General Description

OST75N65HEMF-W 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 diode

RoHS compliant

Applications

- Induction converters
- Uninterruptible power supplies

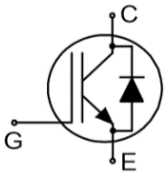
Key Performance Parameters

Parameter	Value	Unit
$V_{CES, min}$ @ 25°C	650	V
Maximum junction temperature	175	°C
$I_{C, pulse}$	300	A
$V_{CE(sat), typ}$ @ V_{GE}=15V	1.48	V
Q_g	259	nC

Marking Information

Product Name	Package	Marking
OST75N65HEMF-W	TO247	OST75N65HEM

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	90	A
Continuous collector current[1], T_C=100℃		75	A
Pulsed collector current[2], T_C=25℃	$I_{C, pulse}$	300	A
Diode forward current[1], T_C=25℃	I_F	90	A
Diode forward current[1], T_C=100℃		75	A
Diode pulsed current[2], T_C=25℃	$I_{F, pulse}$	300	A
Power dissipation[3], T_C=25℃	P_D	395	W
Power dissipation[3], T_C=100℃		198	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{θJC}$	0.38	°C/W
Diode thermal resistance, junction-case	$R_{θJC}$	0.45	°C/W
Thermal resistance, junction-ambient	$R_{θJA}$	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	$V_{CE(sat)}$		1.48	1.8	V	V_{GE}=15 V, I_C=75 A T_{vj}=25°C
			1.65		V	V_{GE}=15 V, I_C=75 A, T_{vj} =125°C
			1.75		V	V_{GE}=15 V, I_C=75 A, T_{vj} =175°C
Gate-emitter threshold voltage	$V_{GE(th)}$	3.0	4.0	5.0	V	V_{CE}=V_{GE}, I_C=0.5 mA
Diode forward voltage	V_F		1.85		V	V_{GE}=0 V, I_F=75 A T_{vj} =25°C
			1.72		V	V_{GE}=0 V, I_F=75 A, T_{vj} =125°C
			1.63		V	V_{GE}=0 V, I_F=75 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}		8396		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		243		pF	
Reverse transfer capacitance	C_{res}		75		pF	
Turn-on delay time	$t_{d(on)}$		55		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=75 A, T_{vj} = 25°C
Rise time	t_r		64		ns	
Turn-off delay time	$t_{d(off)}$		289		ns	
Fall time	t_f		47		ns	
Turn-on energy	E_{on}		2.60		mJ	
Turn-off energy	E_{off}		1.56		mJ	
Turn-on delay time	$t_{d(on)}$		48		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=30 A, T_{vj} = 25°C
Rise time	t_r		25		ns	
Turn-off delay time	$t_{d(off)}$		326		ns	
Fall time	t_f		24		ns	
Turn-on energy	E_{on}		0.79		mJ	
Turn-off energy	E_{off}		0.48		mJ	
Turn-on delay time	$t_{d(on)}$		52		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=75 A, T_{vj} = 175°C
Rise time	t_r		62		ns	
Turn-off delay time	$t_{d(off)}$		319		ns	
Fall time	t_f		51		ns	
Turn-on energy	E_{on}		3.81		mJ	
Turn-off energy	E_{off}		1.92		mJ	
Turn-on delay time	$t_{d(on)}$		45		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=30 A, T_{vj} = 175°C
Rise time	t_r		27		ns	
Turn-off delay time	$t_{d(off)}$		375		ns	
Fall time	t_f		41		ns	
Turn-on energy	E_{on}		1.42		mJ	
Turn-off energy	E_{off}		0.71		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		259		nC	V_{GE}=15 V, V_{CC}=520 V, I_C=75 A
Gate-emitter charge	Q_{ge}		76		nC	
Gate-collector charge	Q_{gc}		101		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		130		ns	V_R=400 V, I_F=75 A, di_F/dt=500 A/μs, T_{vj} = 25°C
Diode reverse recovery charge	Q_{rr}		0.77		μC	
Diode peak reverse recovery current	I_{rrm}		13		A	
Diode reverse recovery time	t_{rr}		216		ns	V_R=400 V, I_F=75 A, di_F/dt=500 A/μs, T_{vj} = 175°C
Diode reverse recovery charge	Q_{rr}		3.12		μC	
Diode peak reverse recovery current	I_{rrm}		27		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

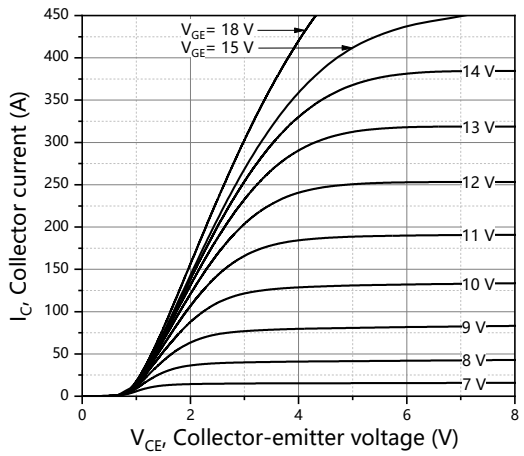


Figure 1. Typical output characteristics
(T_{vj}=25°C)

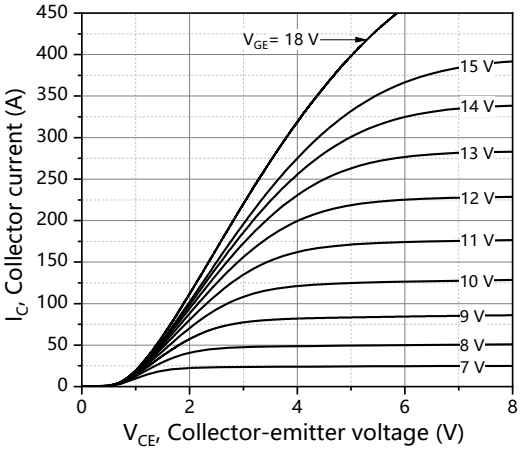


Figure 2. Typical output characteristics
(T_{vj}=150°C)

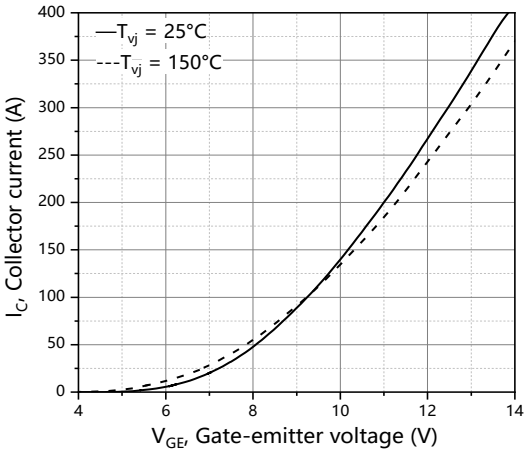


Figure 3. Typical transfer characteristics
(V_{CE}=20V)

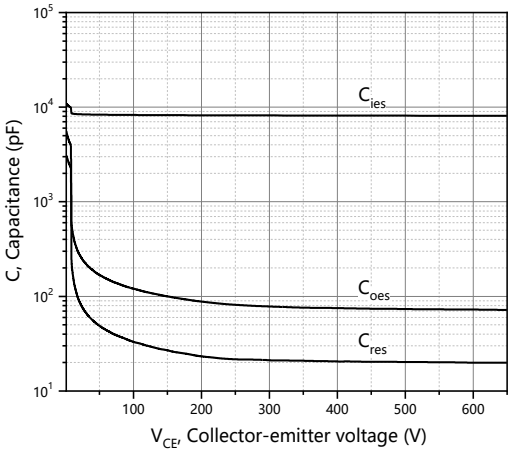


Figure 4. Typical capacitance
(V_{GE}=0V, f=100 kHz)

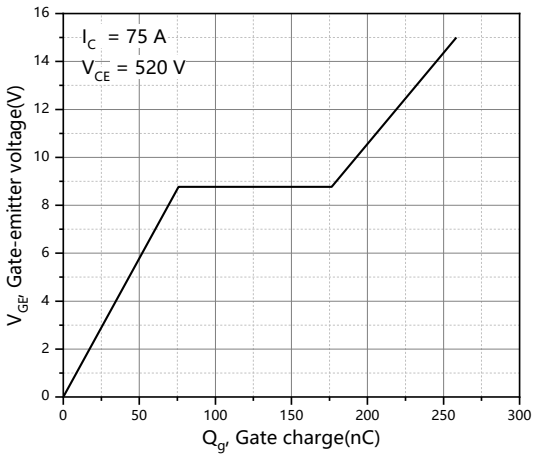


Figure 5. Typical gate charge

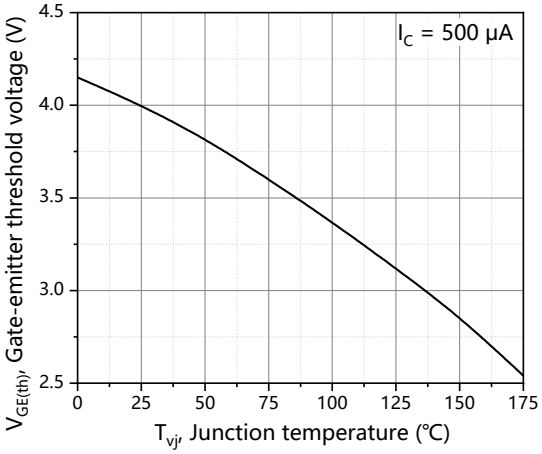


Figure 6. Gate-emitter threshold voltage

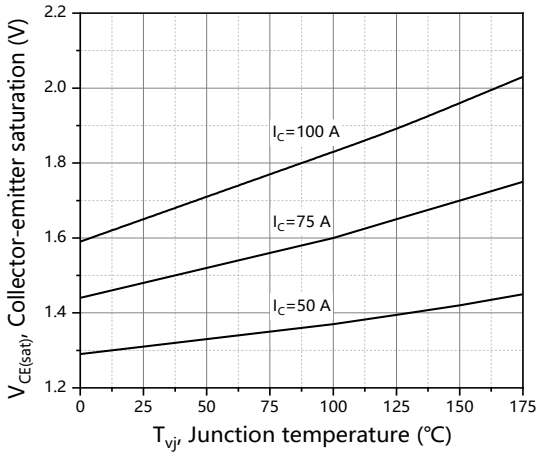


Figure 7. Typical collector-emitter voltage

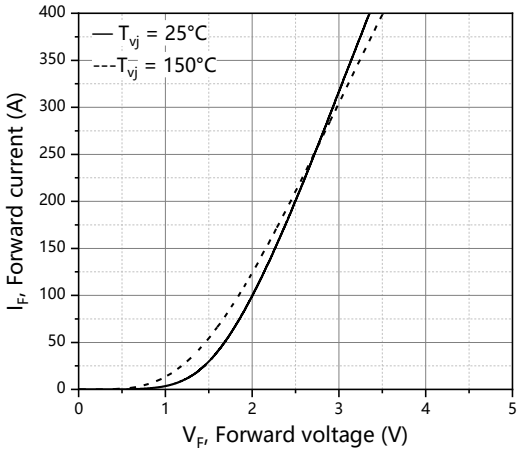


Figure 8. Forward characteristic of diode

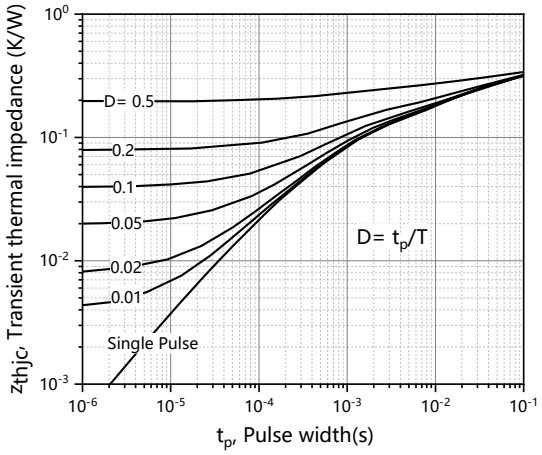


Figure 9. IGBT transient thermal impedance

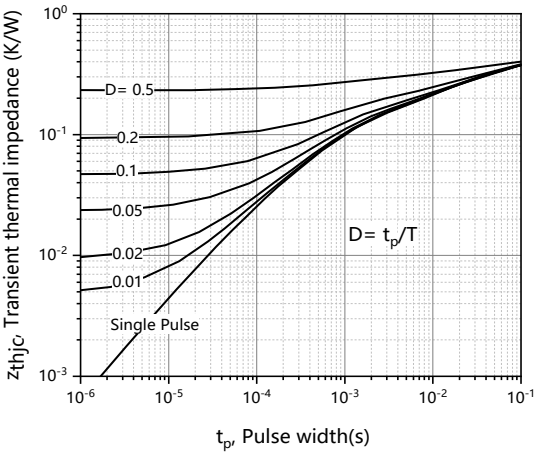


Figure 10. Diode transient thermal impedance

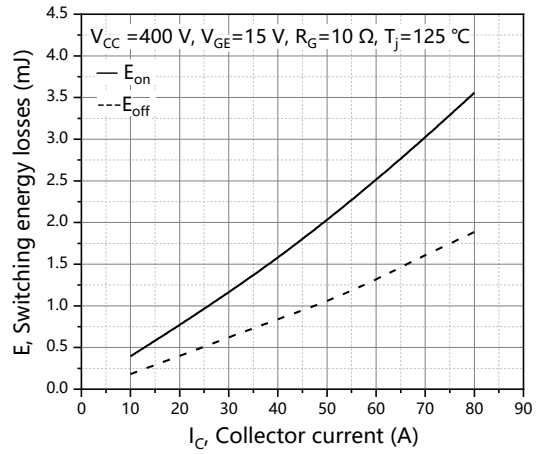
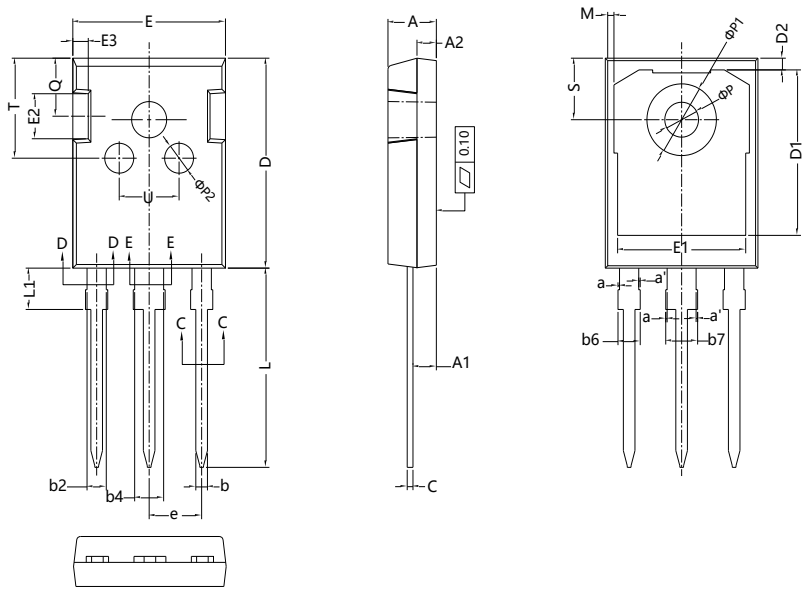


Figure 11. Switching energy vs. collector current

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
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 : 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
OST75N65HEMF-W	TO247	yes	yes	yes

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Revision History

Version	Revision History	Data
V1.0	Initial release	2025-07-14

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