General Description

OST100N120H5EM2F 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

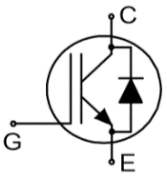
Key Performance Parameters

Parameter	Value	Unit
$V_{CES,\ min}$ @ 25 °C	1200	V
Maximum junction temperature	175	°C
$I_{C,\ pulse}$	400	A
$V_{CE(sat),\ typ}$ @ V_{GE}=15 V	1.7	V
Q_g	317	nC

Marking Information

Product Name	Package	Marking
OST100N120H5EM2F	TO247-plus	OST100N120H5EM2

Package & Pin Information



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

Parameter	Symbol	Value	Unit
Collector emitter voltage	V_{CES}	1200	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	166	A
Continuous collector current[1], T_C=100 °C		139	A
Pulsed collector current[2], T_C=25 °C	$I_{C,\ pulse}$	400	A
Diode forward current[1], T_C=25 °C	I_F	142	A
Diode forward current[1], T_C=100 °C		100	A
Diode pulsed current[2], T_C=25 °C	$I_{F,\ pulse}$	400	A
Power dissipation[3], T_C=25 °C	P_D	625	W
Power dissipation[3], T_C=100 °C		312	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	0.24	°C/W
Diode thermal resistance, junction-case	$R_{\theta JC}$	0.45	°C/W
Thermal resistance, junction-ambient	$R_{\theta JA}$	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	$V_{(BR)CES}$	1200			V	V_{GE}=0 V, I_C=0.5 mA
Collector-emitter saturation voltage	$V_{CE(sat)}$		1.7	2.3	V	V_{GE}=15 V, I_C=100 A T_{vj}=25 °C
			2.2		V	V_{GE}=15 V, I_C=100 A, T_{vj}=125 °C
			2.5		V	V_{GE}=15 V, I_C=100 A, T_{vj}=175 °C
Gate-emitter threshold voltage	$V_{GE(th)}$	5.0	5.5	6.0	V	V_{CE}=V_{GE}, I_D=0.5 mA
Diode forward voltage	V_F		3	3.6	V	V_{GE}=0 V, I_F=100 A T_{vj}=25 °C
			2.72		V	V_{GE}=0 V, I_F=100 A, T_{vj}=125 °C
			2.52		V	V_{GE}=0 V, I_F=100 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}=1200 V, V_{GE}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{ies}		17630		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		242		pF	
Reverse transfer capacitance	C_{res}		10		pF	
Turn-on delay time	$t_{d(on)}$		120		ns	V_{GE}=15 V, V_{CC}=600 V, R_G=10 Ω, I_C=100 A
Rise time	t_r		93		ns	
Turn-off delay time	$t_{d(off)}$		280		ns	
Fall time	t_f		65		ns	
Turn-on energy	E_{on}		5.84		mJ	
Turn-off energy	E_{off}		3.36		mJ	
Turn-on delay time	$t_{d(on)}$		115		ns	V_{GE}=15 V, V_{CC}=600 V, R_G=10 Ω, I_C=50 A
Rise time	t_r		48		ns	
Turn-off delay time	$t_{d(off)}$		324		ns	
Fall time	t_f		40		ns	
Turn-on energy	E_{on}		2.40		mJ	
Turn-off energy	E_{off}		1.71		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		317		nC	V_{GE}=15 V, V_{CC}=960 V, I_C=100 A
Gate-emitter charge	Q_{ge}		145		nC	
Gate-collector charge	Q_{gc}		57		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		227		ns	V_R=600 V, I_F=100 A, di_F/dt=500 A/μs T_{vj}=25 °C
Diode reverse recovery charge	Q_{rr}		2.16		μC	
Diode peak reverse recovery current	I_{rrm}		17.7		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

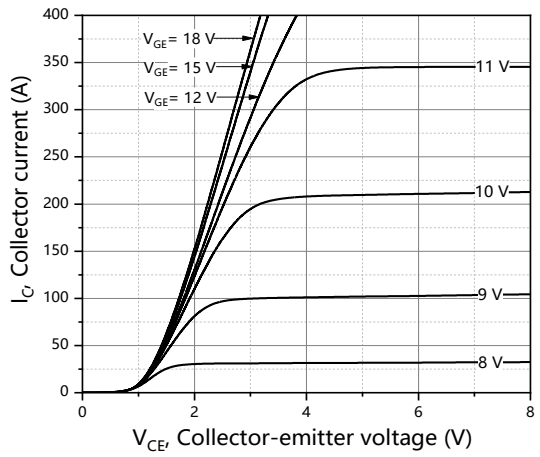


Figure 1. Typical output characteristics
(T_{vj}=25 °C)

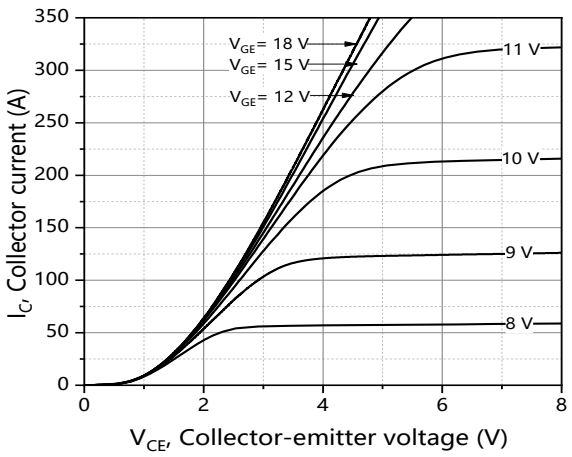


Figure 2. Typical output characteristics
(T_{vj}=150 °C)

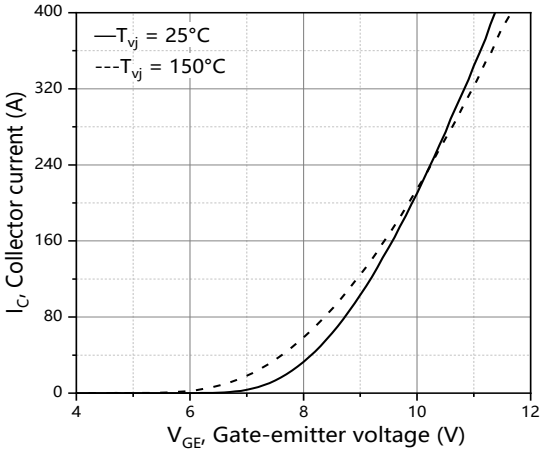


Figure 3. Typical transfer characteristics
(V_{CE}=20 V)

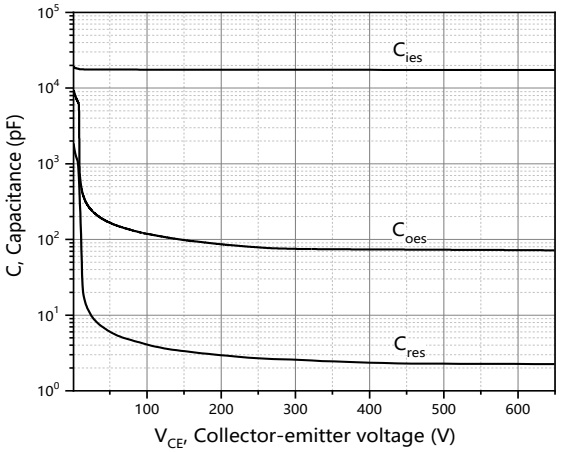


Figure 4. Typical capacitance
(V_{GE}=0V, f=100 kHz)

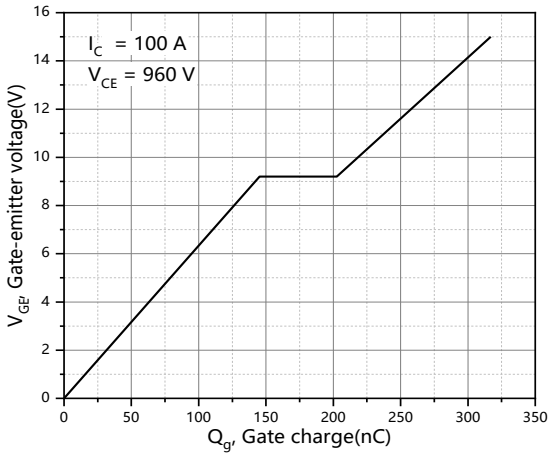


Figure 5. Typical gate charge

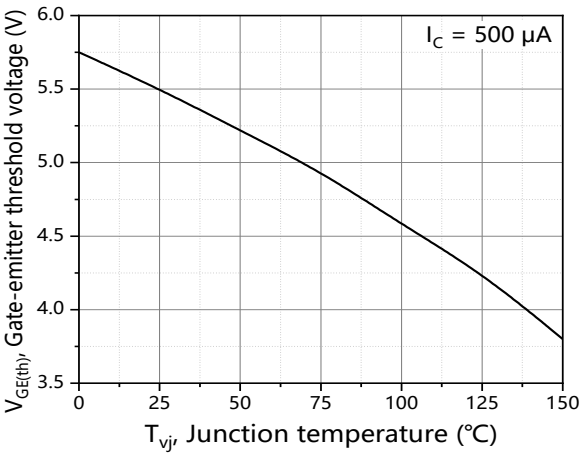


Figure 6. Gate-emitter threshold voltage

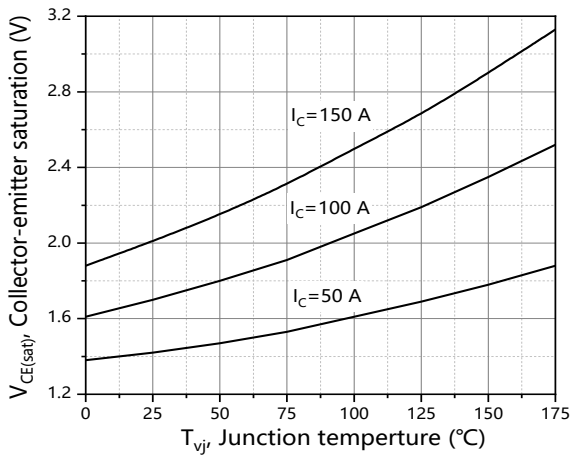


Figure 7. Typical collector-emitter voltage

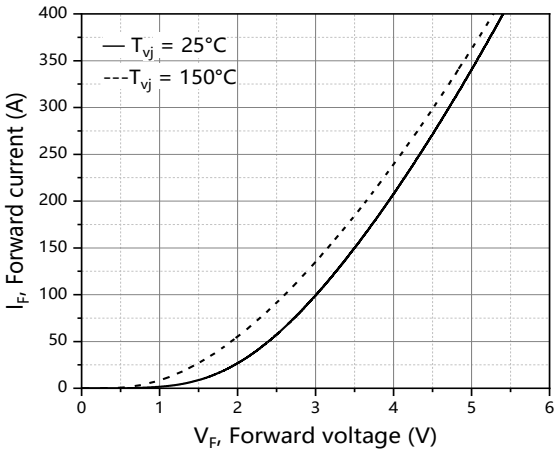


Figure 8. Forward characteristic of diode

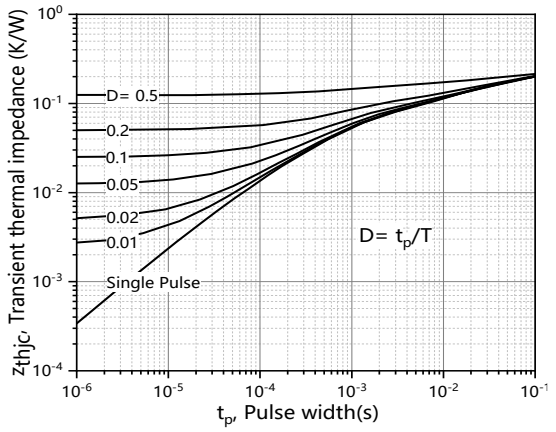


Figure 9. IGBT transient thermal impedance

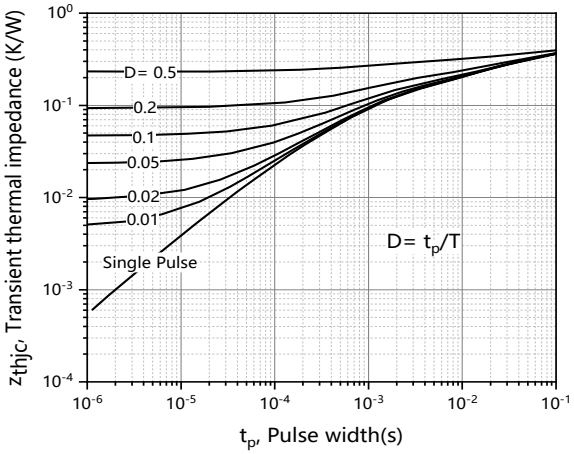


Figure 10. Diode transient thermal impedance

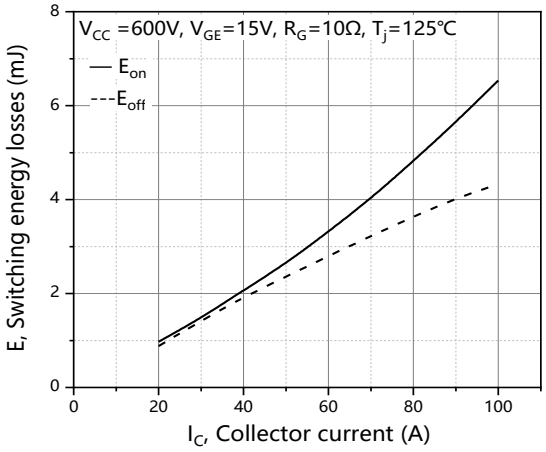
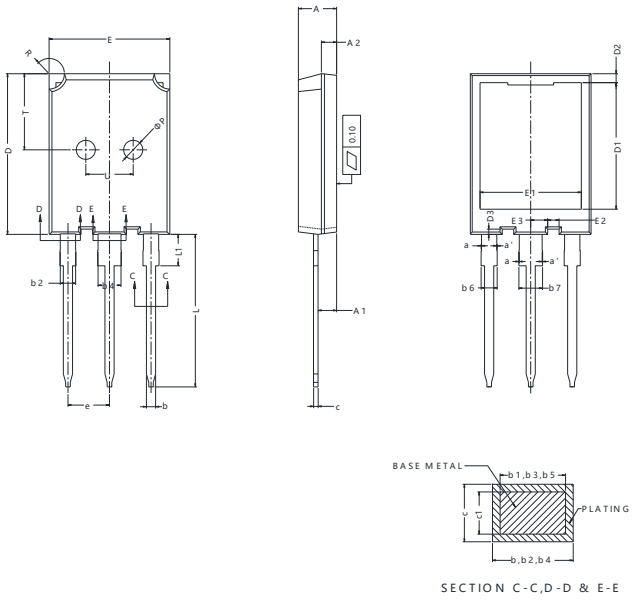


Figure 11. Switching energy vs. collector current

Package Information



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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
b1	1.15	1.20	1.22
b2	1.96		2.06
b3	1.95	2.00	2.02
b4	2.96		3.06
b5	2.96	3.00	3.02
b6			2.25
b7			3.25
c	0.59		0.66
c1	0.59	0.60	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
D3	0.58		0.78
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	1.40	1.50	1.60
E3	2.12	2.22	2.32
e	5.436 BSC		
L	19.80	19.95	20.10
L1			4.30
P	2.40	2.50	2.60
R	1.90		2.10
T	9.80		10.20
U	6.00		6.40

Version 1: TO247-plus-J package outline dimension

Ordering Information

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

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OST100N120H5EM2F	TO247-plus	yes	yes	yes

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