JJMICROELECTRONICS

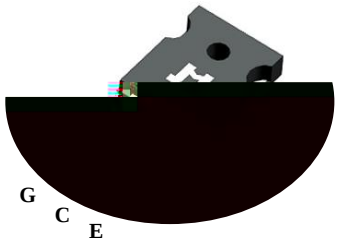
650V 50A T elıch alıd Field S IGBT

JJT50N65HE

Key performance:

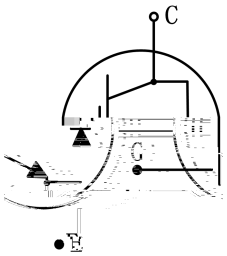
- $_{CE}$ =650V
- $_{C}$=50A@ $_{C}$=100
- $_{CE(sat)}$=1.8V

TO-247



Features:

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



Benefits:

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

Applications:

- PFC applications
- Uninterruptible power supplies
- Solar inverters

Package parameters

Type	Marking	Package	Packaging Method
JJT50N65HE	T5065HE	TO-247	Tube

Symbol	Parameter	Values	Unit

Electrical characteristics of IGBT (vj=25 unless otherwise specified)

Static characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
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	5.0	5.4	5.6	V
CE(sat)	Collector-emitter saturation voltage	GE=15 V, C=50A	-	1.8	-	V
		GE=15V, C=50A, vj=175	-	2.3	-	V

Dynamic characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
ies	Input capacitance	CE=30V GE=0V =1MHz	-	4820	-	pF
oes	Output capacitance		-	170	-	pF
res	Reverse transfer capacitance		-	37	-	pF
g	Total gate charge	CC=520V GE=15V C=50A	-	158	-	nC

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
$t_{d(on)}$	Turn-on delay time		-	52	-	ns
t_r	Rise time		-	82	-	ns
$t_{d(off)}$	Turn-off delay time	V_{CC}=400V V_{GE}=0/15V	-	193	-	ns
t_f	Fall time	I_C=50A R_G=10	-	61	-	ns
E_{on}	Turn-on energy	Inductive load	-	1.7	-	mJ
E_{off}	Turn-off energy		-	1.0	-	mJ
E_{ts}	Total switching energy					

Electrical characteristics of Diode ($_{vj}$=25 unless otherwise specified)

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
$_{F}$	Diode forward voltage	$_{F}$=50A	-	1.8	-	V
		$_{F}$=50A, $_{vj}$=175	-	1.4	-	V
$_{rr}$	Diode reverse recovery time	$_{R}$=400V $_{F}$=50A d $_{F}$/d =-800A/μs	-	82	-	ns
$_{rrm}$	Diode peak reverse recovery current		-	15	-	A
$_{rr}$	Diode reverse recovery charge		-	698	-	nC
$_{rr}$	Diode reverse recovery time	$_{R}$=400V $_{F}$=50A d $_{F}$/d =-800A/μs $_{vj}$=175	-	132	-	ns
$_{rrm}$	Diode peak reverse recovery current		-	26	-	A
$_{rr}$	Diode reverse recovery charge		-	2194	-	nC

Typical performance characteristics

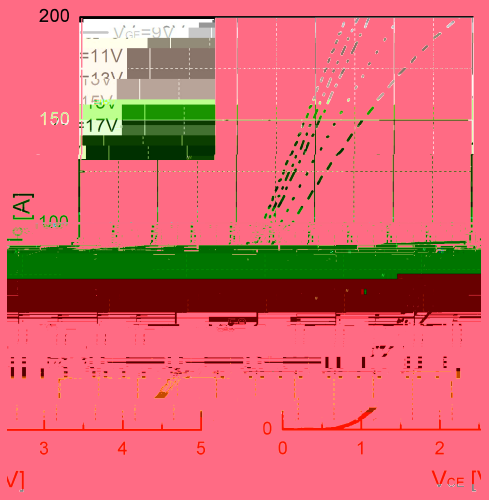


Fig 1. Typical output characteristic (vj=25)

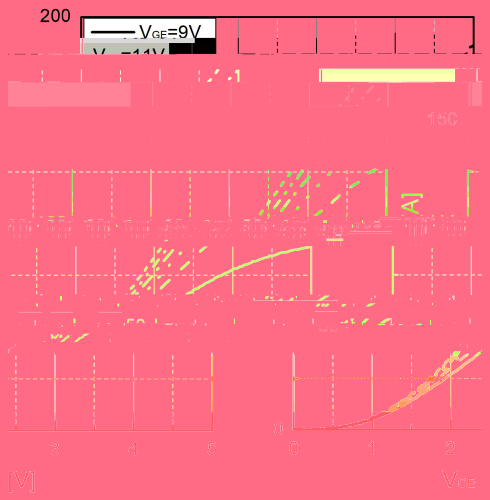


Fig 2. Typical output characteristic(vj=175)

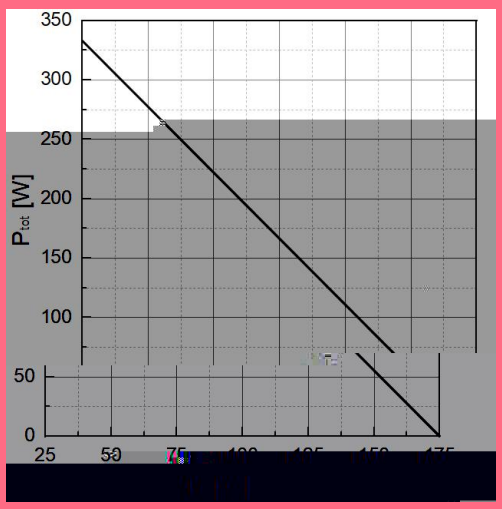


Fig 3. Power dissipation as a function of

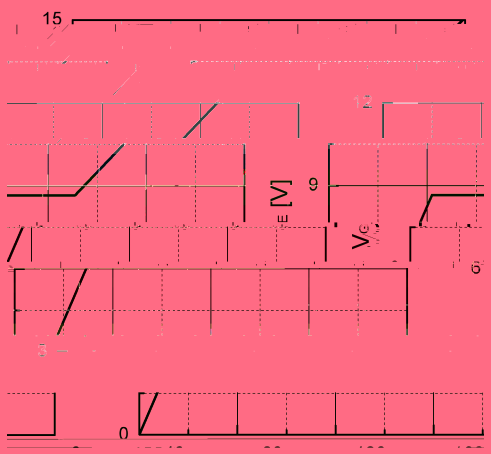


Fig 4. Typical Gate charge

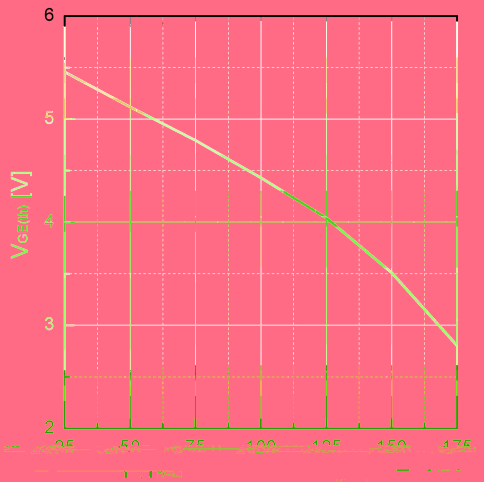


Fig 5. Typical GE(th) as a function of vj (C=1mA)

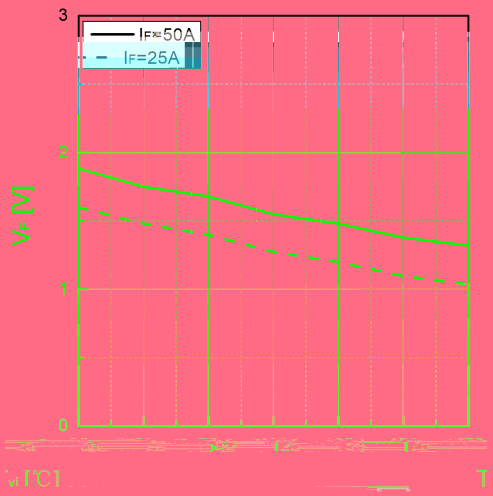


Fig 6. Typical F as a function of vj

Typical performance characteristics

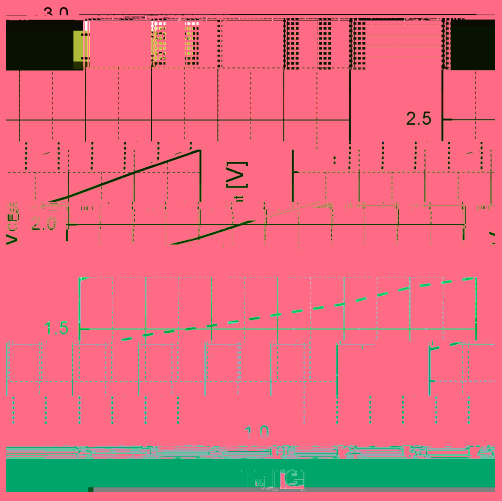


Fig 7. Typical $_{CEsat}$ as a function of $_{vj}$

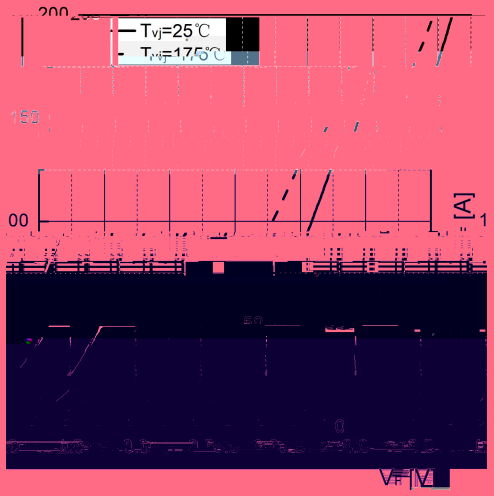


Fig 8. Typical $_{F}$ as a function of $_{F}$

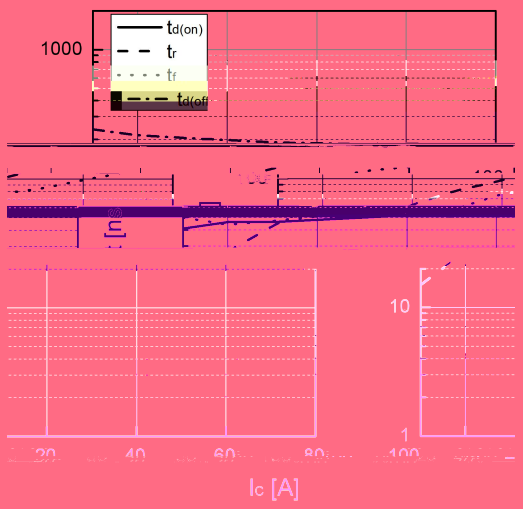


Fig 9. Typical switching time as a function of $_{C}$

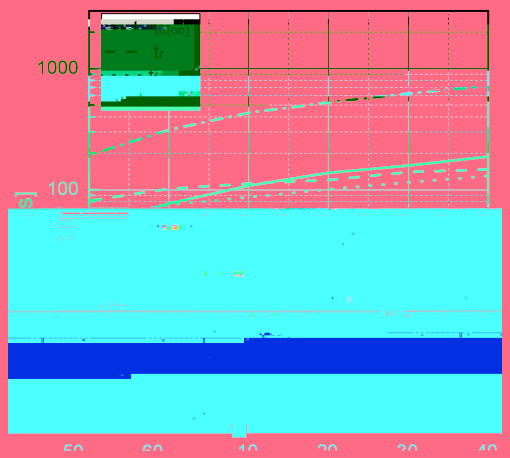


Fig 10. Typical switching times as a function of $_{G}$

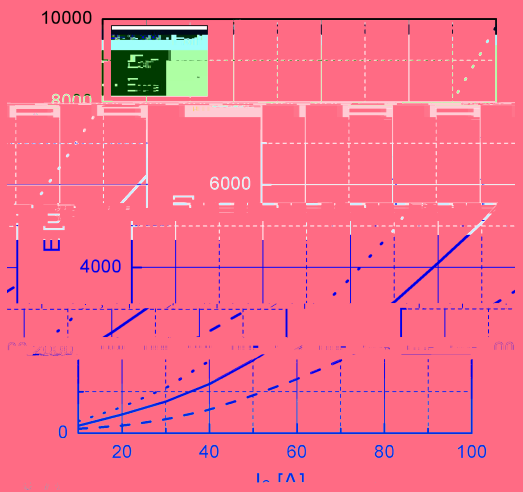


Fig 11. Typical switching energy losses as a function of $_{C}$

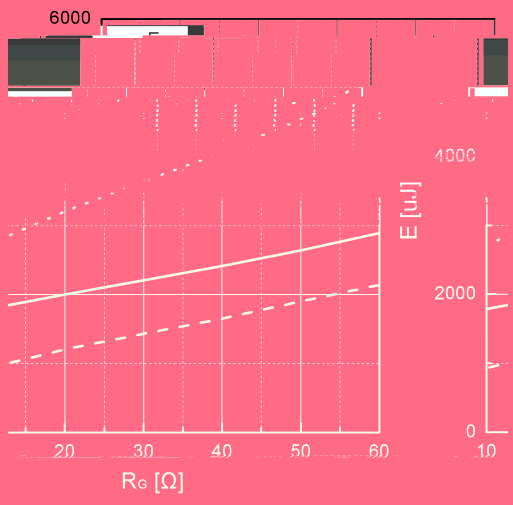


Fig 12. Typical switching energy losses as a function of $_{G}$

Typical performance characteristics

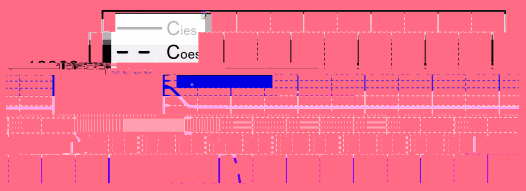


Fig 13. Typical capacitance as a function of $_{CE}$ (f=1Mhz, $_{GE}$=0V)

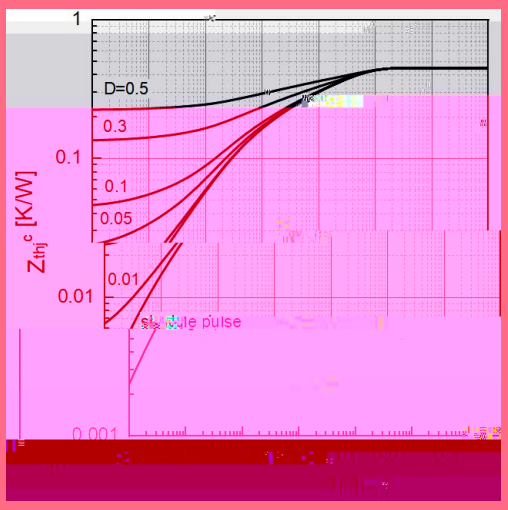
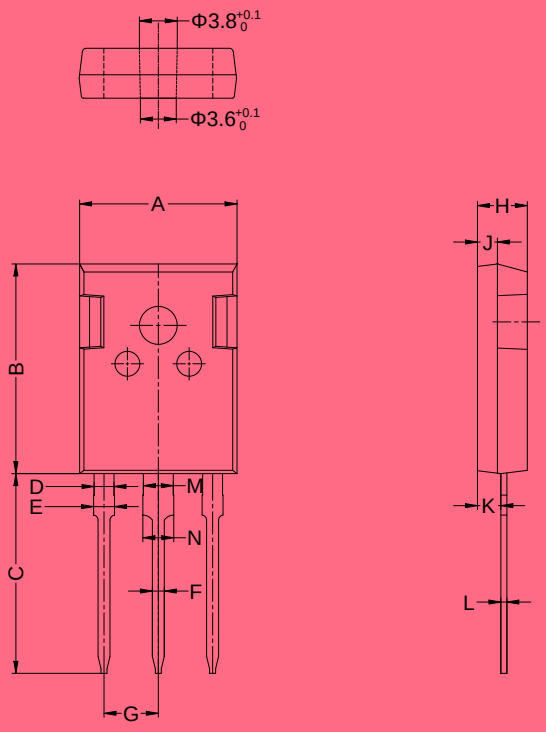


Fig 14. Transient thermal impedance of IGBT

Package dimension

TO-247



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
2023-12-27	Rev 1.1	Update
2024-04-17	Rev 1.2	Update
2024-05-17	Rev 2.0	Update
2026-06-25	Rev 2.1	Update thermal

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