



General Description

OST60N65K7EWF 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

- PV inverters
- Induction converters
- Uninterruptible power supplies

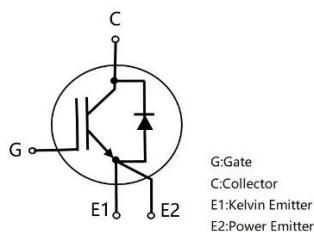
Key Performance Parameters

Parameter	Value	Unit
$V_{CES, min} @ 25^{\circ}C$	650	V
Maximum junction temperature	175	$^{\circ}C$
$I_C, pulse$	240	A
$V_{CE(sat), typ} @ V_{GE}=15V$	1.5	V
Q_g	107	nC

Marking Information

Product Name	Package	Marking
OST60N65K7EWF	TO263-7L	OST60N65K7EW

Package & Pin Information



Absolute Maximum Ratings at $T_{vj}=25^{\circ}\text{C}$ 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, $T_P \leq 10\mu\text{s}$, $D < 0.01$		± 30	V
Continuous collector current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_C	80	A
Continuous collector current ¹⁾ , $T_C=100^{\circ}\text{C}$		60	A
Pulsed collector current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{C, \text{ pulse}}$	240	A
Diode forward current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_F	80	A
Diode forward current ¹⁾ , $T_C=100^{\circ}\text{C}$		60	A
Diode pulsed current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{F, \text{ pulse}}$	240	A
Power dissipation ³⁾ , $T_C=25^{\circ}\text{C}$	P_D	300	W
Power dissipation ³⁾ , $T_C=100^{\circ}\text{C}$		150	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	0.5	$^{\circ}\text{C/W}$
Diode thermal resistance, junction-case	$R_{\theta JC}$	1.0	$^{\circ}\text{C/W}$
Thermal resistance, junction-ambient ⁴⁾	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_{vj}=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Collector-emitter breakdown voltage	$V_{(BR)CES}$	650			V	$V_{GE}=0\text{ V}$, $I_C=0.5\text{ mA}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		1.5	1.85	V	$V_{GE}=15\text{ V}$, $I_C=60\text{ A}$ $T_{vj}=25^{\circ}\text{C}$
			1.76		V	$V_{GE}=15\text{ V}$, $I_C=60\text{ A}$, $T_{vj}=125^{\circ}\text{C}$
			1.91		V	$V_{GE}=15\text{ V}$, $I_C=60\text{ A}$, $T_{vj}=175^{\circ}\text{C}$
Gate-emitter threshold voltage	$V_{GE(th)}$	3.0	4.0	5.0	V	$V_{CE}=V_{GE}$, $I_C=0.5\text{ mA}$
Diode forward voltage	V_F		2.2	2.5	V	$V_{GE}=0\text{ V}$, $I_F=50\text{ A}$ $T_{vj}=25^{\circ}\text{C}$
			2.67		V	$V_{GE}=0\text{ V}$, $I_F=50\text{ A}$, $T_{vj}=125^{\circ}\text{C}$
			3.05		V	$V_{GE}=0\text{ V}$, $I_F=50\text{ A}$, $T_{vj}=175^{\circ}\text{C}$
Gate-emitter leakage current	I_{GES}			100	nA	$V_{CE}=0\text{ V}$, $V_{GE}=20\text{ V}$
Zero gate voltage collector current	I_{CES}			100	μA	$V_{CE}=650\text{ V}$, $V_{GE}=0\text{ V}$

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{ies}		5695		pF	$V_{GE}=0\text{ V}$, $V_{CE}=25\text{ V}$, $f=100\text{ kHz}$
Output capacitance	C_{oes}		301		pF	
Reverse transfer capacitance	C_{res}		4.2		pF	
Turn-on delay time	$t_{d(on)}$		38		ns	$V_{GE}=15\text{ V}$, $V_{CC}=400\text{ V}$, $R_G=10\ \Omega$, $I_C=60\text{ A}$
Rise time	t_r		24		ns	
Turn-off delay time	$t_{d(off)}$		127		ns	
Fall time	t_f		17		ns	
Turn-on energy	E_{on}		0.67		mJ	
Turn-off energy	E_{off}		0.66		mJ	
Turn-on delay time	$t_{d(on)}$		35		ns	$V_{GE}=15\text{ V}$, $V_{CC}=400\text{ V}$, $R_G=10\ \Omega$, $I_C=30\text{ A}$
Rise time	t_r		16		ns	
Turn-off delay time	$t_{d(off)}$		148		ns	
Fall time	t_f		13		ns	
Turn-on energy	E_{on}		0.24		mJ	
Turn-off energy	E_{off}		0.34		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		107		nC	$V_{GE}=15\text{ V}$, $V_{CC}=520\text{ V}$, $I_C=60\text{ A}$
Gate-emitter charge	Q_{ge}		43		nC	
Gate-collector charge	Q_{gc}		21		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		19		ns	$V_R=400\text{ V}$, $I_F=60\text{ A}$, $di_F/dt=500\text{ A}/\mu\text{s}$ $T_{vj}=25^\circ\text{C}$
Diode reverse recovery charge	Q_{rr}		40		nC	
Diode peak reverse recovery current	I_{rrm}		3.1		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d 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 inch² FR-4 board with 2oz. Copper, in a still air environment with $T_a=25^\circ\text{C}$.

Electrical Characteristics Diagrams

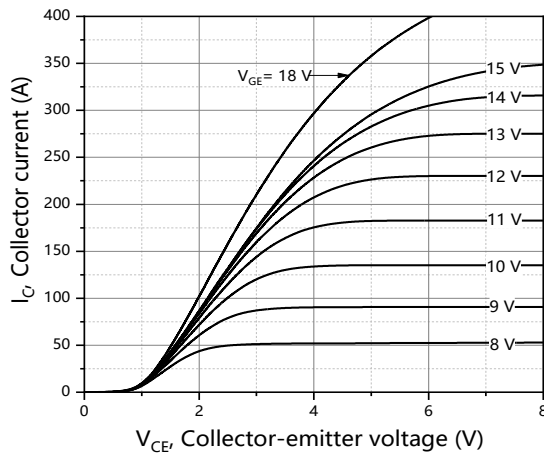


Figure 1. Typical output characteristics
($T_{vj}=25^{\circ}\text{C}$)

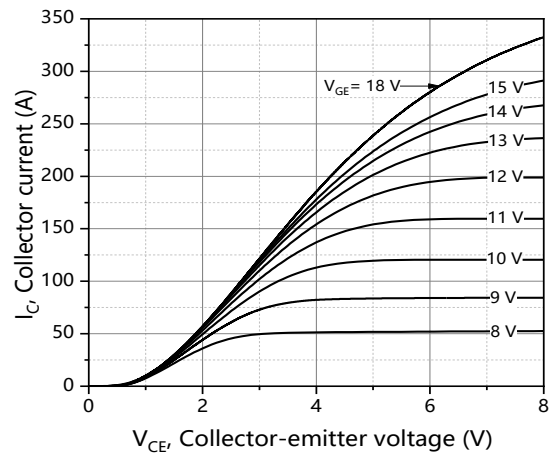


Figure 2. Typical output characteristics
($T_{vj}=150^{\circ}\text{C}$)

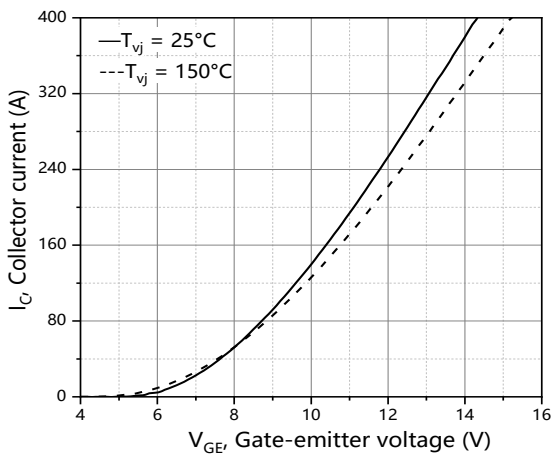


Figure 3. Typical transfer characteristics
($V_{CE}=20\text{V}$)

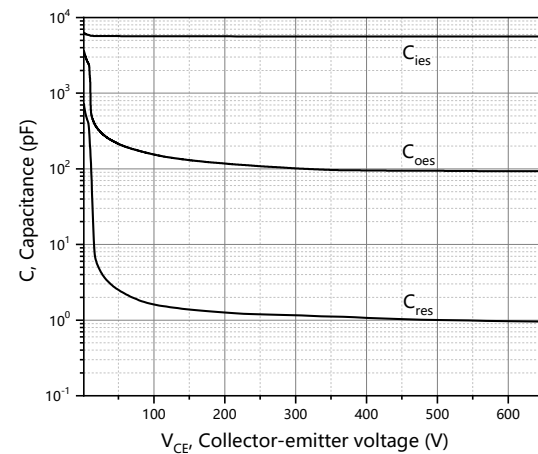


Figure 4. Typical capacitance
($V_{GE}=0\text{V}$, $f=100\text{ kHz}$)

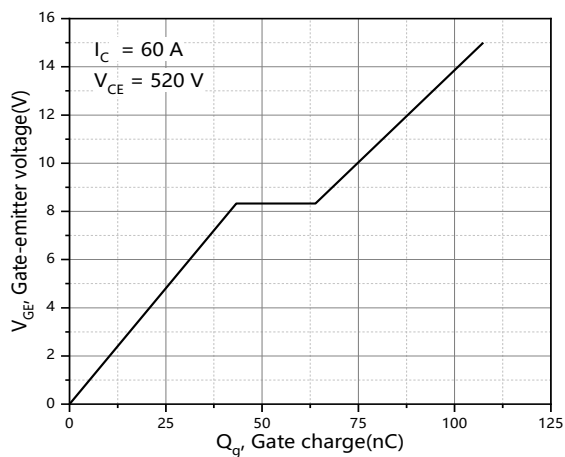


Figure 5. Typical gate charge

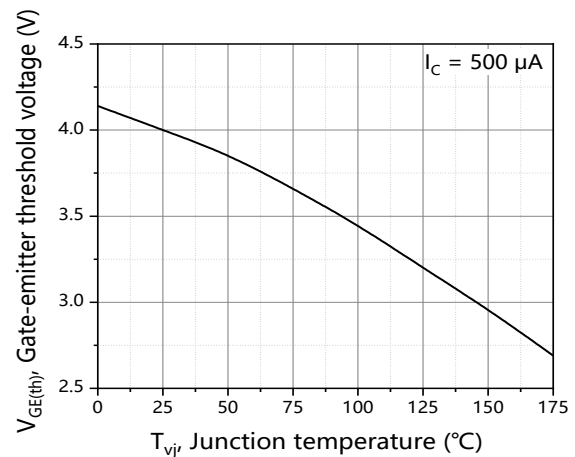
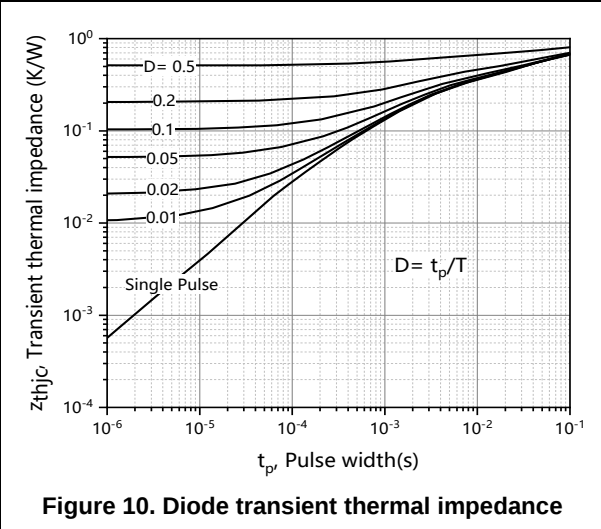
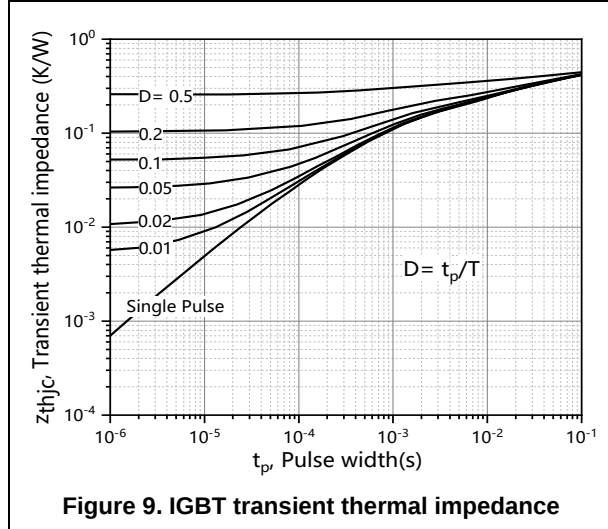
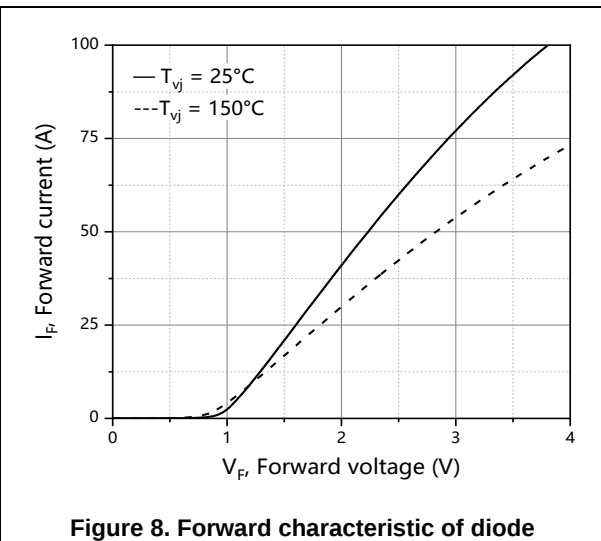
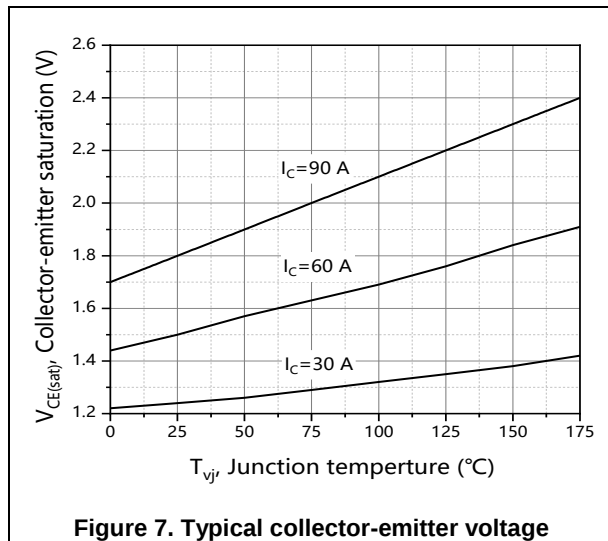
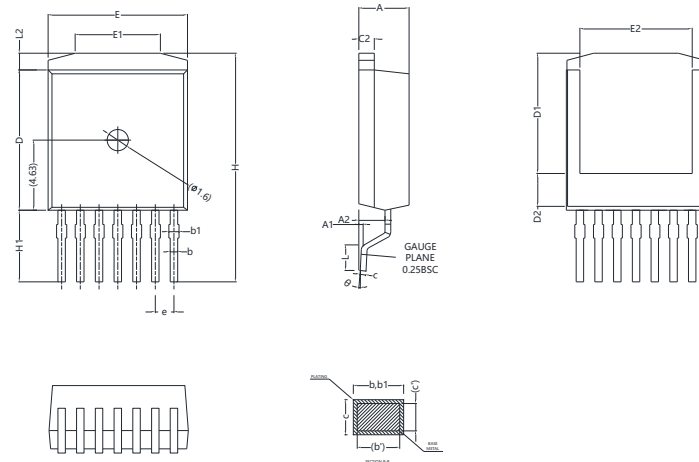


Figure 6. Gate-emitter threshold voltage



Package Information



Items	Min	Max
A	4.3	4.7
A1	—	0.25
A2	2.2	2.6
b	0.52	0.72
b'	0.5	0.7
b1	0.6	0.8
c	0.42	0.62
c'	0.4	0.6
c2	1.07	1.47
D	9.05	9.45
D1	7.58	7.98
D2	2.05	2.45
e	1.27 BSC	
E	9.8	10.2
E1	6.3	6.7
E2	7.8	8.2
L	2.48	2.88
L2	0.87	1.27
H	14.87	15.27
H1	4.55	4.95
θ	0°	8°

TO263-7L-S package outline dimension



Ordering Information

Package Type	Units/ Reel	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO263-7L-S	800	1	800	7	5600

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OST60N65K7EWF	TO263-7L	yes	yes	yes

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