

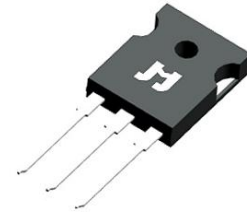
650V 60A Trench and Field Stop IGBT

JJT60N65UE

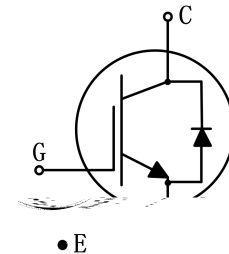
- $V_{CE} = 650V$
- $I_C = 60A @ T_C = 100$
- $V_{CE(sat)} = 1.9V$

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



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



- PFC applications
- Welding machines

Type	Marking	Package	Packaging Method
JJT60N65UE	T6065UE	TO-247	Tube



V_{CES}	Collector-emitter voltage	650	V
V_{GES}	Gate-emitter voltage	± 20	V
I_C	Continuous collector current ($T_C=25^\circ\text{C}$)	120	A
	Continuous collector current ($T_C=100^\circ\text{C}$)	60	A
I_{CM}	Pulsed collector current, t_p limited by T_{vjmax}	240	A
I_F	Diode continuous forward current ($T_C=100^\circ\text{C}$)	60	A
I_{FM}	Diode maximum current, t_p limited by T_{vjmax}	240	A
P_{tot}	Power dissipation ($T_C=25^\circ\text{C}$)	333	W
	Power dissipation ($T_C=100^\circ\text{C}$)	167	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	-	0.45	K/ W
$R_{th(j-c)}$	Thermal resistance, junction to case for Diode	-	0.90	K/ W
$R_{th(j-a)}$	Thermal resistance, junction to ambient	-	40	K/ W



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



Switching characteristics

$t_{d(on)}$	Turn-on delay time	$V_{CC}=400V$ $V_{GE}=0/15V$ $I_C=60A$ $R_G=10\Omega$ Inductive load	-	44	-	ns
t_r	Rise time		-	100	-	ns
$t_{d(off)}$	Turn-off delay time		-	166	-	ns
t_f	Fall time		-	75	-	ns
E_{on}	Turn-on energy		-	2.3	-	mJ
E_{off}	Turn-off energy		-	1.3	-	mJ
E_{ts}	Total switching energy		-	3.6	-	mJ
$t_{d(on)}$	Turn-on delay time	$V_{CC}=400V$ $V_{GE}=0/15V$ $I_C=60A$ $R_G=10\Omega$ Inductive load $T_{vj}=175$	-	45	-	ns
t_r	Rise time		-	105	-	ns
$t_{d(off)}$	Turn-off delay time		-	180	-	ns
t_f	Fall time		-	76	-	ns
E_{on}	Turn-on energy		-	3.6	-	mJ
E_{off}	Turn-off energy		-	1.6	-	mJ
E_{ts}	Total switching energy		-	5.2	-	mJ



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

V_F	Diode forward voltage	$I_F=60A$	-	2.5	-	V
		$I_F=60A, T_{vj}=175$	-	2.0	-	V
t_{rr}	Diode reverse recovery time	$V_R=400V$ $I_F=60A$ $di_F/dt=-450A/\mu s$	-	78	-	ns
I_{rrm}	Diode peak reverse recovery current		-	15	-	A
Q_{rr}	Diode reverse recovery charge		-	511	-	nC
t_{rr}	Diode reverse recovery time	$V_R=400V$ $I_F=60A$ $di_F/dt=-450A/\mu s$ $T_{vj}=175$	-	126	-	ns
I_{rrm}	Diode peak reverse recovery current		-	26	-	A
Q_{rr}	Diode reverse recovery charge		-	2163	-	nC

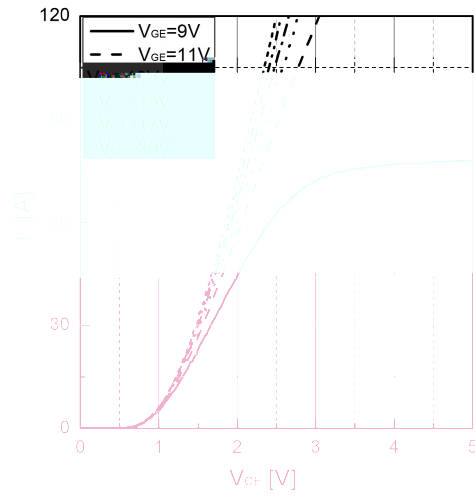


Fig 1. Typical output characteristic ($T_{vj}=25^{\circ}\text{C}$)

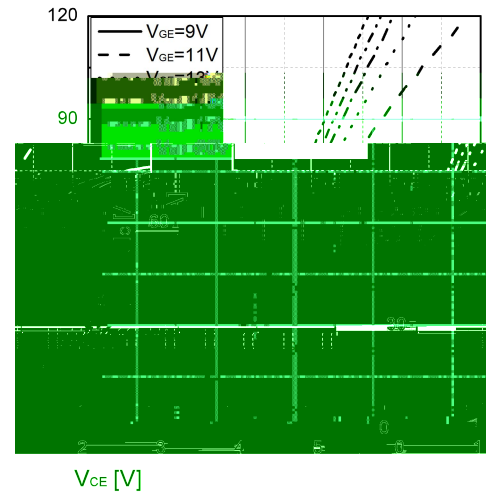


Fig 2. Typical output characteristic ($T_{vj}=175^{\circ}\text{C}$)

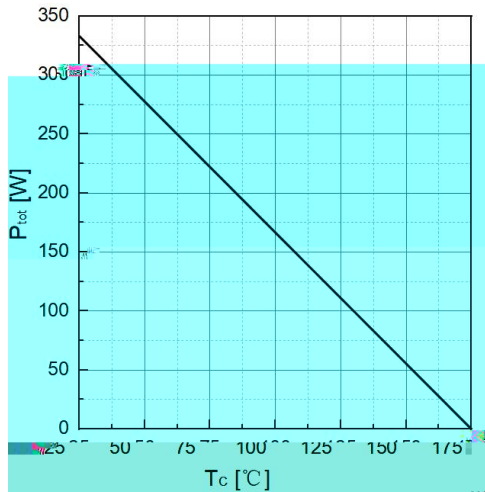


Fig 3. Power dissipation as a function of T_c

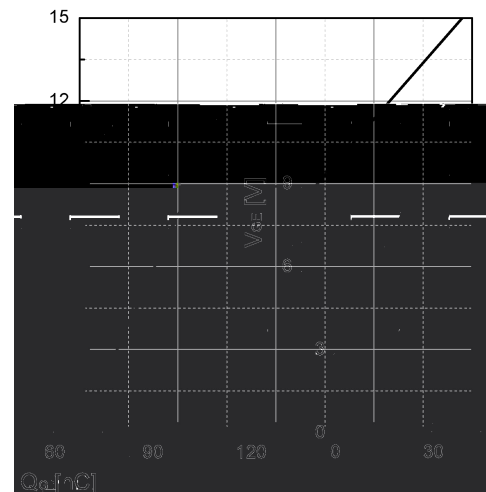


Fig 4. Typical Gate charge

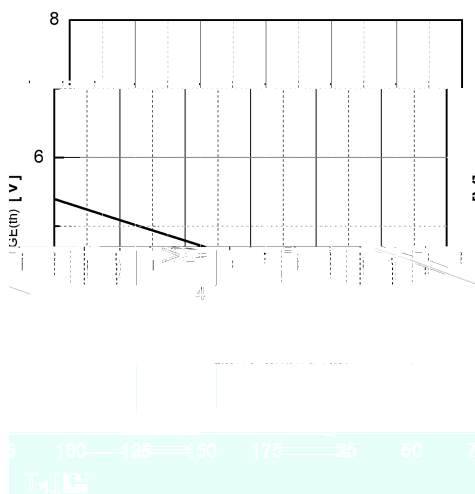


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj}
($I_C=1\text{mA}$)

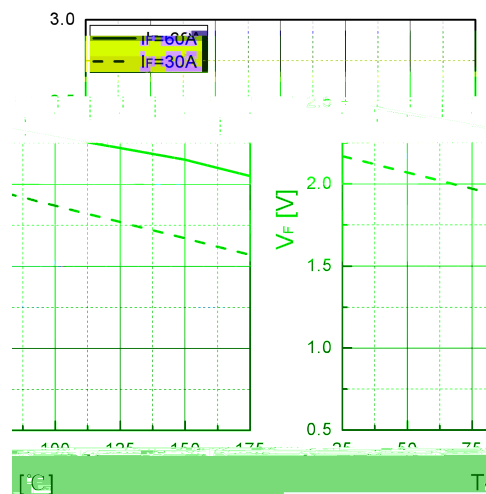


Fig 6. Typical V_F as a function of T_{vj}

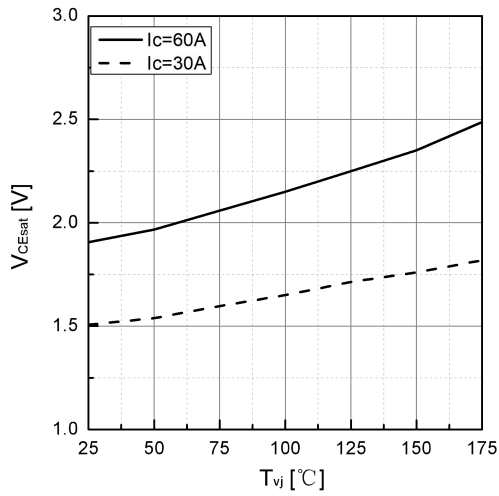


Fig 7. Typical V_{CEsat} as a function of T_{vj}

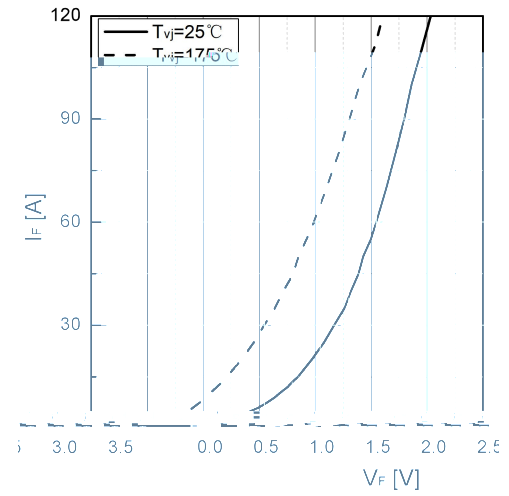


Fig 8. Typical I_F as a function of V_F

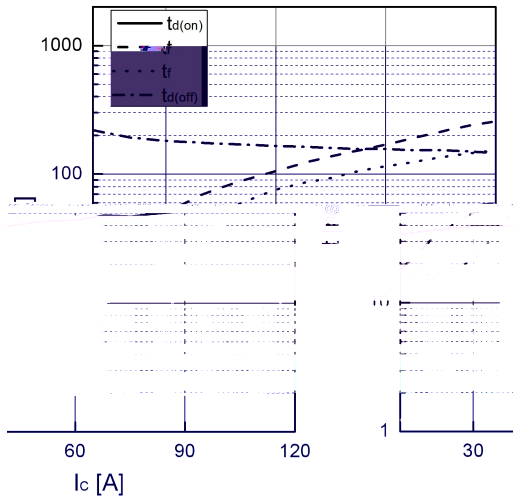


Fig 9. Typical switching time as a function of I_c

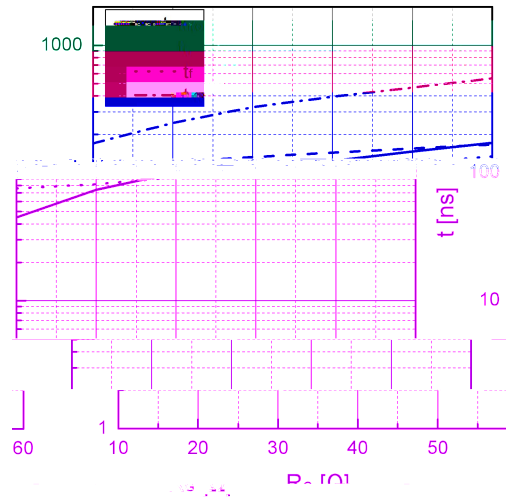


Fig 10. Typical switching times as a function of R_G

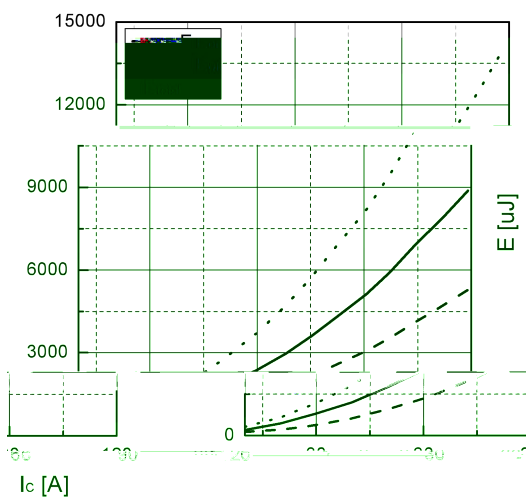


Fig 11. Typical switching energy losses as a function of I_c

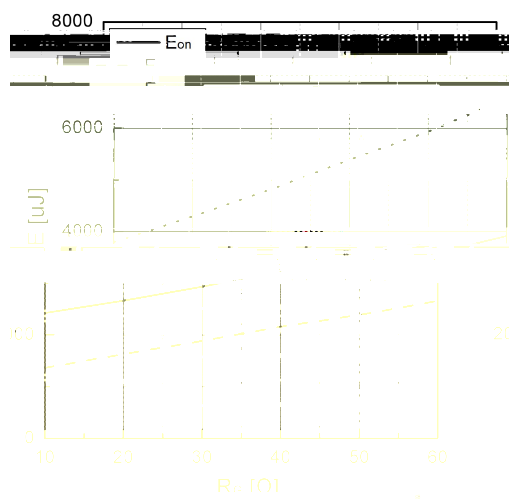


Fig 12. Typical switching energy losses as a function of R_G

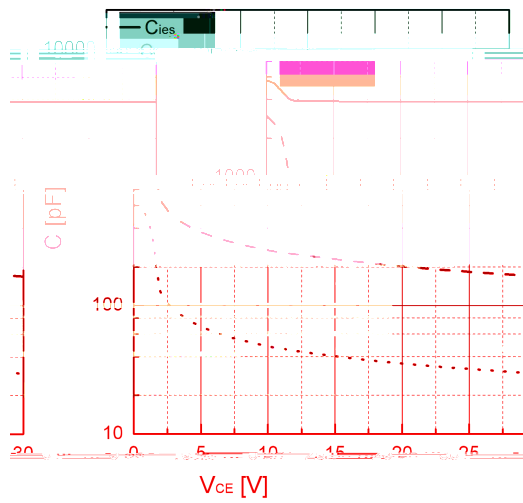


Fig 13. Typical capacitance as a function of V_{CE}
($f=1\text{MHz}$, $V_{GE}=0\text{V}$)

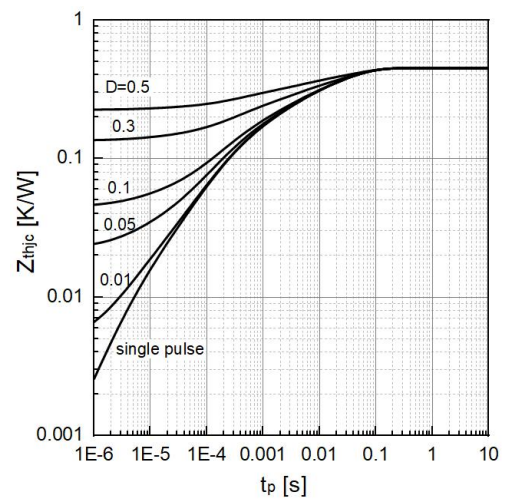
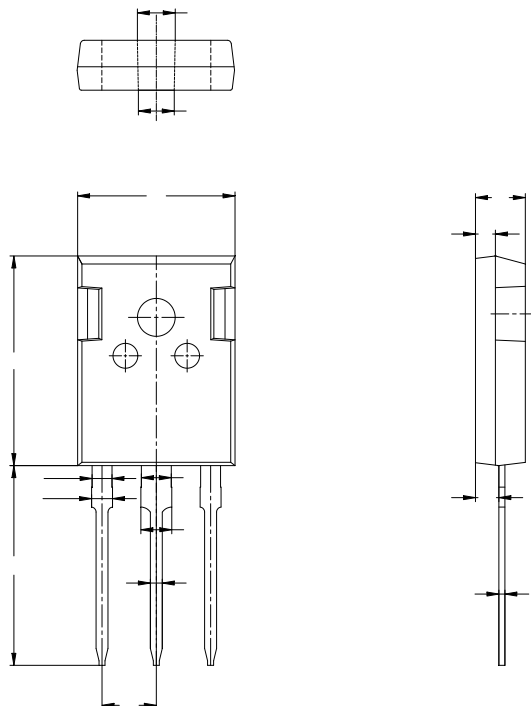


Fig 14. Transient thermal impedance of IGBT



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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
2023-12-12	Rev 1.0	Release of the datasheet
2024-03-20	Rev 1.1	Update
2024-05-17	Rev 1.2	Update

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