General Description

OSC80N65HF uses advanced Oriental-Semi's patented Trident-Gate Bipolar Transistor (TGBT^{TM}) technology to provide extremely low V_{CE}(sat), low gate charge, and excellent switching performance. This device is suitable for mid to high range switching frequency converters.

Features

- Advanced TGBT^{TM} technology
- Excellent conduction and switching loss
- Excellent stability and uniformity

RoHS compliant

Applications

- Induction converters
- Uninterruptible power supplies

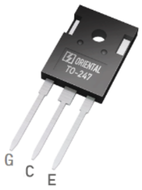
Key Performance Parameters

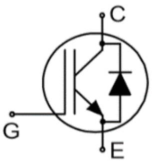
Parameter	Value	Unit
$V_{CES,\ min}$ @ 25°C	650	V
Maximum junction temperature	175	°C
$I_{C,\ pulse}$	200	A
$V_{CE(sat),\ typ}$ @ V_{GE}=15V	1.85	V
Q_g	179	nC

Marking Information

Product Name	Package	Marking
OSC80N65HF	TO247	OSC80N65H

Package & Pin Information





Absolute Maximum Ratings at T_{vj}=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Collector emitter voltage	V_{CES}	650	V
Gate emitter voltage	V_{GES}	±20	V
Transient gate emitter voltage, T_P≤10μs, D<0.01		±30	V
Continuous collector current[1], T_C=25℃	I_C	114	A
Continuous collector current[1], T_C=100℃		80	A
Pulsed collector current[2], T_C=25℃	$I_{C,\ pulse}$	200	A
Diode forward current[1], T_C=25℃	I_F	114	A
Diode forward current[1], T_C=100℃		80	A
Diode pulsed current[2], T_C=25℃	$I_{F,\ pulse}$	200	A
Power dissipation[3], T_C=25℃	P_D	250	W
Power dissipation[3], T_C=100℃		125	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	°C
Short circuit withstand time V_{GE}=15 V, V_{CC}≤400 V Allowed number of short circuits<1000 Time between short circuits:≥1.0 S T_{vj}=150 °C	t_{SC}	10	μs

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	0.6	°C/W
Diode thermal resistance, junction-case	$R_{\theta JC}$	0.33	°C/W
Thermal resistance, junction-ambient[4]	$R_{\theta JA}$	40	°C/W

Electrical Characteristics at T_{vj}=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Collector-emitter breakdown voltage	$V_{(BR)CES}$	650			V	V_{GE}=0 V, I_C=1 mA
Collector-emitter saturation voltage	$V_{CE(sat)}$		1.85	2.1	V	V_{GE}=15 V, I_C=80 A T_{vj}=25°C
			2.45		V	V_{GE}=15 V, I_C=80 A, T_{vj} =125°C
			2.8			V_{GE}=15 V, I_C=80 A, T_{vj} =175°C
Gate-emitter threshold voltage	$V_{GE(th)}$	3.0	4.0	5.0	V	V_{CE}=V_{GE}, I_D=2 mA
Diode forward voltage	V_F		1.2	1.5	V	V_{GE}=0 V, I_F=80 A T_{vj} =25°C
			1.15			V_{GE}=0 V, I_F=80 A, T_{vj} =125°C
			1.1			V_{GE}=0 V, I_F=80 A, T_{vj} =175°C
Gate-emitter leakage current	I_{GES}			100	nA	V_{CE}=0 V, V_{GE}=20 V
Zero gate voltage collector current	I_{CES}			10	μA	V_{CE}=650 V, V_{GE}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{ies}		7709		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		2978		pF	
Reverse transfer capacitance	C_{res}		3		pF	
Turn-on delay time	$t_{d(on)}$		72		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=80 A
Rise time	t_r		112		ns	
Turn-off delay time	$t_{d(off)}$		255		ns	
Fall time	t_f		112		ns	
Turn-on energy	E_{on}		5.16		mJ	
Turn-off energy	E_{off}		1.22		mJ	
Turn-on delay time	$t_{d(on)}$		67		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=40 A
Rise time	t_r		47		ns	
Turn-off delay time	$t_{d(off)}$		296		ns	
Fall time	t_f		25		ns	
Turn-on energy	E_{on}		2.01		mJ	
Turn-off energy	E_{off}		0.35		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		179		nC	V_{GE}=15 V, V_{CC}=520 V, I_C=80 A
Gate-emitter charge	Q_{ge}		55		nC	
Gate-collector charge	Q_{gc}		32		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		116		ns	V_R=400 V, I_F=80 A, di_F/dt=500 A/μs T_{vj} = 25°C
Diode reverse recovery charge	Q_{rr}		2.8		μC	
Diode peak reverse recovery current	I_{rrm}		47.5		A	

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.

Electrical Characteristics Diagrams

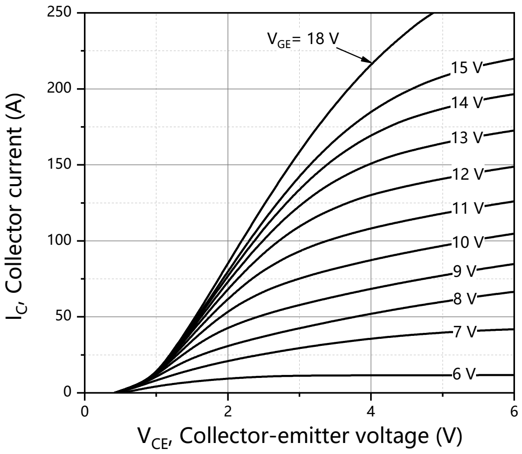


Figure 1. Typical output characteristics

(T_{vj}=25°C)

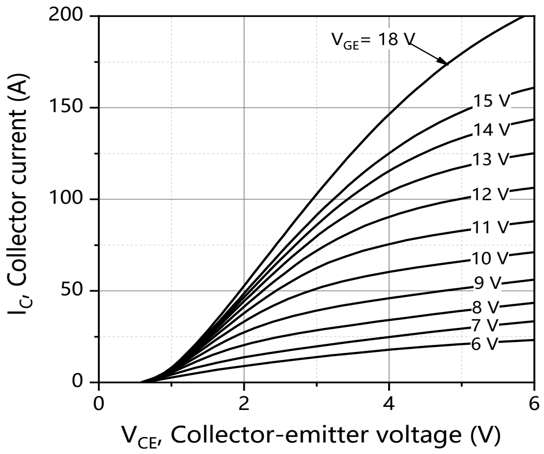


Figure 2. Typical output characteristics

(T_{vj}=150 °C)

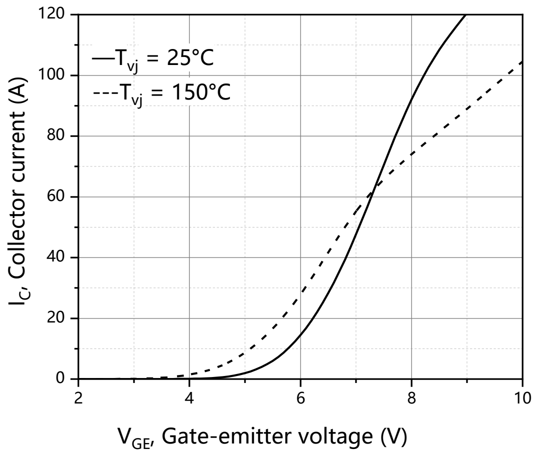


Figure 3. Typical transfer characteristics

(V_{CE}=20 V)

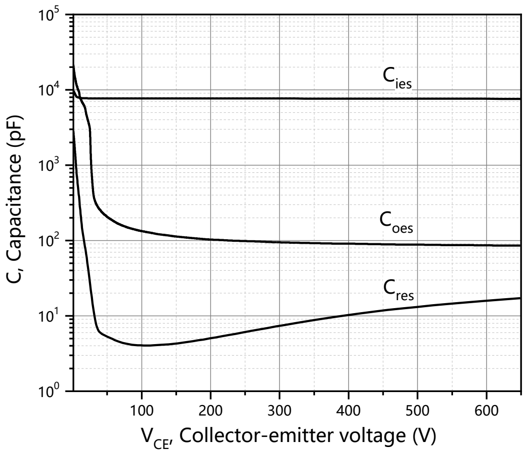


Figure 4. Typical capacitance

(V_{GE}=0V, *f*=100 kHz)

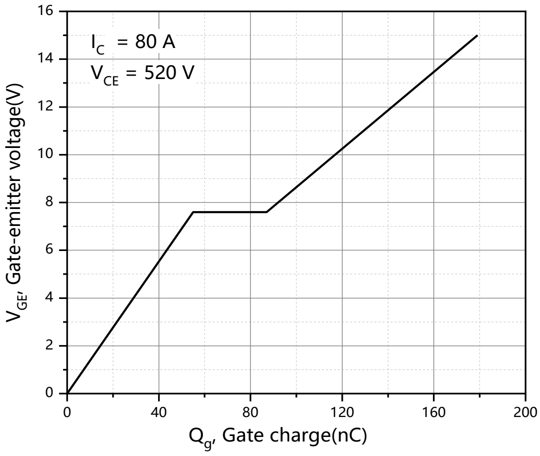


Figure 5. Typical gate charge

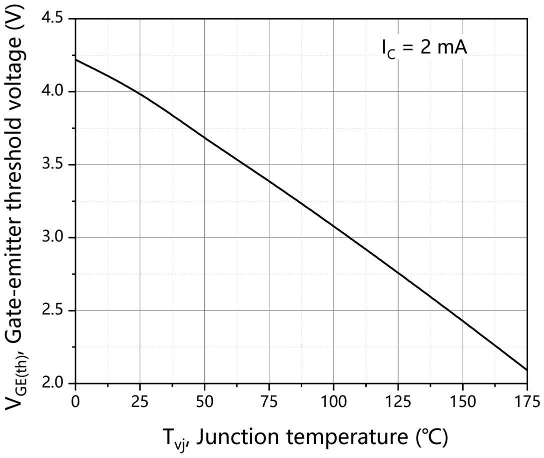


Figure 6. Gate-emitter threshold voltage

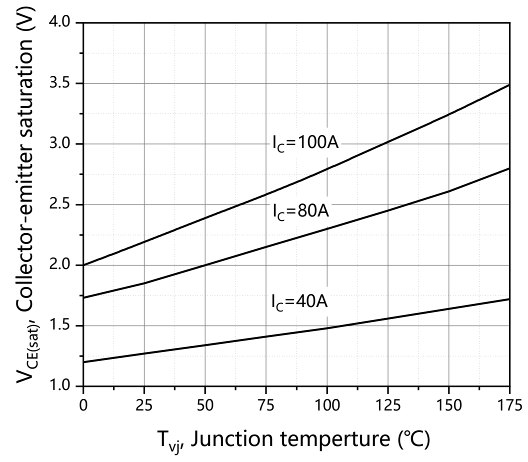


Figure 7. Typical collector-emitter voltage

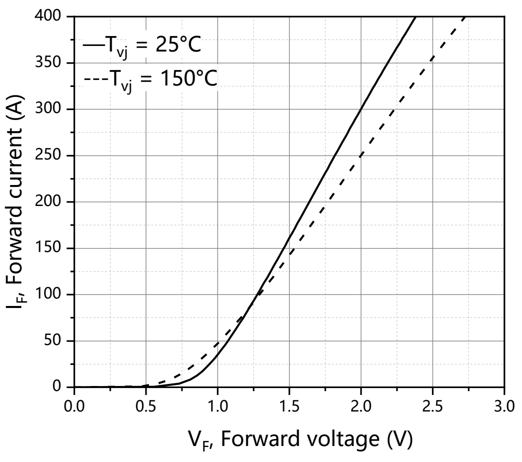


Figure 8. Forward characteristic of diode

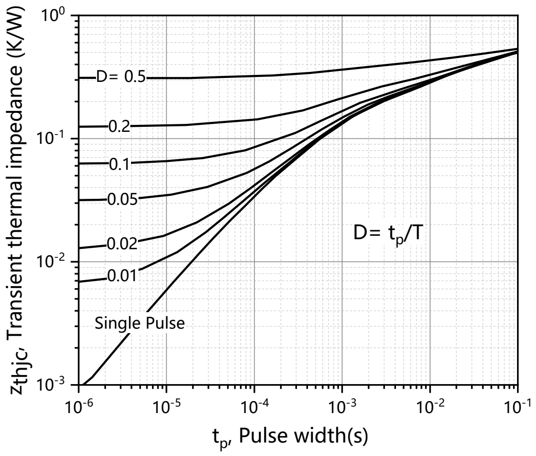


Figure 9. IGBT transient thermal impedance

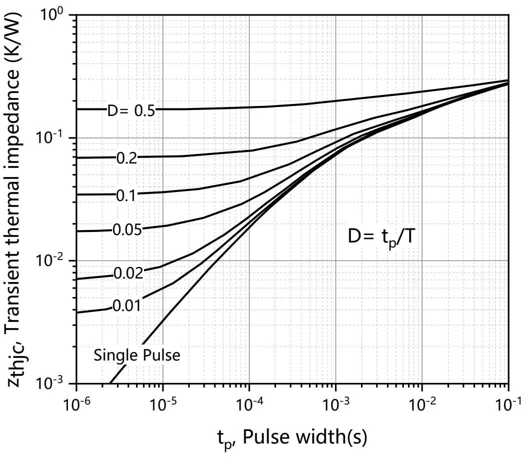
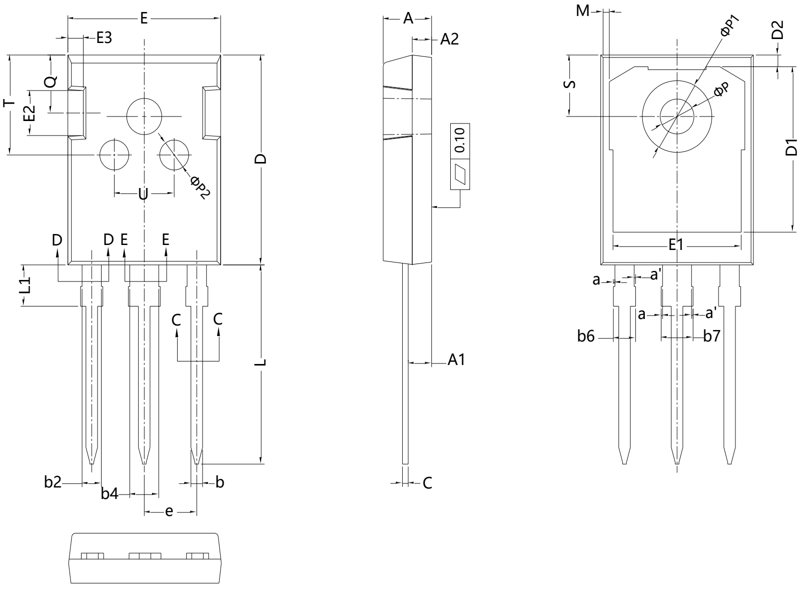


Figure 10. Diode transient thermal impedance

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0.00	-	0.15
a'	0.00	-	0.15
b	1.16	-	1.26
b2	1.96	-	2.06
b4	2.96	-	3.06
b6	-	-	2.25
b7	-	-	3.25
c	0.59	-	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.40	4.50	4.60
E3	1.50	1.60	1.70
e	5.436 BSC		
L	19.80	19.92	20.10
L1	-	-	4.30
M	0.35	-	0.95
P	3.40	3.50	3.60
P1	7.00	-	7.40
P2	2.40	2.5	2.6
Q	5.60	-	6.0
S	6.05	6.15	6.25
T	9.8	-	10.20
U	6.00	-	6.40

Version 1: TO247-J package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO247-J	30	20	600	4	2400

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSC80N65HF	TO247	yes	yes	yes

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