General Description

OST60N65HEMF-D 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

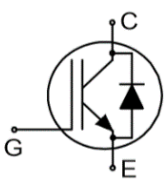
Key Performance Parameters

Parameter	Value	Unit
$V_{CES, min}$ @ 25°C	650	V
Maximum junction temperature	175	°C
$I_{C, pulse}$	240	A
$V_{CE(sat), typ}$ @ V_{GE}=15V	1.6	V
Q_g	133	nC

Marking Information

Product Name	Package	Marking
OST60N65HEMF-D	TO247	OST60N65HEM

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	80	A
Continuous collector current[1], T_C=100℃		60	A
Pulsed collector current[2], T_C=25℃	$I_{C, pulse}$	240	A
Diode forward current[1], T_C=25℃	I_F	80	A
Diode forward current[1], T_C=100℃		60	A
Diode pulsed current[2], T_C=25℃	$I_{F, pulse}$	240	A
Power dissipation[3], T_C=25℃	P_D	250	W
Power dissipation[3], T_C=100℃		100	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{θJC}$	0.6	°C/W
Diode thermal resistance, junction-case	$R_{θJC}$	0.38	°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	$V_{CE(sat)}$		1.6	1.8	V	V_{GE}=15 V, I_C=60 A T_{vj}=25°C
			1.82		V	V_{GE}=15 V, I_C=60 A, T_{vj} =125°C
			1.97			V_{GE}=15 V, I_C=60 A, T_{vj} =175°C
Gate-emitter threshold voltage	$V_{GE(th)}$	3.3	4.3	5.3	V	V_{CE}=V_{GE}, I_D=0.5 mA
Diode forward voltage	V_F		1.6	1.83	V	V_{GE}=0 V, I_F=60 A T_{vj} =25°C
			1.42			V_{GE}=0 V, I_F=60 A, T_{vj} =125°C
			1.36			V_{GE}=0 V, I_F=60 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}=600 V, V_{GE}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{ies}		5290		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		154		pF	
Reverse transfer capacitance	C_{res}		36		pF	
Turn-on delay time	$t_{d(on)}$		56		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=60 A
Rise time	t_r		75		ns	
Turn-off delay time	$t_{d(off)}$		185		ns	
Fall time	t_f		65		ns	
Turn-on energy	E_{on}		1.96		mJ	
Turn-off energy	E_{off}		0.73		mJ	
Turn-on delay time	$t_{d(on)}$		52		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=30 A
Rise time	t_r		36		ns	
Turn-off delay time	$t_{d(off)}$		194		ns	
Fall time	t_f		41		ns	
Turn-on energy	E_{on}		0.71		mJ	
Turn-off energy	E_{off}		0.27		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		133		nC	V_{GE}=15 V, V_{CC}=520 V, I_C=60 A
Gate-emitter charge	Q_{ge}		39		nC	
Gate-collector charge	Q_{gc}		43		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		99		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}		1.1		μC	
Diode peak reverse recovery current	I_{rrm}		17.8		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

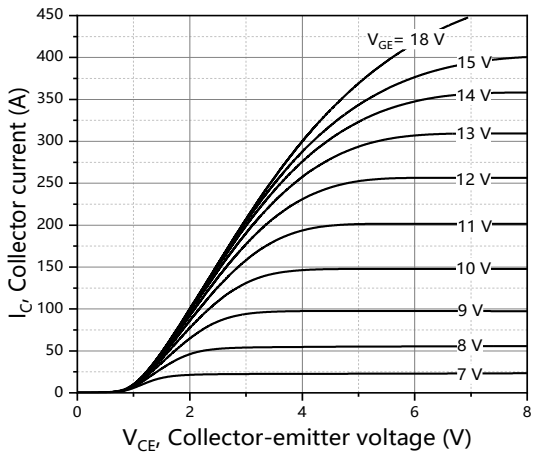


Figure 1. Typical output characteristics
(T_{vj}=25°C)

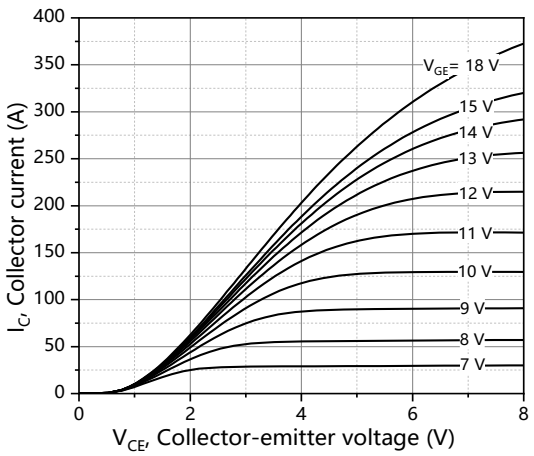


Figure 2. Typical output characteristics
(T_{vj}=150°C)

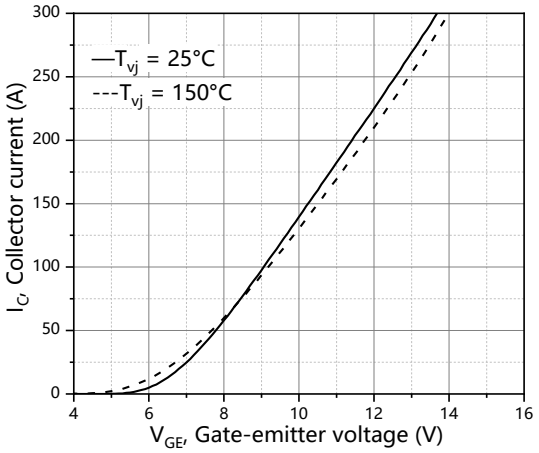


Figure 3. Typical transfer characteristics
(V_{CE}=20V)

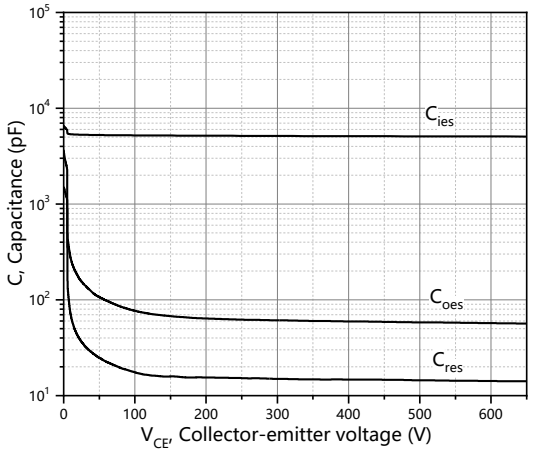


Figure 4. Typical capacitance
(V_{GE}=0V, f=100 kHz)

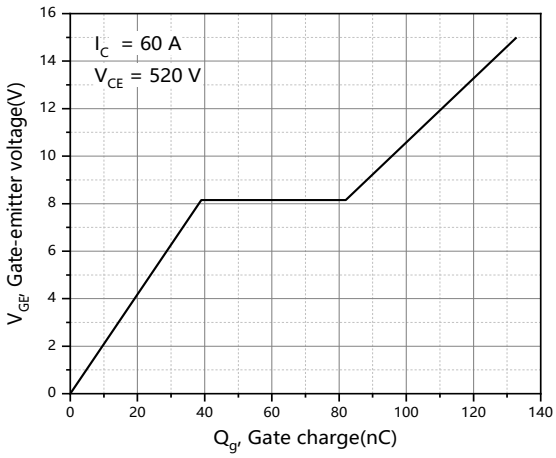


Figure 5. Typical gate charge

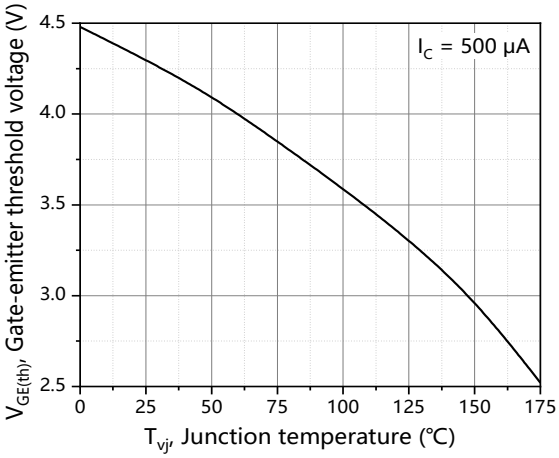


Figure 6. Gate-emitter threshold voltage

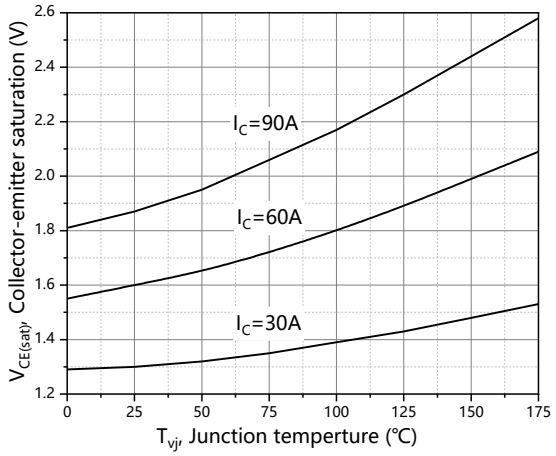


Figure 7. Typical collector-emitter voltage

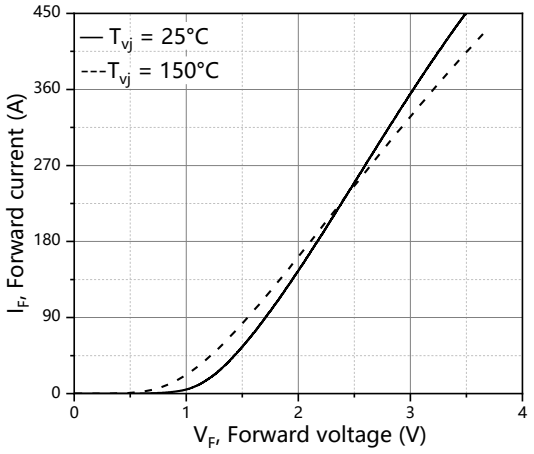


Figure 8. Forward characteristic of diode

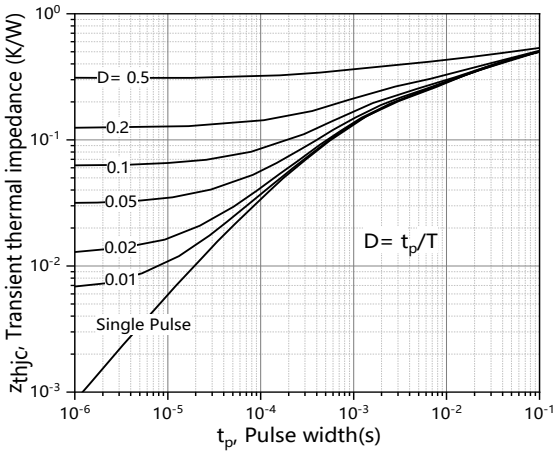


Figure 9. IGBT transient thermal impedance

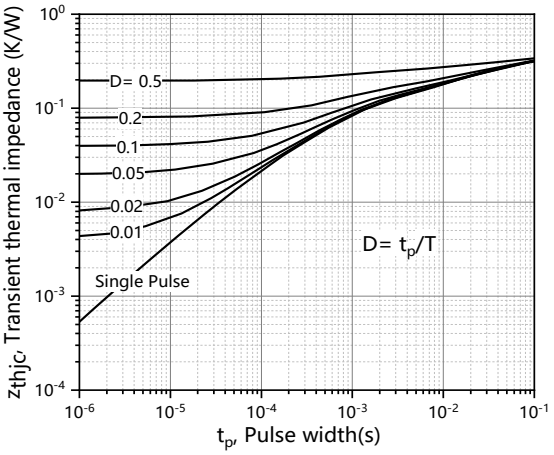


Figure 10. Diode transient thermal impedance

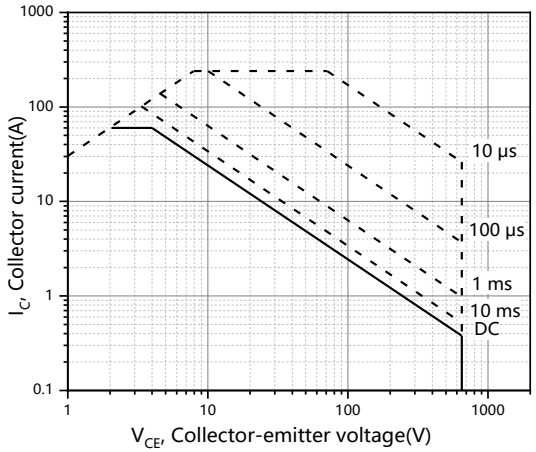
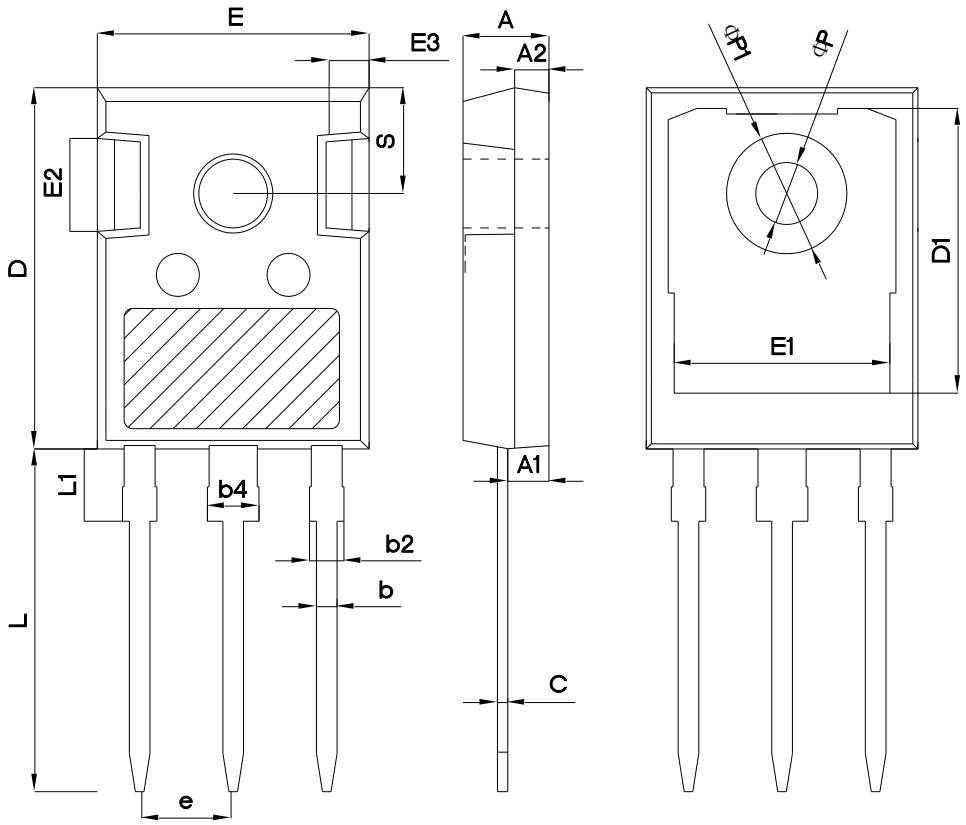


Figure 11. Safe operation area T_C=25 °C

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44 BSC		
L	19.82	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15 BSC		

Version 1: TO247-P package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO247-P	30	11	330	6	1980

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OST60N65HEMF	TO247	yes	yes	yes

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