

Key performance:

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

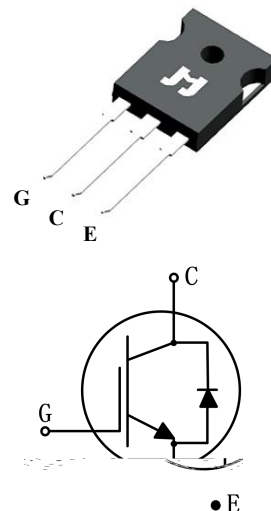
TO-247

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



Parameter

Values

Unit

**Electrical characteristics of IGBT** ($v_j=25$ unless otherwise specified)**Static characteristics**

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
C_{ES}	Collector-emitter breakdown voltage	$V_{GE}=0V, I_C=250\text{ A}$	650	-	-	V
C_{ES}	Collector-emitter leakage current	$V_{CE}=650V, V_{GE}=0V$	-	-	50	A
G_{ES}	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	$V_{GE}=V_{CE}, I_C=1$	5.0	5.4	5.6	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$V_{GE}=15\text{ V}, I_C=50\text{ A}$	-	1.8	-	V
		$V_{GE}=15V, I_C=50\text{ A}, v_j=175$	-	2.3	-	V

Dynamic characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
t_{ies}	Input capacitance	$V_{CE}=30V$ $V_{GE}=0V$ $f=1\text{ MHz}$	-	4820	-	pF
t_{oes}	Output capacitance		-	170	-	pF
t_{res}	Reverse transfer capacitance		-	37	-	pF
Q_g	Total gate charge	$V_{CC}=520V$ $V_{GE}=15V$ $I_C=50\text{ A}$	-	158	-	nC

Switching characteristics

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
d(on)	Turn-on delay time	$V_{CC}=400V$ $V_{GE}=0/15V$ $I_C=50A$ $R_G=10\Omega$ Inductive load	-	52	-	ns
r	Rise time		-	82	-	ns
d(off)	Turn-off delay time		-	193	-	ns
f	Fall time		-	61	-	ns
on	Turn-on energy		-	1.7	-	mJ
off	Turn-off energy		-	1.0	-	mJ
ts	Total switching energy		-	2.7	-	mJ
d(on)	Turn-on delay time	$V_{CC}=400V$ $V_{GE}=0/15V$ $I_C=50A$ $R_G=10\Omega$ Inductive load $v_j=175$	-	49	-	ns
r	Rise time		-	85	-	ns
d(off)	Turn-off delay time		-	210	-	ns
f	Fall time		-	68	-	ns
on	Turn-on energy		-	2.5	-	mJ
off	Turn-off energy		-	1.0	-	mJ
ts	Total switching energy		-	3.5	-	mJ

**Electrical characteristics of Diode** ($v_j=25$ unless otherwise specified)

Symbol	Parameter	Test condition	Values			Unit
			Min.	Typ.	Max.	
F	Diode forward voltage	$I_F=50A$	-	1.8	-	V
		$I_F=50A, v_j=175$	-	1.4	-	V
t_{rr}	Diode reverse recovery time	$V_R=400V$ $I_F=50A$ $dI_F/dt = -800A/s$	-	82	-	ns
I_{rrm}	Diode peak reverse recovery current		-	15	-	A
Q_{rr}	Diode reverse recovery charge		-	698	-	nC
t_{rr}	Diode reverse recovery time	$V_R=400V$ $I_F=50A$ $dI_F/dt = -800A/s$ $v_j=175$	-	132	-	ns
I_{rrm}	Diode peak reverse recovery current		-	26	-	A
Q_{rr}	Diode reverse recovery charge		-	2194	-	nC

Typical performance characteristics

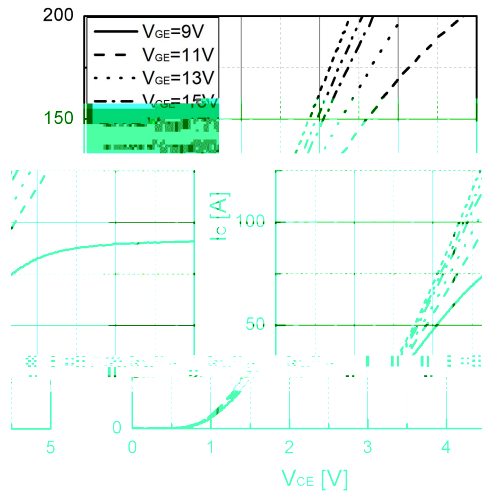


Fig 1. Typical output characteristic ($v_j=25^\circ\text{C}$)

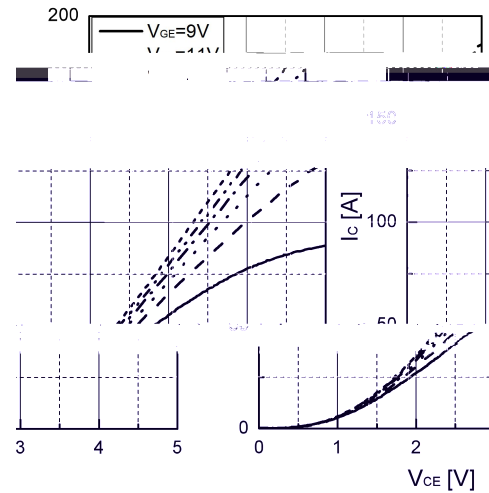


Fig 2. Typical output characteristic($v_j=175^\circ\text{C}$)

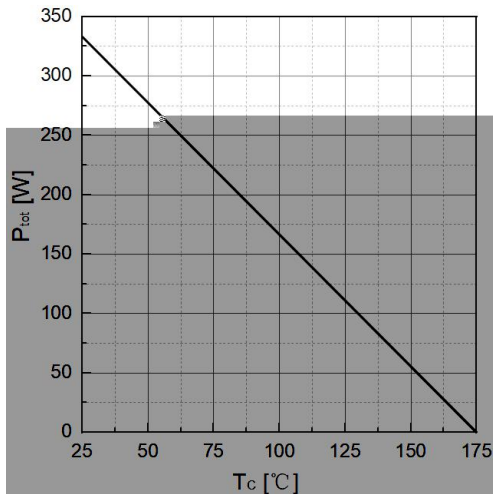


Fig 3. Power dissipation as a function of

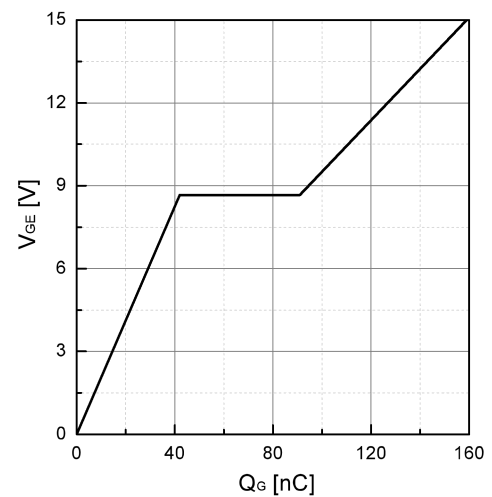


Fig 4. Typical Gate charge

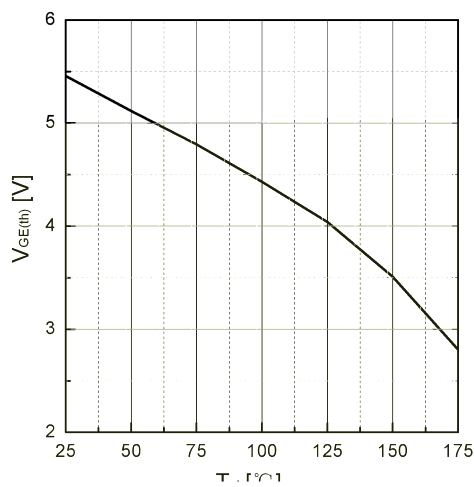


Fig 5. Typical $V_{GE(th)}$ as a function of T_j
($I_D=1\text{mA}$)

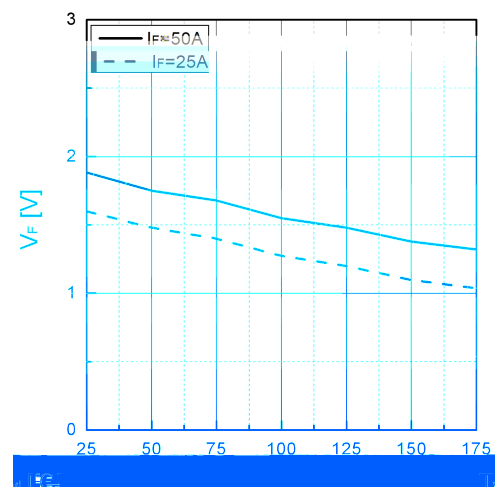


Fig 6. Typical V_F as a function of T_j

Typical performance characteristics

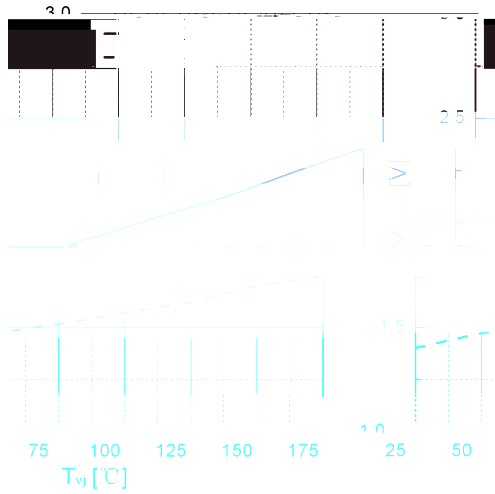


Fig 7. Typical $C_{E_{sat}}$ as a function of T_{vj}

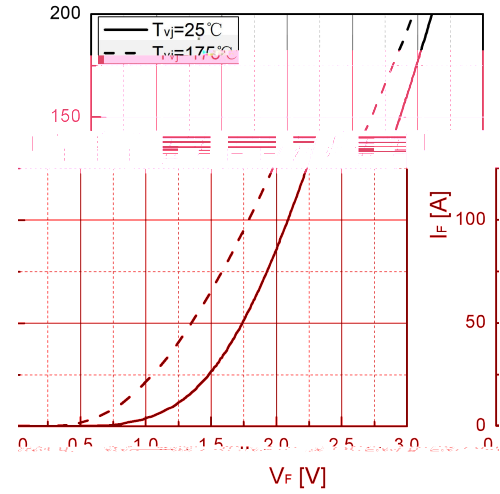


Fig 8. Typical I_F as a function of V_F

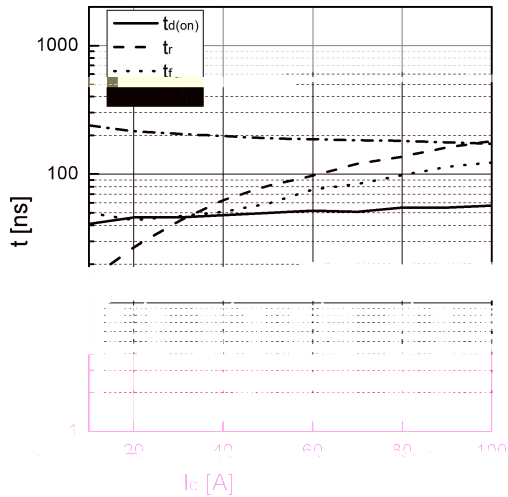


Fig 9. Typical switching time as a function of I_c

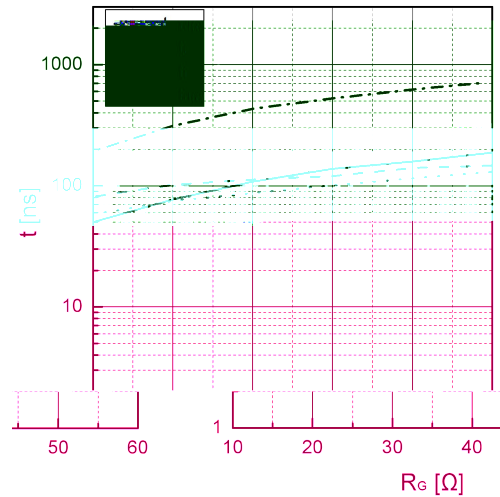


Fig 10. Typical switching times as a function of R_G

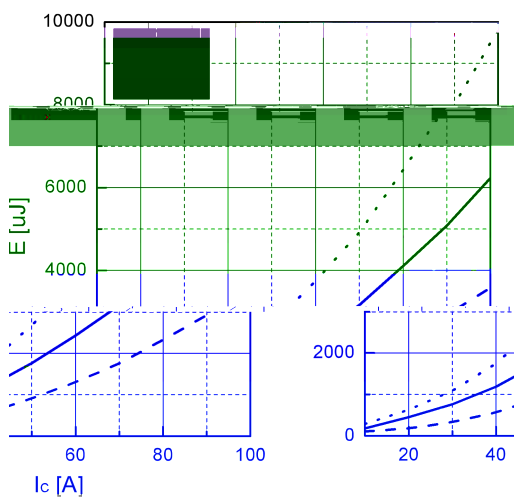


Fig 11. Typical switching energy losses as a function of I_c

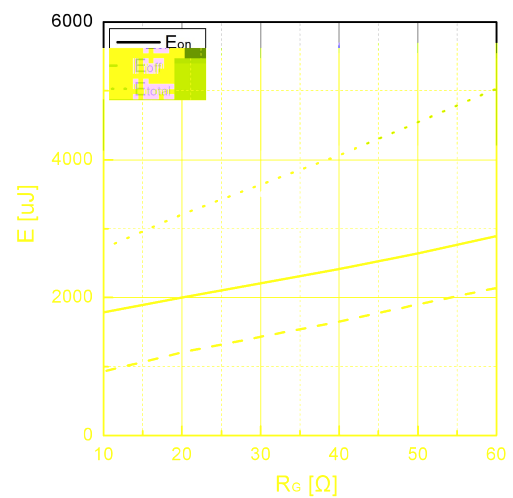


Fig 12. Typical switching energy losses as a function of R_G

Typical performance characteristics

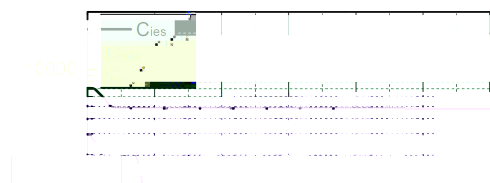


Fig 13. Typical capacitance as a function of V_{CE}
($f=1\text{MHz}$, $V_{GE}=0\text{V}$)

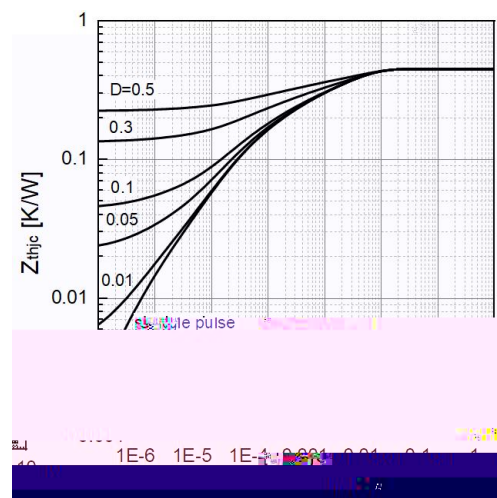
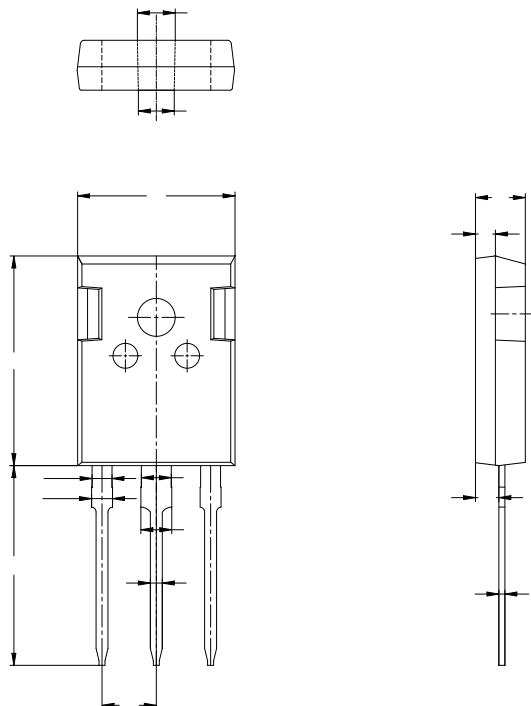


Fig 14. Transient thermal impedance of IGBT

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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