General Description

OST10N120K7SF 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

RoHS compliant

Applications

- Induction converters
- Uninterruptible power supplies

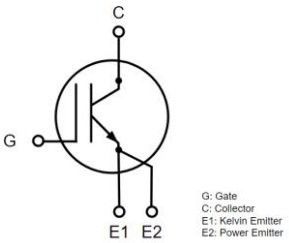
Key Performance Parameters

Parameter	Value	Unit
$V_{CES,\ min}$ @ 25 °C	1200	V
Maximum junction temperature	175	°C
$I_{C,\ pulse}$	40	A
$V_{CE(sat),\ typ}$ @ V_{GE}=15 V	1.6	V
Q_g	47	nC

Marking Information

Product Name	Package	Marking
OST10N120K7SF	TO263-7L	OST10N120K7S

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	20	A
Continuous collector current[1], T_C=100 °C		10	A
Pulsed collector current[2], T_C=25 °C	$I_{C,\ pulse}$	40	A
Power dissipation[3], T_C=25 °C	P_D	122	W
Power dissipation[3], T_C=100 °C		61	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	1.23	°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	$V_{(BR)CES}$	1200			V	V_{GE}=0 V, I_C=0.5 mA
Collector-emitter saturation voltage	$V_{CE(sat)}$		1.6	1.9	V	V_{GE}=15 V, I_C=10 A T_{vj}=25 °C
			1.66		V	V_{GE}=15 V, I_C=10 A, T_{vj}=125 °C
			1.72		V	V_{GE}=15 V, I_C=10 A, T_{vj}=175 °C
Gate-emitter threshold voltage	$V_{GE(th)}$	5.2	5.8	6.2	V	V_{CE}=V_{GE}, I_C=0.5 mA
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}		1982		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		27		pF	
Reverse transfer capacitance	C_{res}		9		pF	
Turn-on delay time	$t_{d(on)}$		19		ns	V_{GE}=15 V, V_{CC}=600 V, R_G=10 Ω, I_C=10 A
Rise time	t_r		5		ns	
Turn-off delay time	$t_{d(off)}$		68		ns	
Fall time	t_f		217		ns	
Turn-on energy	E_{on}		0.15		mJ	
Turn-off energy	E_{off}		0.48		mJ	
Turn-on delay time	$t_{d(on)}$		18		ns	V_{GE}=15 V, V_{CC}=600 V, R_G=10 Ω, I_C=5 A
Rise time	t_r		4		ns	
Turn-off delay time	$t_{d(off)}$		66		ns	
Fall time	t_f		190		ns	
Turn-on energy	E_{on}		0.11		mJ	
Turn-off energy	E_{off}		0.22		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		47		nC	V_{GE}=15 V, V_{CC}=960 V, I_C=10 A
Gate-emitter charge	Q_{ge}		19		nC	
Gate-collector charge	Q_{gc}		13		nC	

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 inch^2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

Electrical Characteristics Diagrams

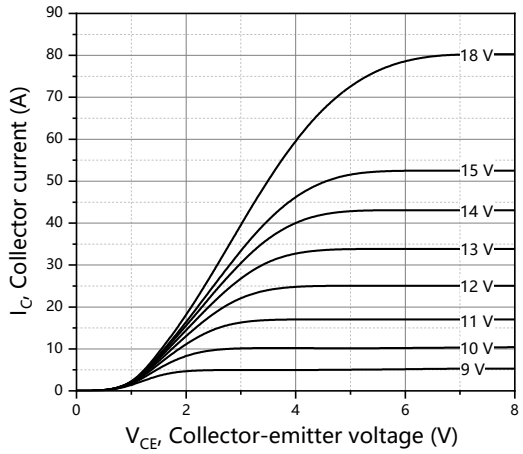


Figure 1. Typical output characteristics
(T_{vj}=25 °C)

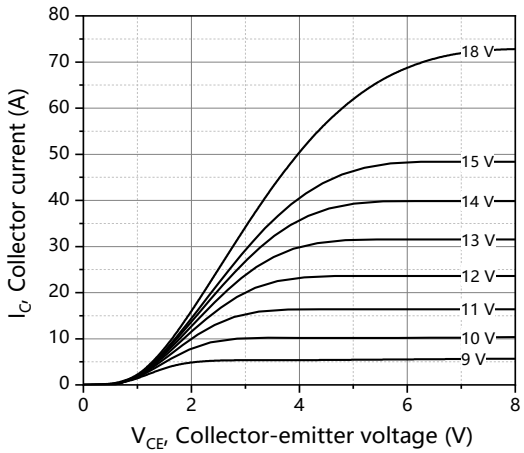


Figure 2. Typical output characteristics
(T_{vj}=150 °C)

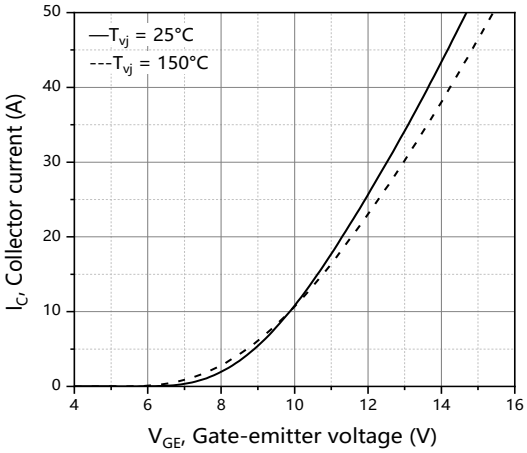


Figure 3. Typical transfer characteristics
(V_{CE}=20 V)

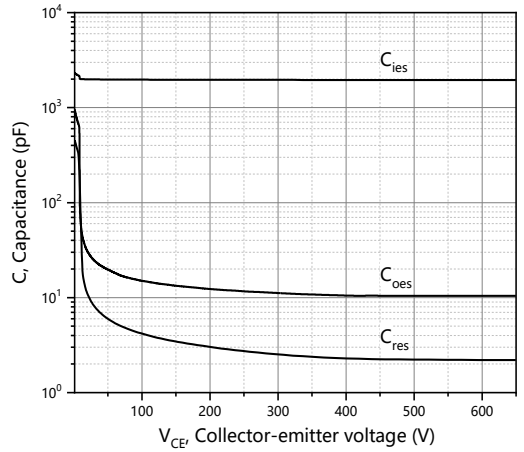


Figure 4. Typical capacitance
(V_{GE}=0V, f=100 kHz)

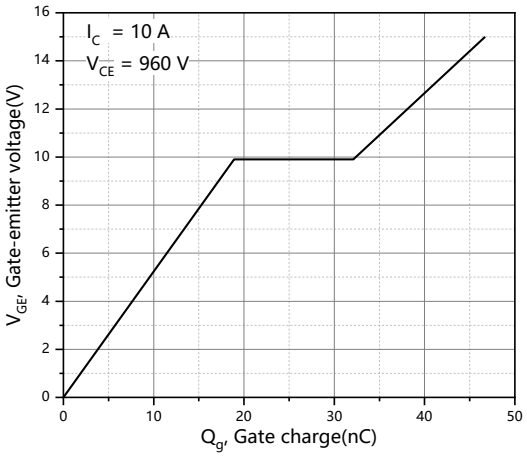


Figure 5. Typical gate charge

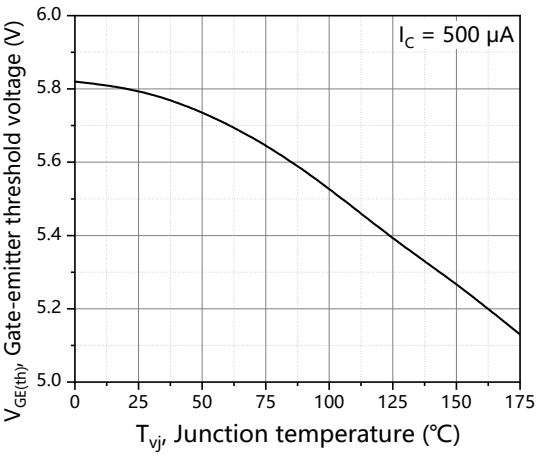


Figure 6. Gate-emitter threshold voltage

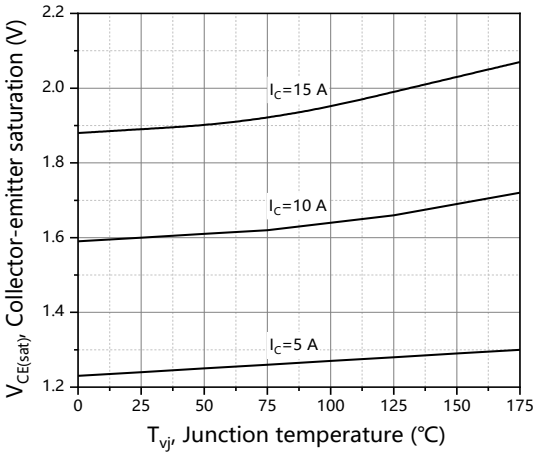


Figure 7. Typical collector-emitter voltage

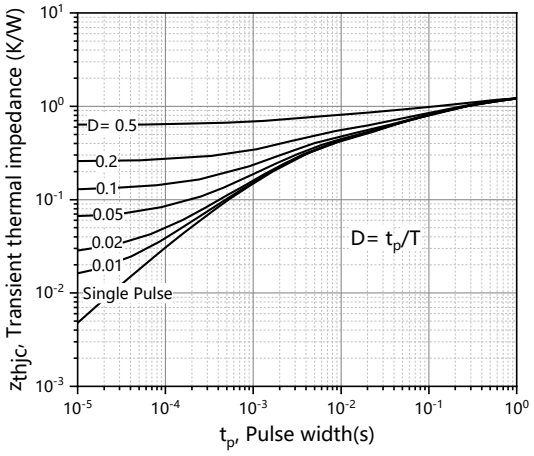
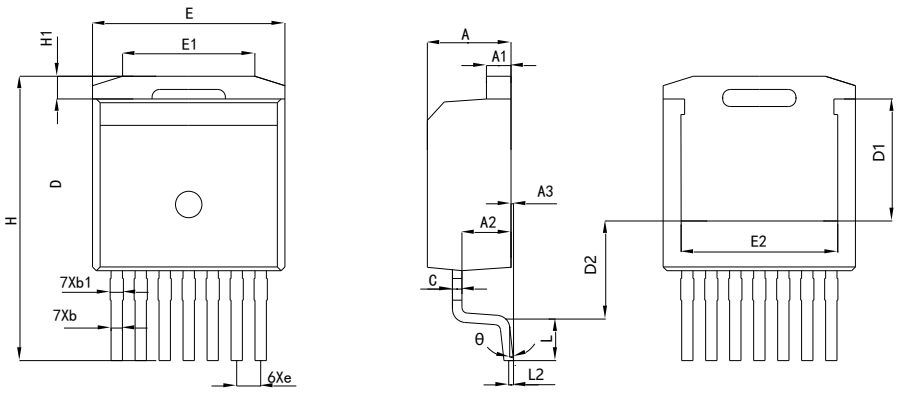


Figure 8. IGBT transient thermal impedance

Package Information



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Symbol	mm		
	Min	Nom	Max
A	4.30	4.43	4.56
A1	1.20	1.30	1.40
A2	2.45	2.60	2.75
A3	0.00	0.13	0.25
b	0.50	0.60	0.70
b1	0.60	0.70	0.90
c	0.45	0.50	0.60
D	8.93	9.08	9.23
D1	6.30	6.45	6.60
D2	5.18 REF		
e	1.27 BSC		
E	10.08	10.18	10.28
E1	7.00 REF		
E2	7.90	8.30	8.70
H	14.53	15.03	15.53
H1	0.98	1.20	1.42
L	1.90	2.20	2.50
L2	0.25 BSC		
θ	0°	3°	7°

Version : TO263-7L-P package outline dimension

Ordering Information

Package Type	Units/ Reel	Reel / Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO263-7L-P	800	1	800	5	4000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OST10N120K7SF	TO263-7L	yes	yes	yes

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Revision History

Version	Revision History	Data
V1.0	Initial release	2025-08-08

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