General Description

OST60N65H4EWF uses advanced Oriental-Semi's patented Trident-Gate Bipolar Transistor (TGBT™) 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™ technology
- Excellent conduction and switching loss
- Excellent stability and uniformity
- Fast and soft antiparallel SiC diode

Applications

- Induction converters
- Uninterruptible power supplies

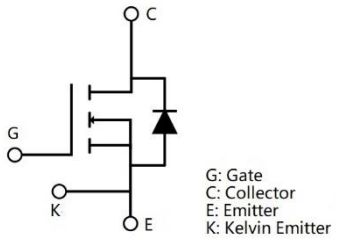
Key Performance Parameters

Parameter	Value	Unit
$V_{CES, min}$ @ 25 °C	650	V
Maximum junction temperature	175	°C
$I_{C, pulse}$	240	A
$V_{CE(sat), typ}$ @ V_{GE}=15 V	1.45	V
Q_g	105	nC

Marking Information

Product Name	Package	Marking
OST60N65H4EWF	TO247-4L	OST60N65H4EW

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≤10 µs, D<0.01		±30	V
Continuous collector current[1], T_C=25 °C	I_C	80	A
Continuous collector current[1], T_C=100 °C		60	A
Pulsed collector current[2], T_C=25 °C	$I_{C,\ pulse}$	240	A
Diode forward current[1], T_C=25 °C	I_F	80	A
Diode forward current[1], T_C=100 °C		60	A
Diode pulsed current[2], T_C=25 °C	$I_{F,\ pulse}$	240	A
Power dissipation[3], T_C=25 °C	P_D	375	W
Power dissipation[3], T_C=100 °C		150	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	0.4	°C/W
Diode thermal resistance, junction-case	$R_{\theta JC}$	0.65	°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=0.5 mA
Collector-emitter saturation voltage	$V_{CE(sat)}$		1.45	1.75	V	V_{GE}=15 V, I_C=60 A T_{vj}=25 °C
			1.65		V	V_{GE}=15 V, I_C=60 A, T_{vj}=125 °C
			1.75			V_{GE}=15 V, I_C=60 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=0.5 mA
Diode forward voltage	V_F		2.2		V	V_{GE}=0 V, I_F=50 A T_{vj}=25 °C
			2.8			V_{GE}=0 V, I_F=50 A, T_{vj}=125 °C
			3.4			V_{GE}=0 V, I_F=50 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}			50	μA	V_{CE}=650 V, V_{GE}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{ies}		5496		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		317		pF	
Reverse transfer capacitance	C_{res}		9.3		pF	
Turn-on delay time	$t_{d(on)}$		54		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=60 A
Rise time	t_r		92		ns	
Turn-off delay time	$t_{d(off)}$		156		ns	
Fall time	t_f		83		ns	
Turn-on energy	E_{on}		2.14		mJ	
Turn-off energy	E_{off}		0.82		mJ	
Turn-on delay time	$t_{d(on)}$		49		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=30 A
Rise time	t_r		42		ns	
Turn-off delay time	$t_{d(off)}$		189		ns	
Fall time	t_f		24		ns	
Turn-on energy	E_{on}		0.79		mJ	
Turn-off energy	E_{off}		0.62		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		105		nC	V_{GE}=15 V, V_{CC}=520 V, I_C=60 A
Gate-emitter charge	Q_{ge}		42.5		nC	
Gate-collector charge	Q_{gc}		17.6		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		36		ns	V_R=400 V, I_F=60 A, di_F/dt=500 A/μs T_{vj}=25 °C
Diode reverse recovery charge	Q_{rr}		99		nC	
Diode peak reverse recovery current	I_{rrm}		5.4		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.
4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

Electrical Characteristics Diagrams

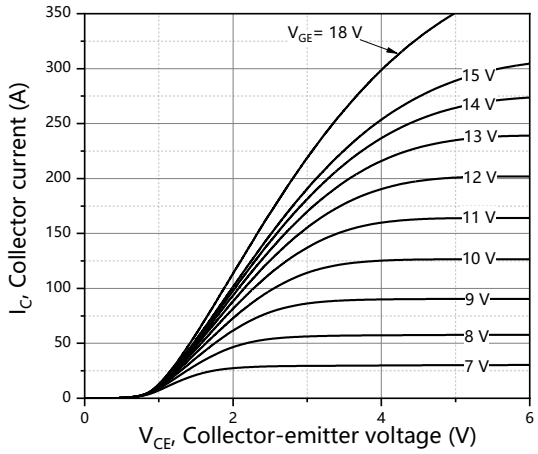


Figure 1. Typical output characteristics
(T_{vj}=25 °C)

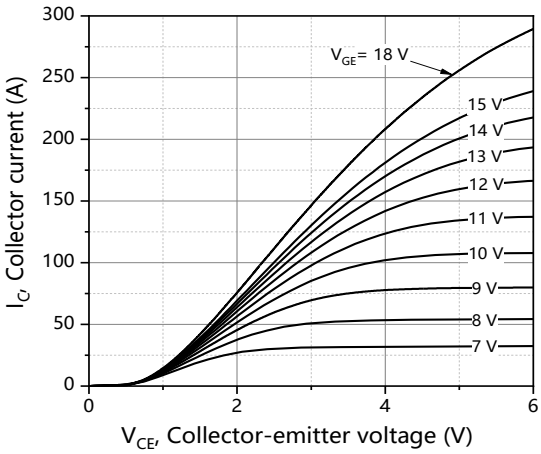


Figure 2. Typical output characteristics
(T_{vj}=150 °C)

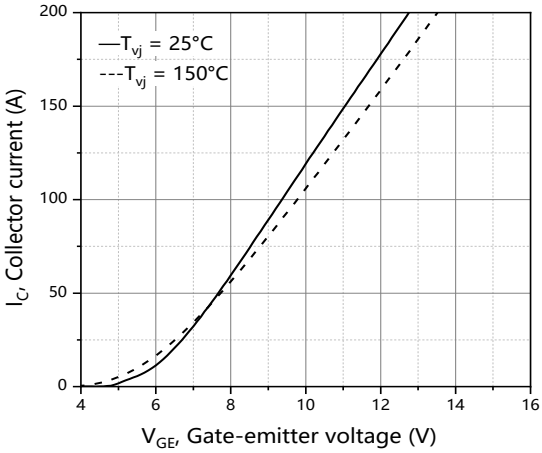


Figure 3. Typical transfer characteristics
(V_{CE}=20 V)

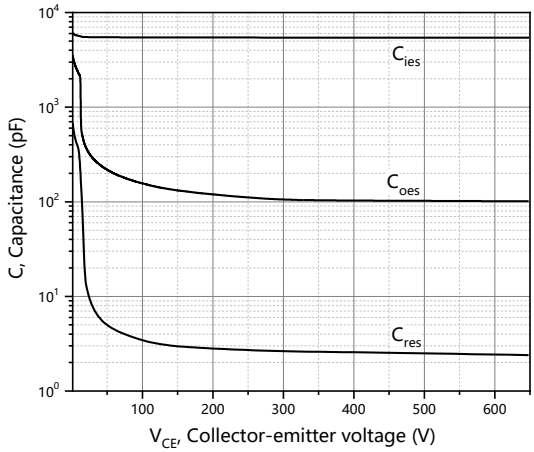


Figure 4. Typical capacitance
(V_{GE}=0V, f=100 kHz)

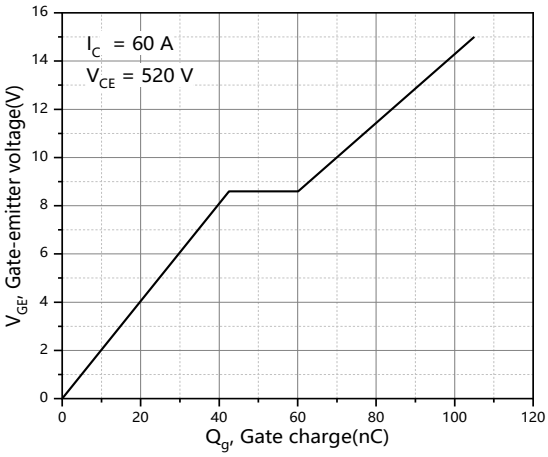


Figure 5. Typical gate charge

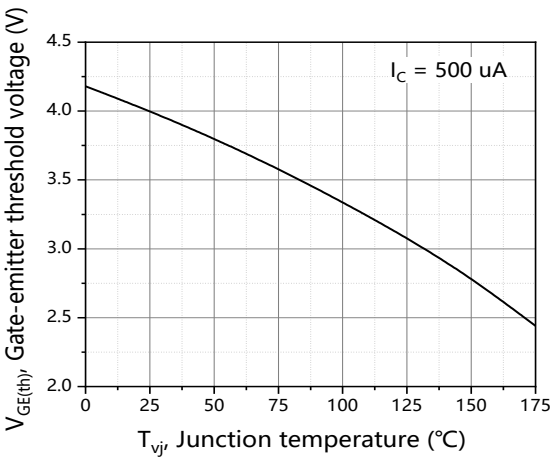


Figure 6. Gate-emitter threshold voltage

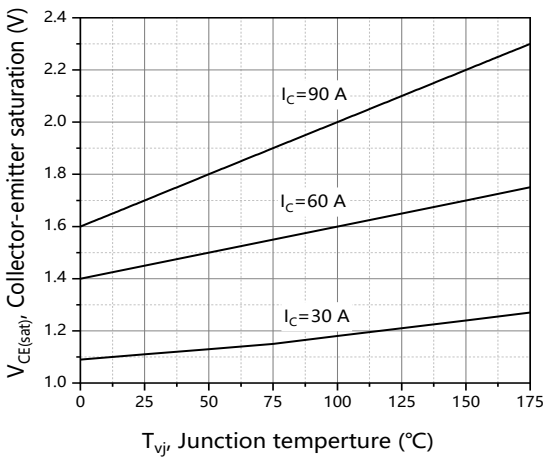


Figure 7. Typical collector-emitter voltage

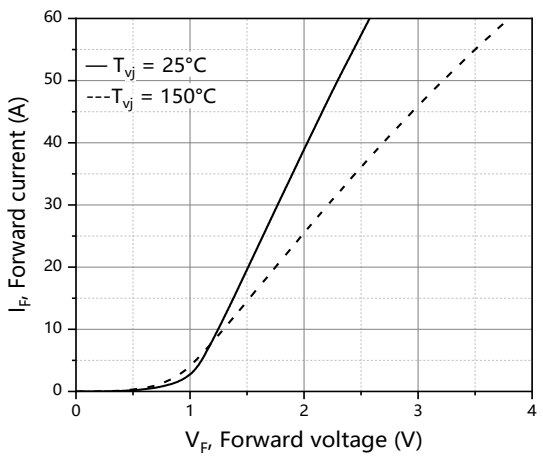


Figure 8. Forward characteristic of diode

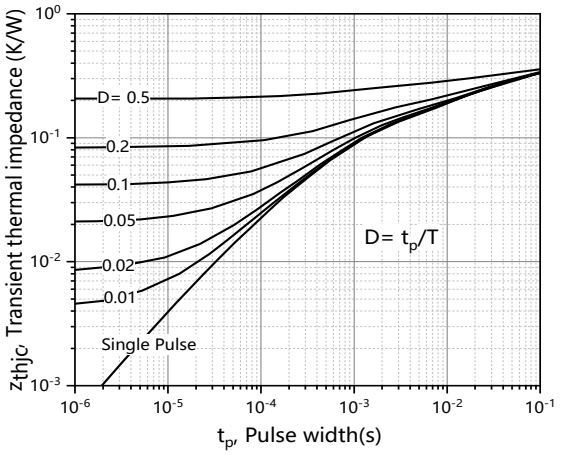


Figure 9. IGBT transient thermal impedance

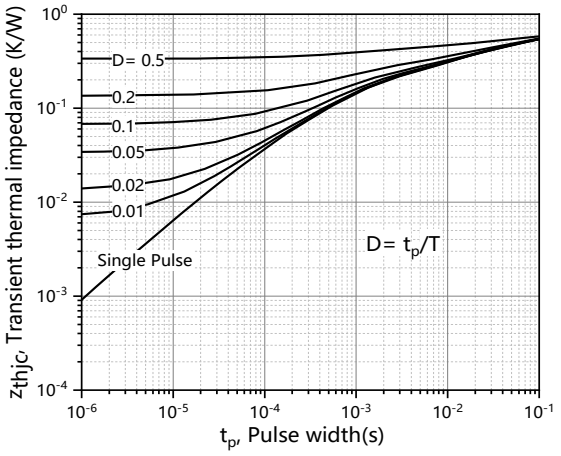
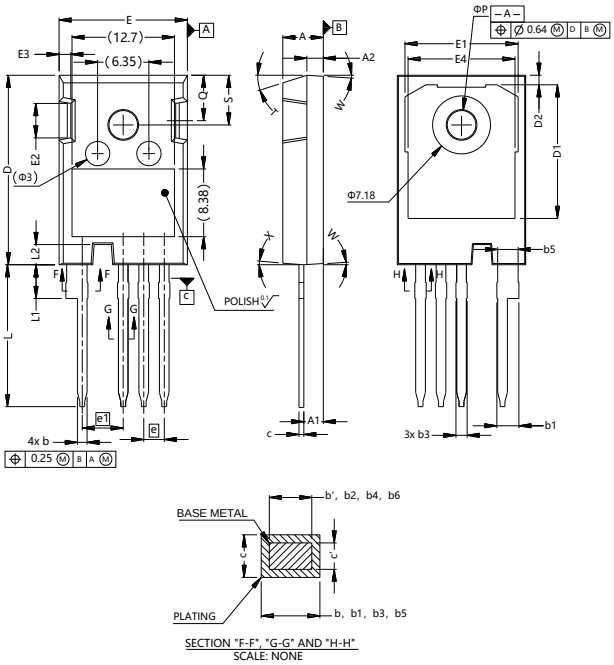


Figure 10. Diode transient thermal impedance

Package Information



Symbol	mm	
	Min	Max
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	2.39	2.94
b2	2.39	2.84
b3	1.07	1.60
b4	1.07	1.50
b5	2.39	2.69
b6	2.39	2.64
c'	0.55	0.65
c	0.55	0.68
D	23.30	23.60
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	2.54 BSC	
e1	5.08 BSC	
N	4	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
ΦP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF	
W	3.5° REF	
X	4° REF	

Version 1: TO247-4L-S package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO247-4L-S	30	15	450	4	1800

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OST60N65H4EWF	TO247-4L	yes	yes	yes

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