JJMICROELECTRONICS

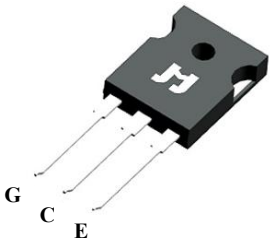
650V 40A Trench and Field Stop IGBT

JJT40N65UE

K :

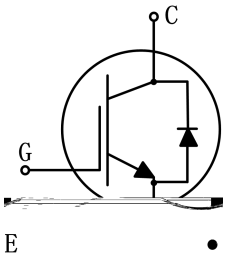
- $_{CE}$ =650V
- $_{C}$=40A@ $_{C}$=100
- $_{CE(sat)}$=1.9V

TO-247



F :

- Trench and field-stop technology.
- Easy parallel switching capability.



B :

- High efficiency for inverters.
- High ruggedness performance.
- RoHS compliant.

A :

- PFC applications
- Welding machines

P

Type	Marking	Package	Packaging Method
JJT40N65UE	T4065UE	TO-247	Tube

M

	P		
CES	Collector-emitter voltage	650	V
GES	Gate-emitter voltage	±20	V
C	Continuous collector current (C=25)	80	A
	Continuous collector current (C=100)	40	A
CM	Pulsed collector current, p limited by vjmax	160	A
F	Diode continuous forward current (C=100)	40	A
FM	Diode maximum current, p limited by vjmax	160	A
tot	Power dissipation (C=25)	300	W
	Power dissipation (C=100)	150	W
vj	Operating junction temperature range	-40 to +175	
stg	Storage temperature range	-55 to +150	

	P			
		.	M .	
th(j-c)	Thermal resistance, junction to case for IGBT	-	0.5	K/ W
th(j-c)	Thermal resistance, junction to case for Diode	-	0.9	K/ W
th(j-a)	Thermal resistance, junction to ambient	-	40	K/ W

E **IGB** (vj=25 unless otherwise specified)

Static characteristics

	P					
			M .	.	M .	
CES	Collector-emitter breakdown voltage	GE=0V, I_C=250μA	650	-	-	V
CES	Collector-emitter leakage current	CE=650V, GE=0V	-	-	50	μA
GES	Gate leakage current, forward	GE=20V, CE=0V	-	-	100	nA
	Gate leakage current, reverse	GE=-20V, CE=0V	-	-	-100	nA
GE(th)	Gate-emitter threshold voltage	GE= CE, C=1mA	4.0	5.0	6.0	V
CE(sat)	Collector-emitter saturation voltage	GE=15 V, C=40A	-	1.9	-	V
		GE=15V, C=40A, vj=175	-	2.6	-	V

Dynamic characteristics

	P					
			M .	.	M .	
ies	Input capacitance	CE=30V GE=0V =1MHz	-	2480	-	pF
oes	Output capacitance		-	95	-	pF
res	Reverse transfer capacitance		-	21	-	pF
g	Total gate charge	CC=520V GE=15V C=40A	-	78	-	nC

Switching characteristics

	P					
			M .	.	M .	
d(on)	Turn-on delay time	$_{CC}$=400V $_{GE}$=0/15V $_{C}$=40A $_{G}$=10Ω Inductive load	-	32	-	ns
r	Rise time		-	55	-	ns
d(off)	Turn-off delay time		-	106	-	ns
f	Fall time		-	51	-	ns
on	Turn-on energy		-	0.9	-	mJ
off	Turn-off energy		-	0.5	-	mJ
ts	Total switching energy		-	1.4	-	mJ
d(on)	Turn-on delay time	$_{CC}$=400V $_{GE}$=0/15V $_{C}$=40A $_{G}$=10Ω Inductive load $_{vj}$=175	-	28	-	ns
r	Rise time		-	52	-	ns
d(off)	Turn-off delay time		-	128	-	ns
f	Fall time		-	75	-	ns
on	Turn-on energy		-	1.4	-	mJ
off	Turn-off energy		-	0.7	-	mJ
ts	Total switching energy		-	2.1	-	mJ

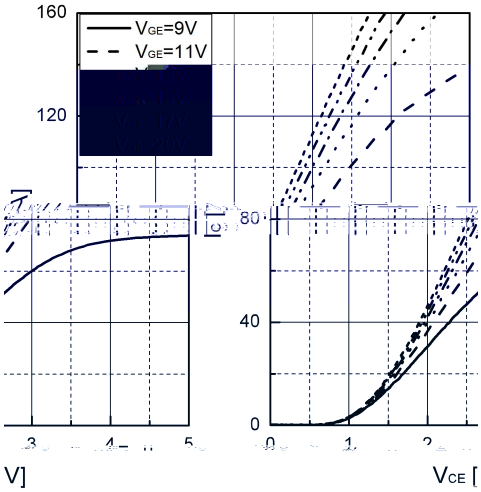


Fig 1. Typical output characteristic (vj=25)

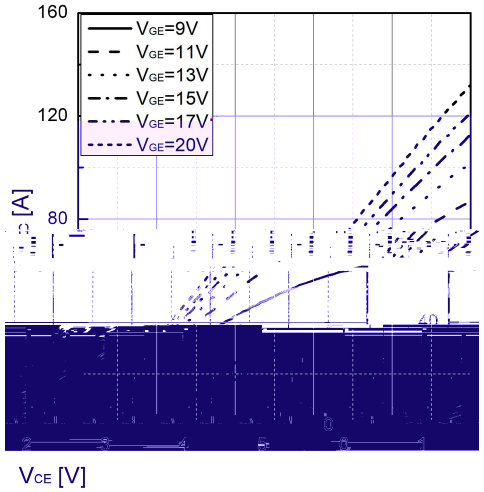


Fig 2. Typical output characteristic (vj=175)

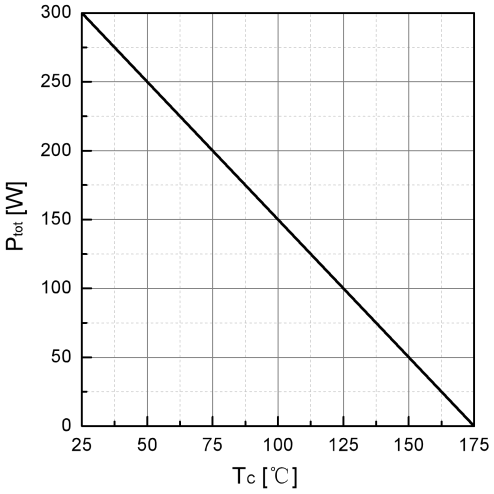


Fig 3. Power dissipation as a function of

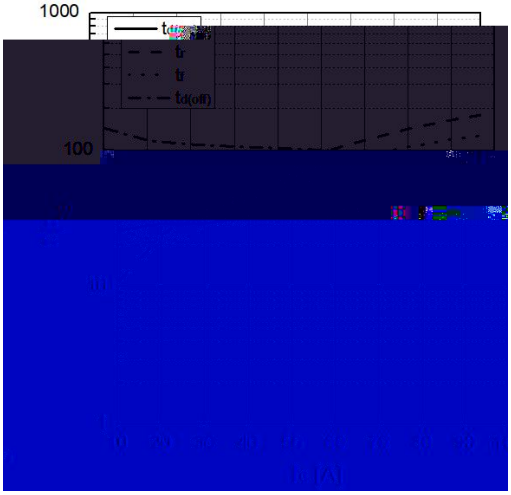


Fig 4. Typical switching time as a function of C

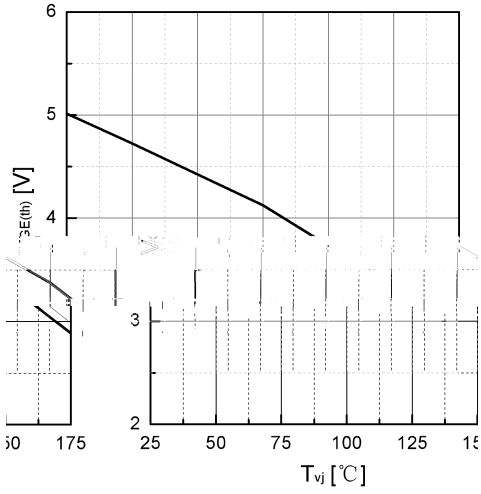


Fig 5. Typical GE(th) as a function of vj

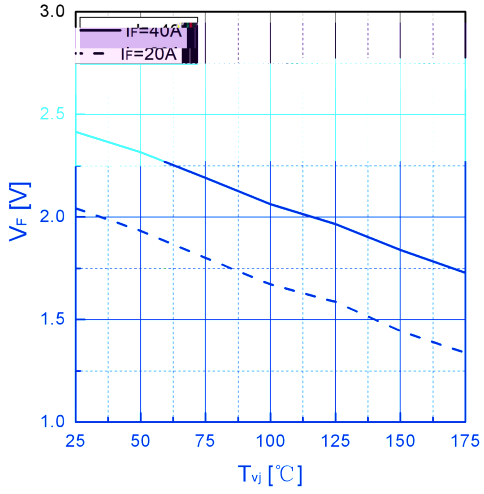


Fig 6. Typical F as a function of vj

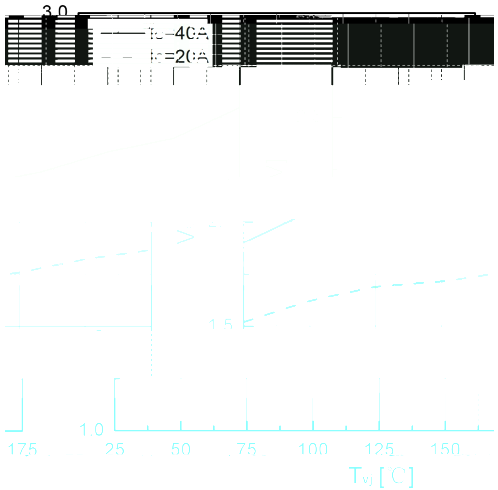


Fig 7. Typical $_{CEsat}$ as a function of $_{vj}$

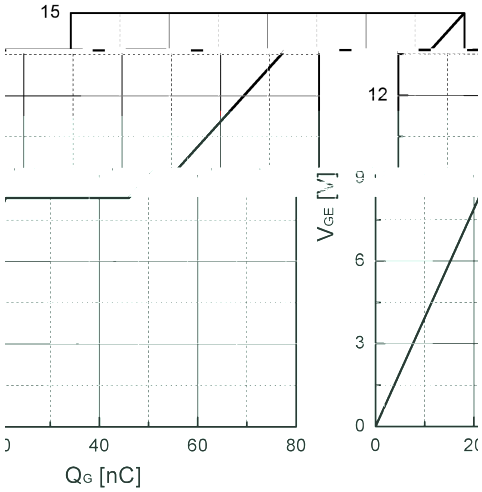


Fig 8. Typical Gate charge

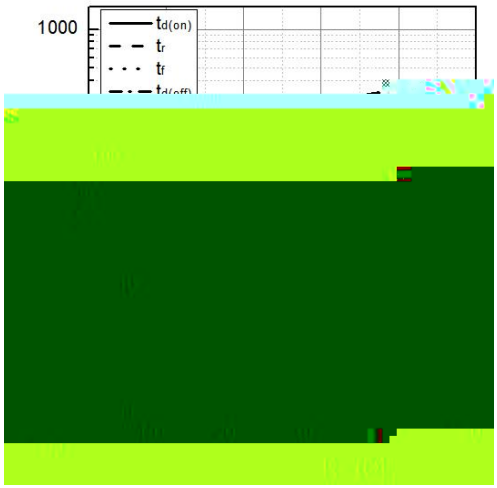


Fig 9. Typical switching times as a function of $_{G}$

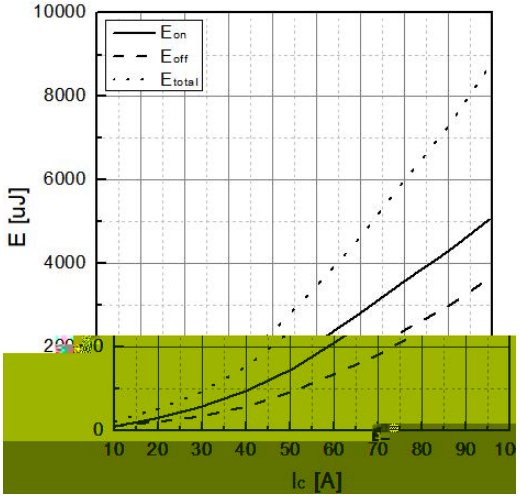


Fig 10. Typical switching energy losses as a function of $_{C}$

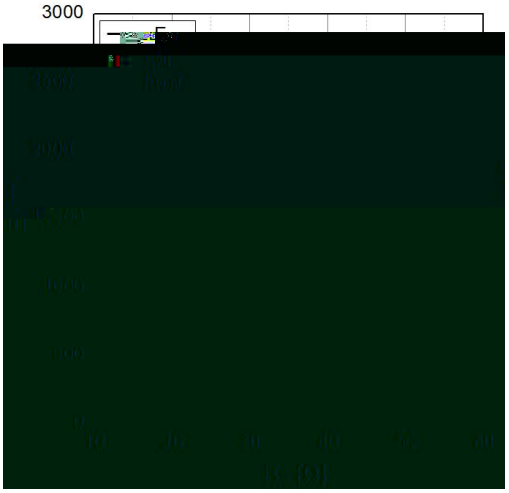


Fig 11. Typical switching energy losses as a function of $_{G}$

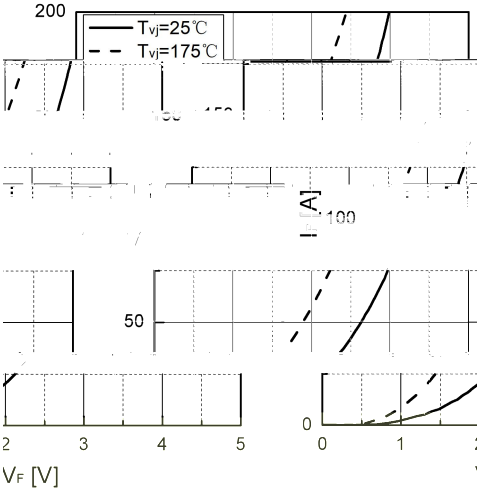


Fig 12. Typical $_{F}$ as a function of $_{F}$

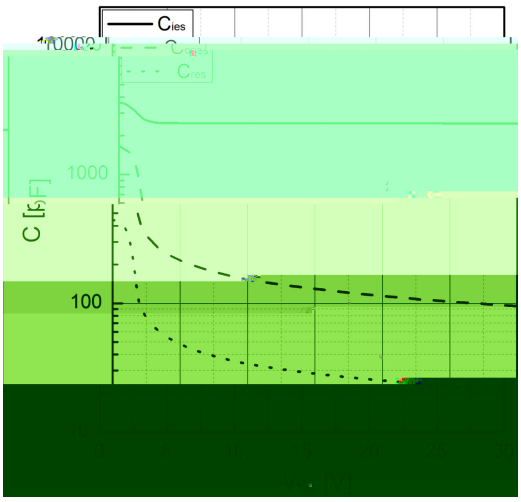


Fig 13. Typical capacitance as a function of $_{CE}$ (f=1Mhz, $_{GE}$=0V)

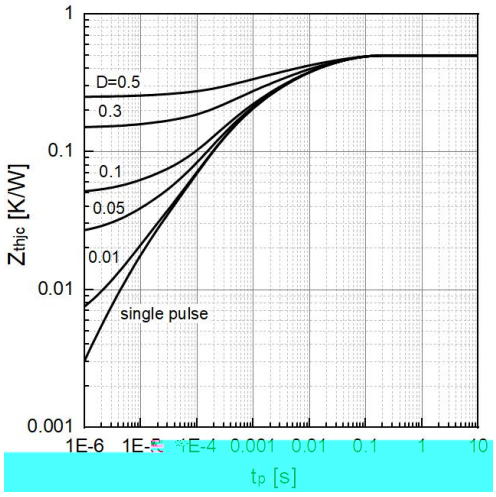


Fig 14. Transient thermal impedance of IGBT

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

Date	Revision	Changes
2023-11-20	Rev 1.0	Release of the datasheet
2024-04-17	Rev 1.1	Update
2024-05-17	Rev 1.2	Update
2026-06-25	Rev 1.3	Update thermal

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