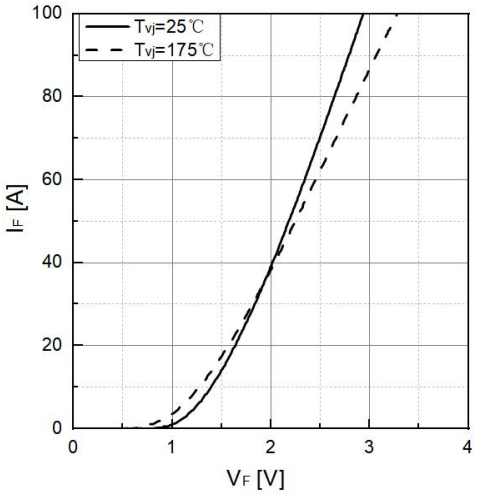


Fig 8. Typical I_F as a function of V_F

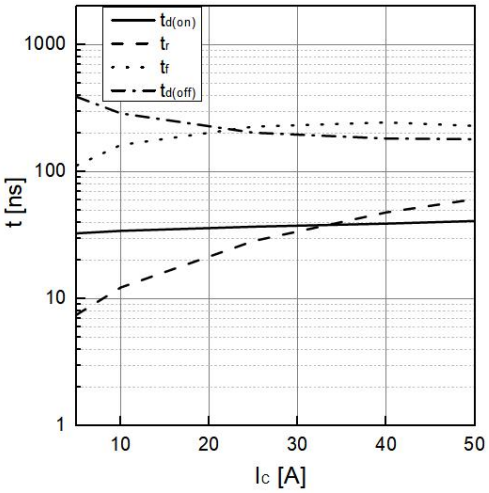


Fig 9. Typical switching time as a function of I_C

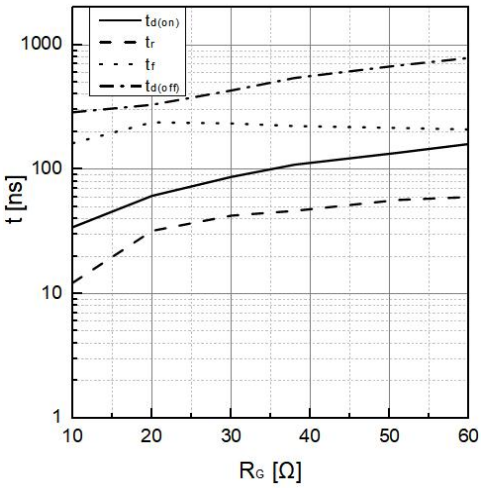


Fig 10. Typical switching times as a function of R_G

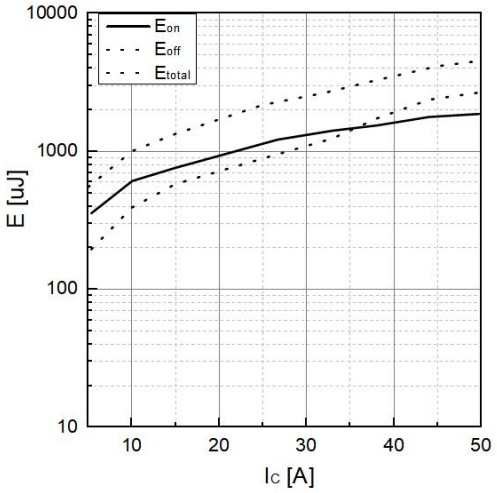


Fig 11. Typical switching energy losses as a function of I_C

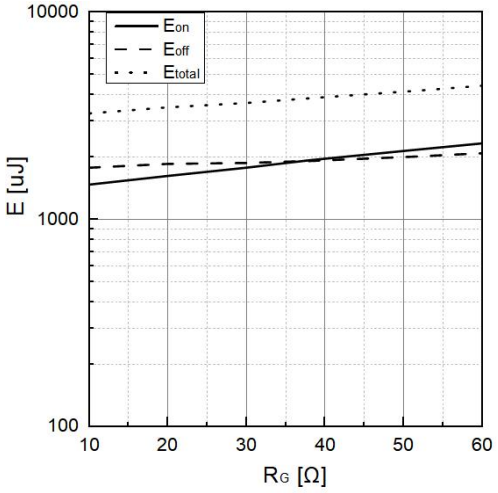


Fig 12. Typical switching energy losses as a function of R_G

Typical performance characteristics

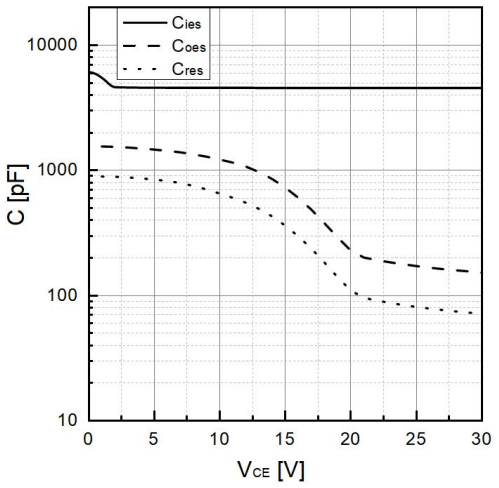


Fig 13. Typical capacitance as a function of V_{CE}
(f=1Mhz, V_{GE}=0V)

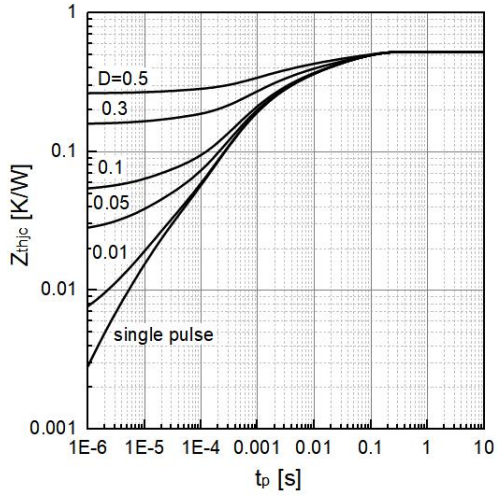


Fig 14. Transient thermal impedance of IGBT

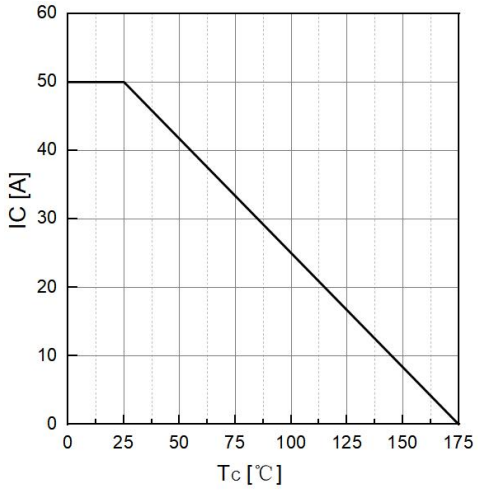


Fig 15. Continuous collector current as a function of Tc
（Tvj≤175℃）

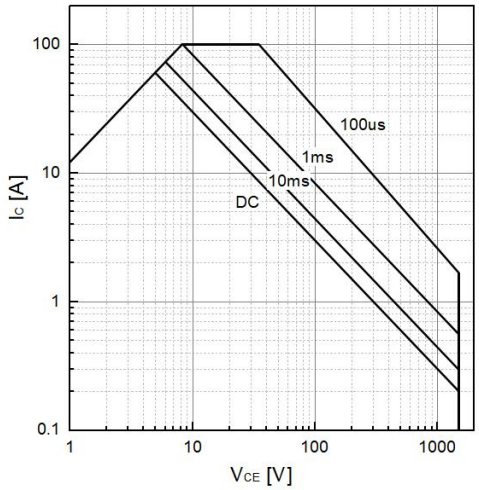


Fig.16 Forward bias safe operating area

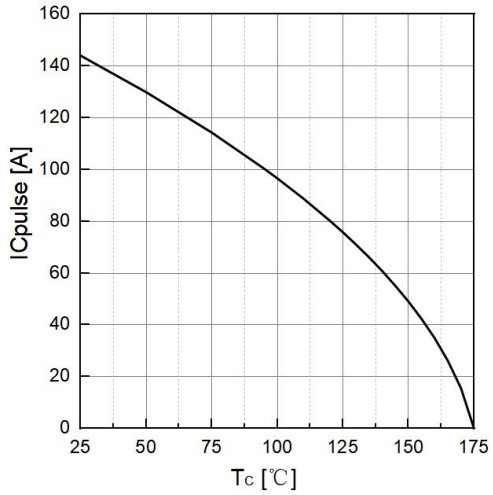


Fig 17. Pulsed collector current as a function of Tc
(Tvj≤175℃，D=1，tp=1ms)

Package dimension

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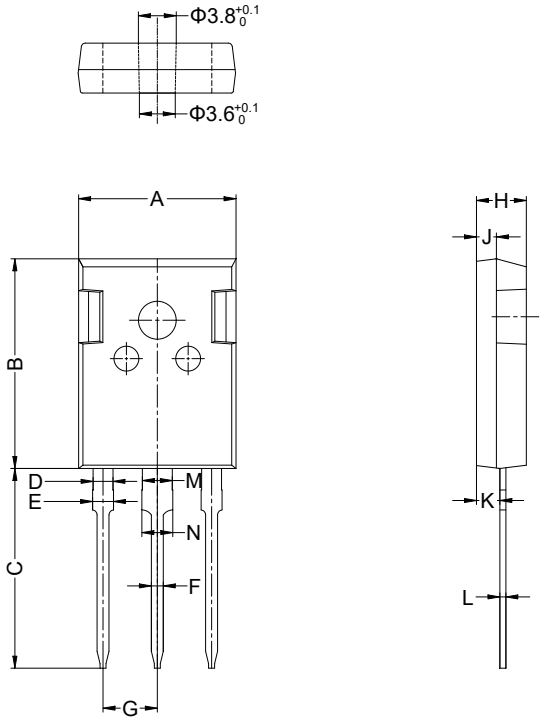

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.50	15.80	16.10	0.610	0.622	0.634
B	20.80	21.00	21.20	0.819	0.827	0.835
C	19.70	20.00	20.30	0.776	0.787	0.799
D	1.80	2.00	2.20	0.071	0.079	0.087
E	1.90	2.10	2.30	0.075	0.083	0.091
F	1.00	1.20	1.40	0.039	0.047	0.055
G	5.25	-	5.65	0.207	-	0.222
H	4.80	5.00	5.20	0.189	0.197	0.205
J	1.90	2.00	2.10	0.075	0.079	0.083
K	2.20	2.35	2.50	0.087	0.093	0.098
L	0.41	0.60	0.79	0.016	0.024	0.031
M	2.80	3.00	3.20	0.110	0.118	0.126
N	2.90	3.10	3.30	0.114	0.122	0.130

Revision history

Date	Revision	Changes
2024-11-11	Rev 1.1	Update
2024-11-20	Rev 1.2	Update
2025-12-08	Rev 1.3	Update with full characterization
2026-01-15	Rev 1.5	Update figure

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