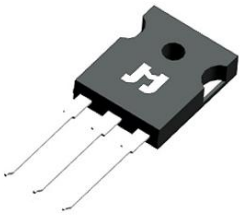
JJMICROELECTRONICS

650V 40A Trench and Field Stop IGBT

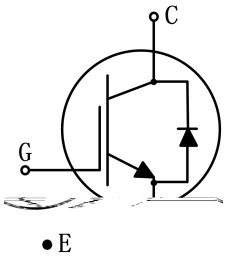
JJT40N65HE

- V_{CE}=650V
- I_C=40A@ T_C=100
- $V_{CE(sat)}$=1.7V

TO-247



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



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

- PFC applications
- Uninterruptible power supplies
- Solar inverters

Type	Marking	Package	Packaging Method
JJT40N65HE	T4065HE	TO-247	Tube

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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	

th(j-c) Thermal resistance, junction to case for IGBT

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V_{CES}	Collector-emitter breakdown voltage	V_{GE}=0V, I_C=250μ		-	V
I_{CES}	Collector-emitter leakage current	V_{CE}=650V, V_{GE}=0V			μA
I_{GES}	Gate				

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Switching characteristics

$t_{d(on)}$	Turn-on delay time	V_{CC}=400V V_{GE}=0/15V I_C=40A R_G=10Ω Inductive load	-	32	-	ns
t_r	Rise time		-	59	-	ns
$t_{d(off)}$	Turn-off delay time		-	110	-	ns
t_f	Fall time		-	52	-	ns
E_{on}	Turn-on energy		-	1.2	-	mJ
E_{off}	Turn-off energy		-	0.6	-	mJ
E_{ts}	Total switching energy		-	1.8	-	mJ
$t_{d(on)}$	Turn-on delay time	V_{CC}=400V V_{GE}=0/15V I_C=40A R_G=10Ω Inductive load T_{vj}=175	-	28	-	ns
t_r	Rise time		-	51	-	ns
$t_{d(off)}$	Turn-off delay time		-	131	-	ns
t_f	Fall time		-	78	-	ns
E_{on}	Turn-on energy		-	1.6	-	mJ
E_{off}	Turn-off energy		-	1.0	-	mJ
E_{ts}	Total switching energy		-	2.6	-	mJ

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($_{vj}$=25 unless otherwise specified)

$_{F}$	Diode forward voltage	$_{F}$=40A	-	1.5	-	V
		$_{F}$=40A, $_{vj}$=175	-	1.3	-	V
$_{rr}$	Diode reverse recovery time	$_{R}$=400V $_{F}$=40A d $_{F}$/d =-1200A/μs	-	82	-	ns
$_{rrm}$	Diode peak reverse recovery current		-	15	-	A
$_{rr}$	Diode reverse recovery charge		-	1620	-	nC
$_{rr}$	Diode reverse recovery time	$_{R}$=400V $_{F}$=40A d $_{F}$/d =-1200A/μs $_{vj}$=175	-	132	-	ns
$_{rrm}$	Diode peak reverse recovery current		-	43	-	A
$_{rr}$	Diode reverse recovery charge		-	3580	-	nC

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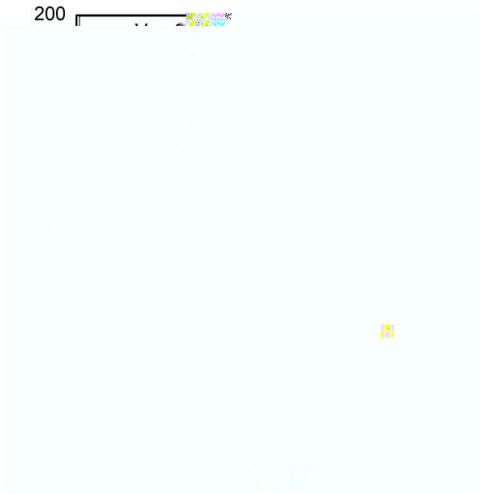

Fig 1. Typical output characteristic (vj=25)

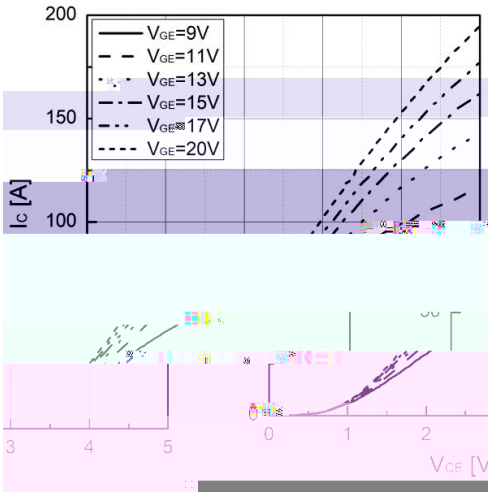

Fig 2. Typical output characteristic(vj=175)

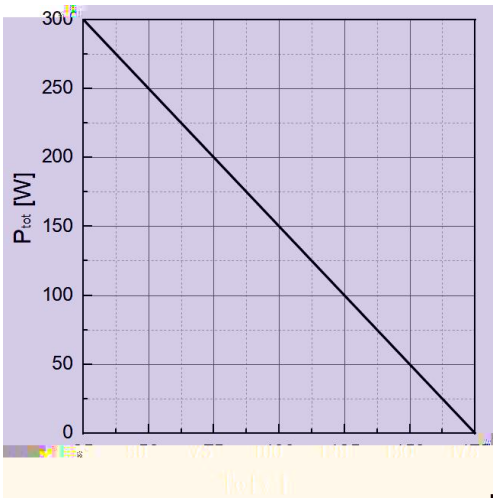

Fig 3. Power dissipation as a function of

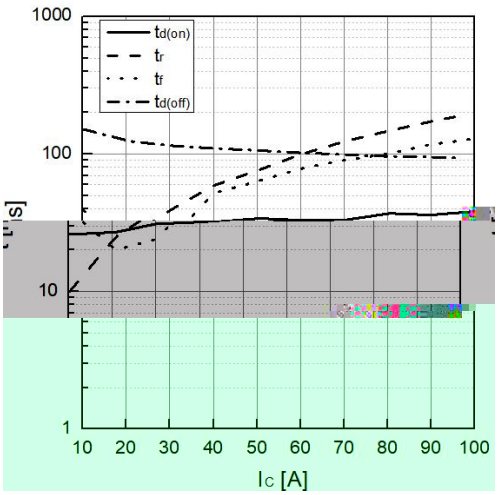

Fig 4. Typical switching time as a function of C

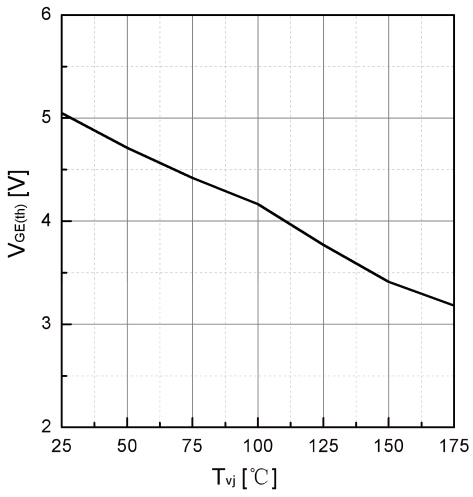

Fig 5. Typical GE(th) as a function of vj (C=1mA)

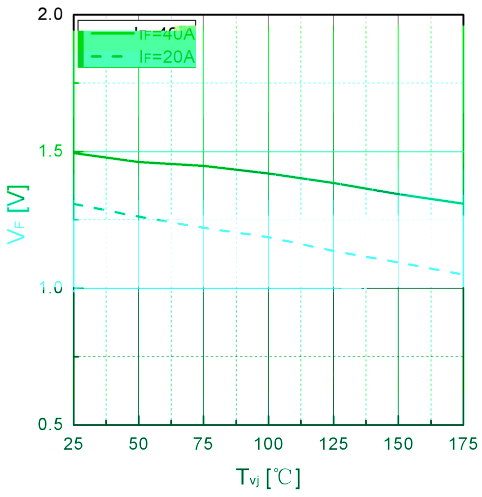

Fig 6. Typical F as a function of vj

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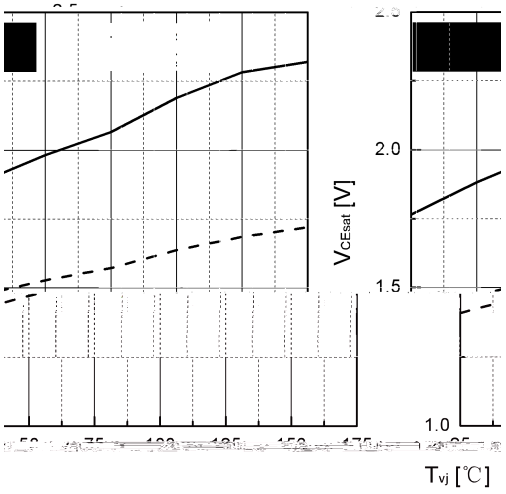

Fig 7. Typical $_{CEsat}$ as a function of $_{vj}$

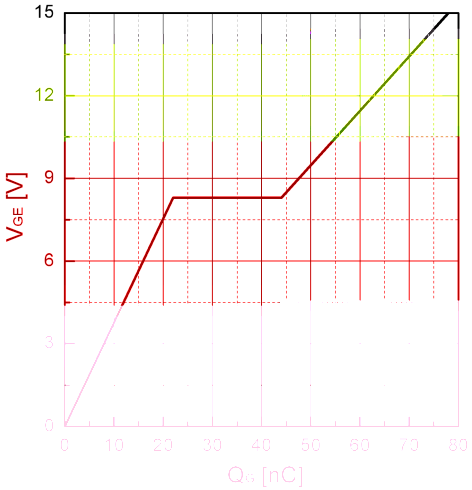

Fig 8. Typical Gate charge

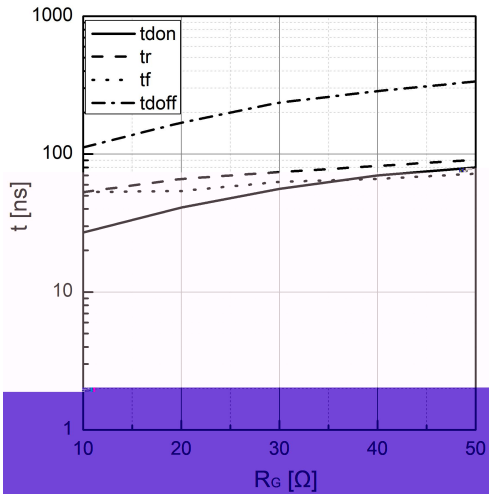

Fig 9. Typical switching times as a function of $_{G}$

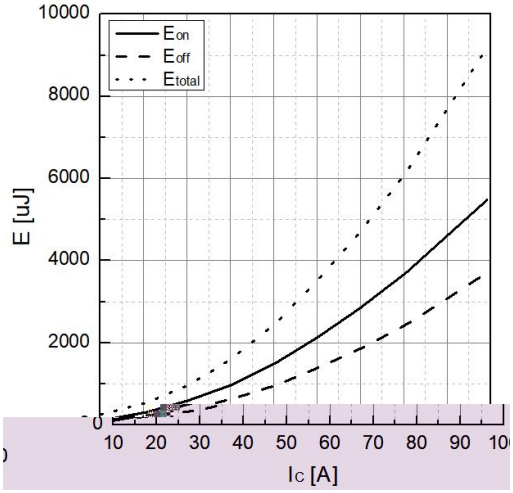

Fig 10. Typical switching energy losses as a function of $_{C}$

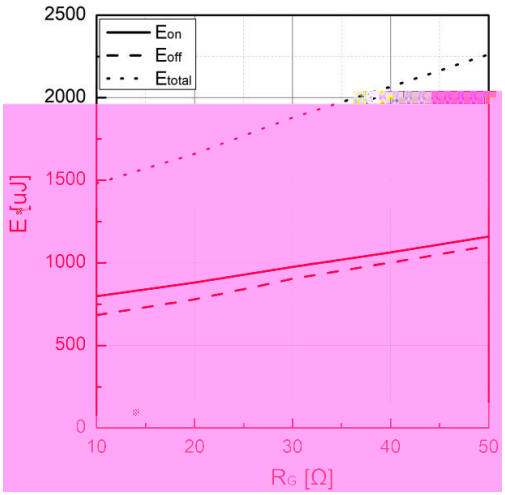

Fig 11. Typical switching energy losses as a function of $_{G}$

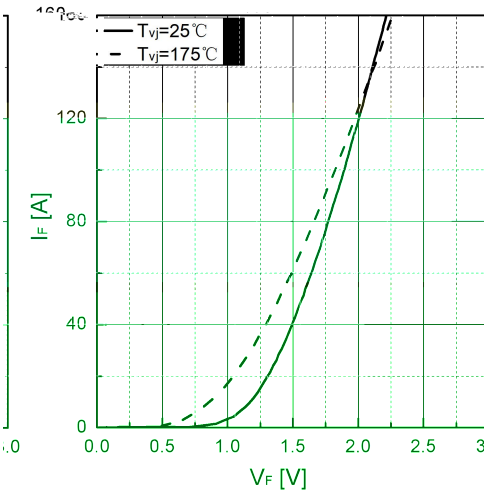

Fig 12. Typical $_{F}$ as a function of $_{F}$

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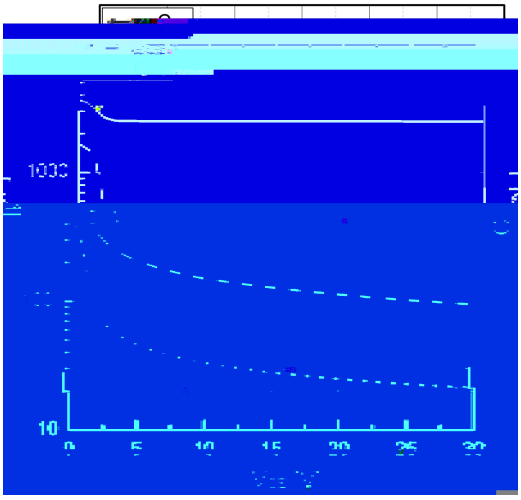

Fig 13. Typical capacitance as a function of $_{CE}$ (f=1Mhz, $_{GE}$=0V)

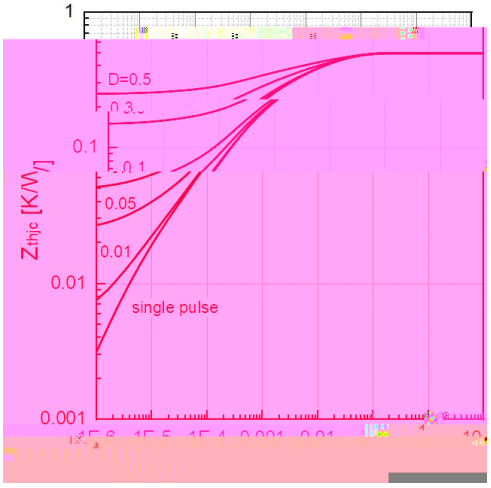

Fig 14. Transient thermal impedance of IGBT

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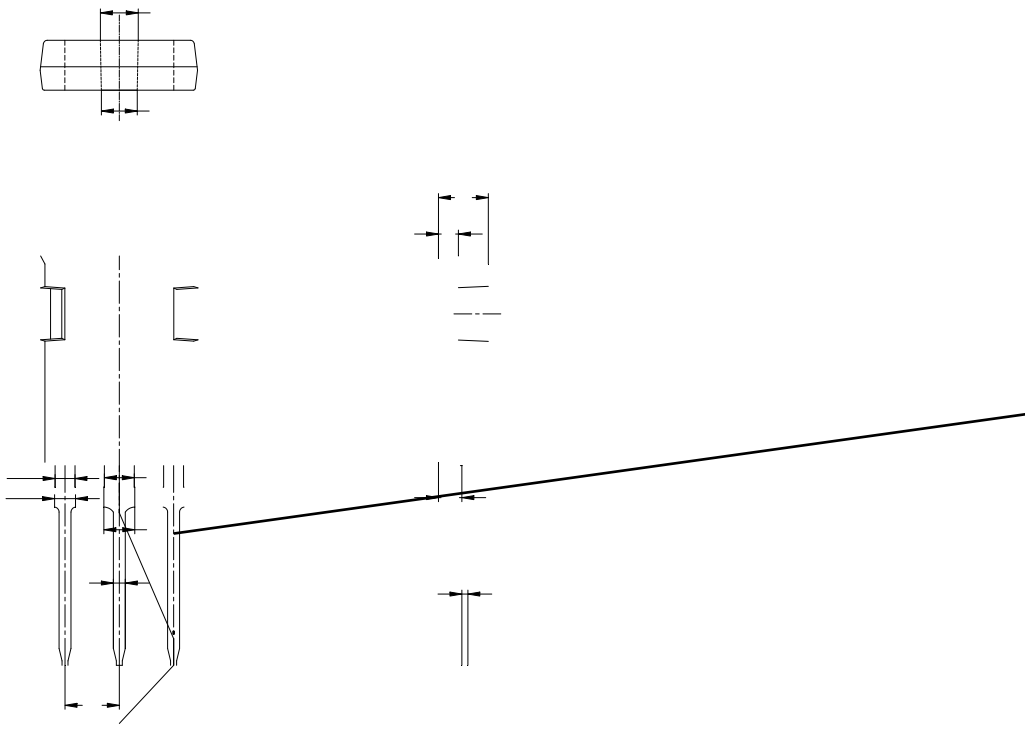

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.50	15.80	16.10	0.610	0.622	0.634
B	20.80	21.00	21.20	0.819	0.827	0.835
C	19.70	20.00	20.30	0.776	0.787	0.799
D	1.80	2.00	2.20	0.071	0.079	0.087
E	1.90	2.10	2.30	0.075	0.083	0.091
F	1.00	1.20	1.40	0.039	0.047	0.055
G	5.25	-	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

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Date	Revision	Changes
2024-03-06	Rev 1.1	Update
2024-05-17	Rev 1.2	Update
2024-10-22	Rev 1.3	Update
2026-06-25	Rev 1.4	Update thermal

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