

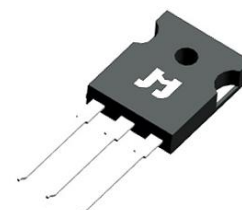
650V 40A Trench and Field Stop IGBT

JJT40N65HE

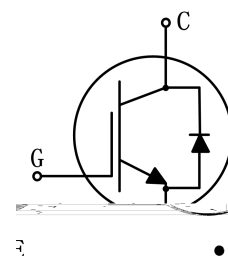
- $V_{CE} = 650V$
- $I_C = 40A @ V_{CE} = 100V$
- $V_{CE(sat)} = 1.7V$

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



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

$R_{th(j-c)}$ Thermal resistance, junction to case for IGBT



V_{CES}	Collector-emitter breakdown voltage	$V_{GE}=0V, I_C=250\text{ A}$	650	-	-	V
I_{CES}	Collector-emitter leakage current	$V_{CE}=650V, V_{GE}=0V$	-	-	50	A
	Gate					
V_{GES}						

0= 0

int

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Switching characteristics

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



($v_j=25$ unless otherwise specified)

F	Diode forward voltage	$I_F=40A$	-	1.5	-	V
		$I_F=40A, v_j=175$	-	1.3	-	V
t_{rr}	Diode reverse recovery time	$V_R=400V$ $I_F=40A$ $dI_F/dt = -1200A/s$	-	82	-	ns
I_{rrm}	Diode peak reverse recovery current		-	15	-	A
Q_{rr}	Diode reverse recovery charge		-	1620	-	nC
t_{rr}	Diode reverse recovery time	$V_R=400V$ $I_F=40A$ $dI_F/dt = -1200A/s$ $v_j=175$	-	132	-	ns
I_{rrm}	Diode peak reverse recovery current		-	43	-	A
Q_{rr}	Diode reverse recovery charge		-	3580	-	nC

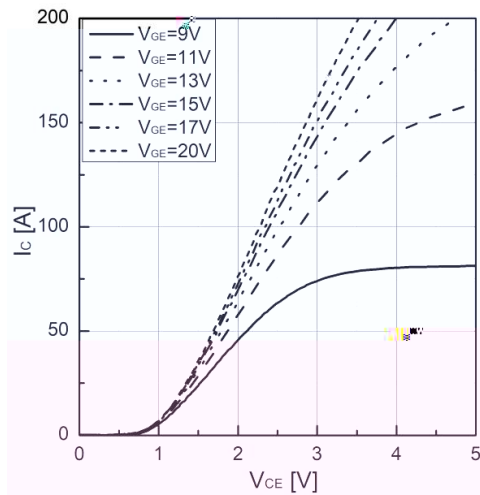


Fig 1. Typical output characteristic ($v_j=25$)

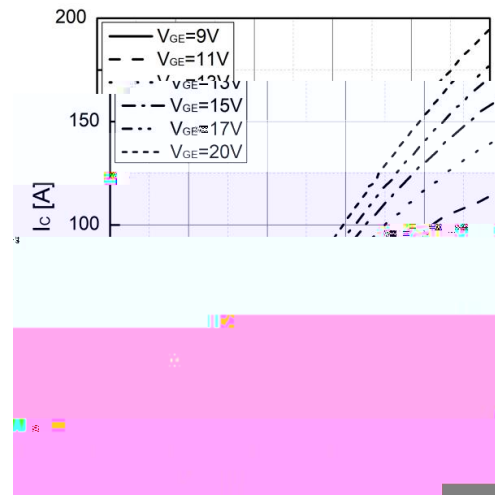


Fig 2. Typical output characteristic($v_j=175$)

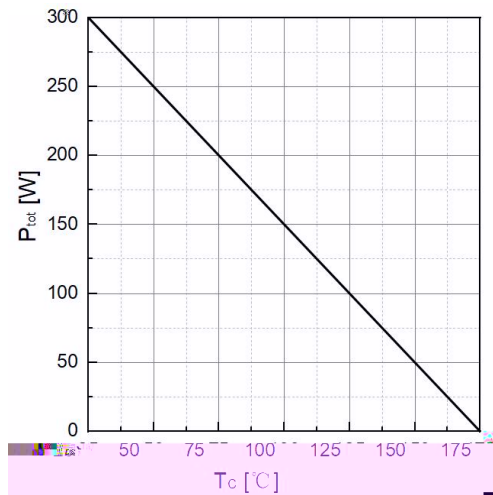


Fig 3. Power dissipation as a function of

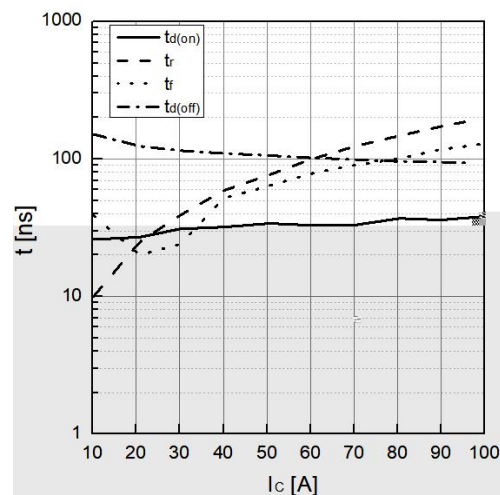


Fig 4. Typical switching time as a function of I_D

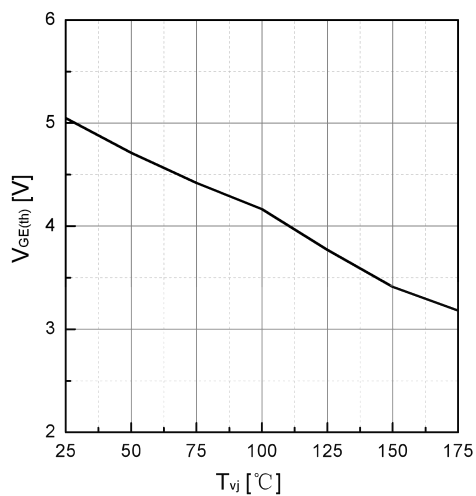


Fig 5. Typical $V_{GS(th)}$ as a function of v_j
($I_D=1mA$)

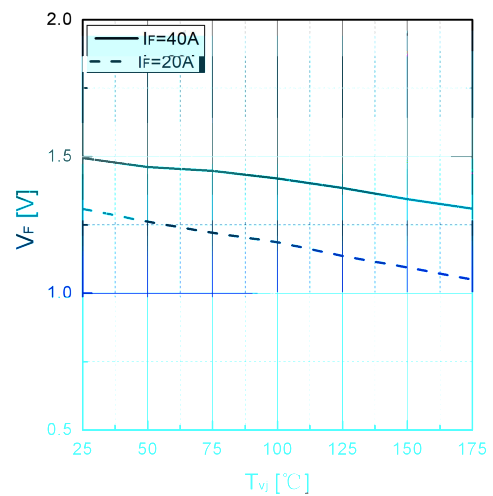


Fig 6. Typical V_F as a function of v_j

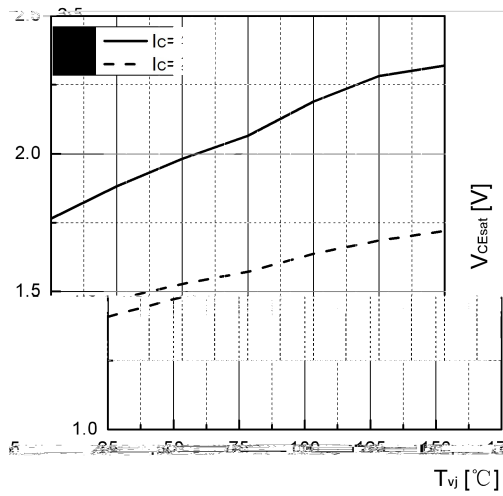


Fig 7. Typical V_{CEsat} as a function of T_{vj}

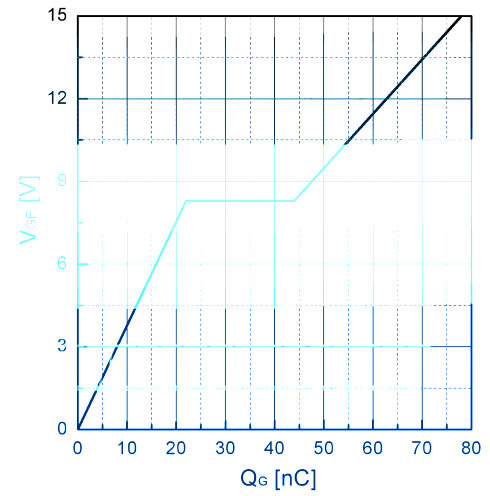


Fig 8. Typical Gate charge

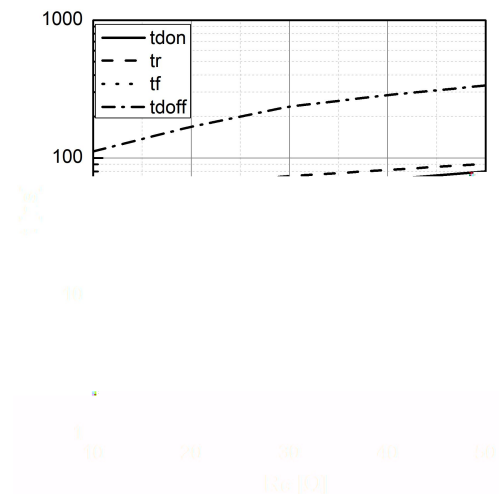


Fig 9. Typical switching times as a function of I_G

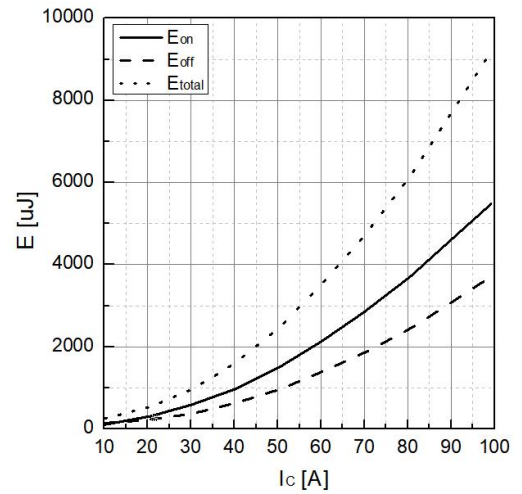


Fig 10. Typical switching energy losses as a function of I_C

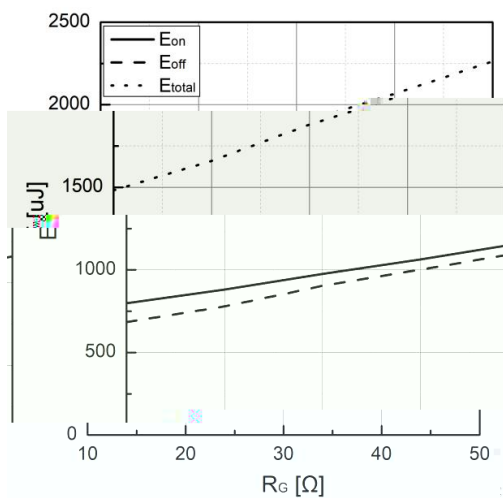


Fig 11. Typical switching energy losses as a function of R_G

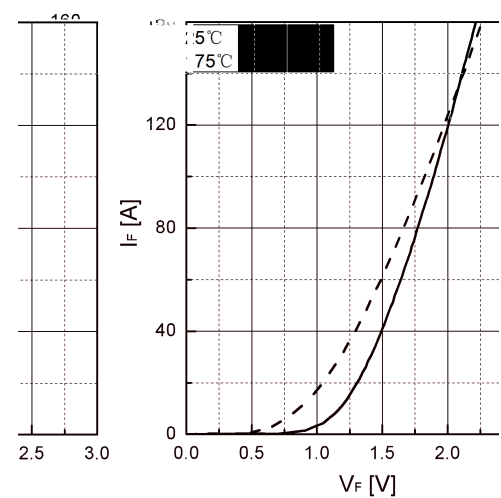


Fig 12. Typical I_F as a function of V_F



Fig 13. Typical capacitance as a function of C_E
($f=1\text{MHz}$, $V_{GE}=0\text{V}$)

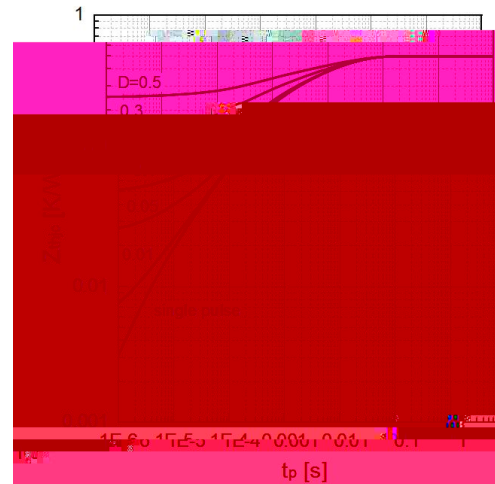
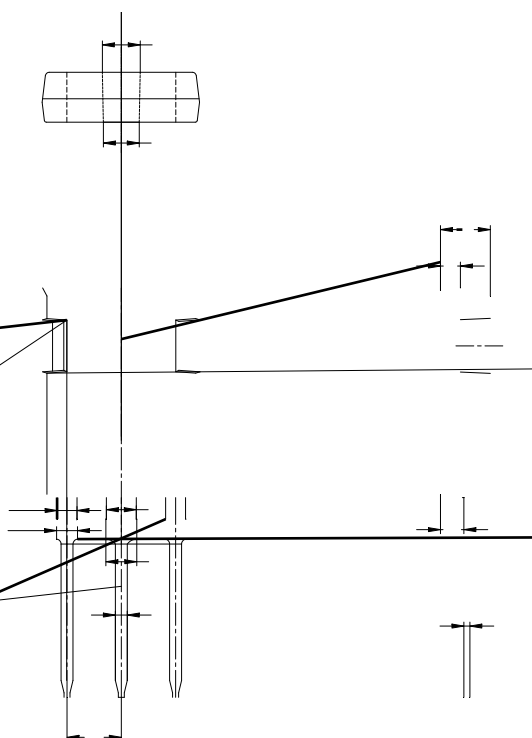


Fig 14. Transient thermal impedance of IGBT



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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



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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