



General Description

OST50N65K7MAF 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



Applications

- Heater

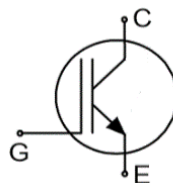
Key Performance Parameters

Parameter	Value	Unit
$V_{CES, \min}$ @ 25 °C	650	V
Maximum junction temperature	175	°C
I_C , pulse	200	A
$V_{CE(sat)}$, typ @ $V_{GE}=15$ V	1.4	V
Q_g	107	nC

Marking Information

Product Name	Package	Marking
OST50N65K7MAF	TO263-7L	OST50N65K7MA

Package & Pin Information



Absolute Maximum Ratings at $T_{vj}=25\text{ }^{\circ}\text{C}$ 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, $T_P \leq 10\text{ }\mu\text{s}$, $D < 0.01$		± 30	V
Continuous collector current ¹⁾ , $T_C = 25\text{ }^{\circ}\text{C}$	I_C	80	A
Continuous collector current ¹⁾ , $T_C = 100\text{ }^{\circ}\text{C}$		50	A
Pulsed collector current ²⁾ , $T_C = 25\text{ }^{\circ}\text{C}$	$I_{C, \text{ pulse}}$	200	A
Power dissipation ³⁾ , $T_C = 25\text{ }^{\circ}\text{C}$	P_D	250	W
Power dissipation ³⁾ , $T_C = 100\text{ }^{\circ}\text{C}$		125	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	$^{\circ}\text{C}$
Short circuit withstand time $V_{GE} = 15\text{ V}$, $V_{CC} \leq 400\text{ V}$ Allowed number of short circuits < 1000 Time between short circuits: $\geq 1.0\text{ S}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$	t_{sc}	5	μs

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	0.6	$^{\circ}\text{C/W}$
Thermal resistance, junction-ambient ⁴⁾	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_{vj}=25\text{ }^{\circ}\text{C}$ 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	$V_{CE(sat)}$		1.40	1.65	V	$V_{GE} = 15\text{ V}$, $I_C = 50\text{ A}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$
			1.47		V	$V_{GE} = 15\text{ V}$, $I_C = 50\text{ A}$, $T_{vj} = 125\text{ }^{\circ}\text{C}$
			1.53		V	$V_{GE} = 15\text{ V}$, $I_C = 50\text{ A}$, $T_{vj} = 175\text{ }^{\circ}\text{C}$
Gate-emitter threshold voltage	$V_{GE(th)}$	5.0	5.5	6.0	V	$V_{CE} = V_{GE}$, $I_C = 0.5\text{ mA}$
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}			10	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}		5869		pF	$V_{GE}=0\text{ V}$, $V_{CE}=25\text{ V}$, $f=100\text{ kHz}$
Output capacitance	C_{oes}		88		pF	
Reverse transfer capacitance	C_{res}		4		pF	
Turn-on delay time	$t_{d(on)}$		173		ns	$V_{GE}=15\text{ V}$, $V_{CC}=400\text{ V}$, $R_G^{(5)}=48\ \Omega$, $I_C=50\text{ A}$
Rise time	t_r		61		ns	
Turn-off delay time	$t_{d(off)}$		335		ns	
Fall time	t_f		79		ns	
Turn-on energy	E_{on}		1.13		mJ	
Turn-off energy	E_{off}		1.34		mJ	
Turn-on delay time	$t_{d(on)}$		164		ns	$V_{GE}=15\text{ V}$, $V_{CC}=400\text{ V}$, $R_G^{(5)}=48\ \Omega$, $I_C=25\text{ A}$
Rise time	t_r		41		ns	
Turn-off delay time	$t_{d(off)}$		393		ns	
Fall time	t_f		54		ns	
Turn-on energy	E_{on}		0.45		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		107		nC	$V_{GE}=15\text{ V}$, $V_{CC}=520\text{ V}$, $I_C=50\text{ A}$
Gate-emitter charge	Q_{ge}		56		nC	
Gate-collector charge	Q_{gc}		11		nC	

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 $T_a=25\text{ }^{\circ}\text{C}$.
- 5) Recommended drive resistance greater than or equal to 66 Ω

Electrical Characteristics Diagrams

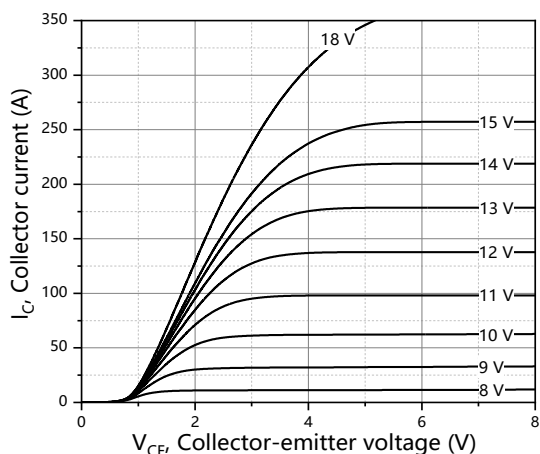


Figure 1. Typical output characteristics
($T_{vj}=25\text{ }^{\circ}\text{C}$)

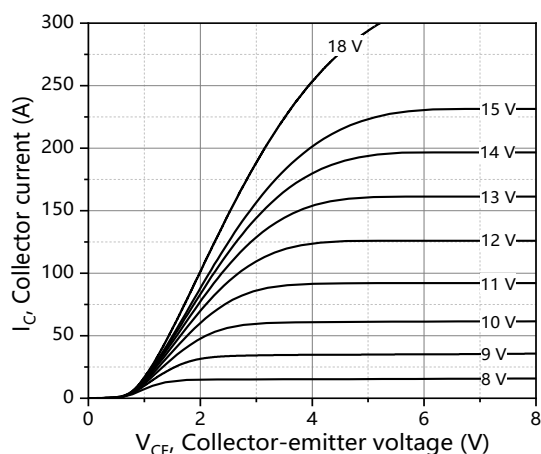


Figure 2. Typical output characteristics
($T_{vj}=150\text{ }^{\circ}\text{C}$)

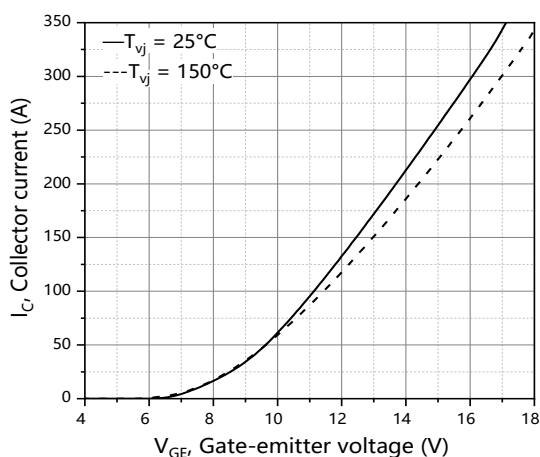


Figure 3. Typical transfer characteristics
($V_{CE}=20\text{ V}$)

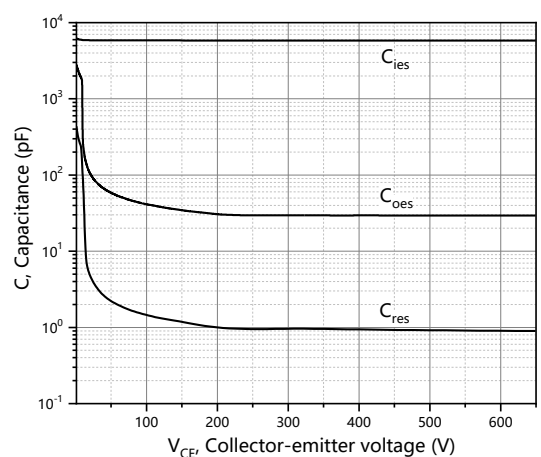


Figure 4. Typical capacitance
($V_{GE}=0\text{ V}$, $f=100\text{ kHz}$)

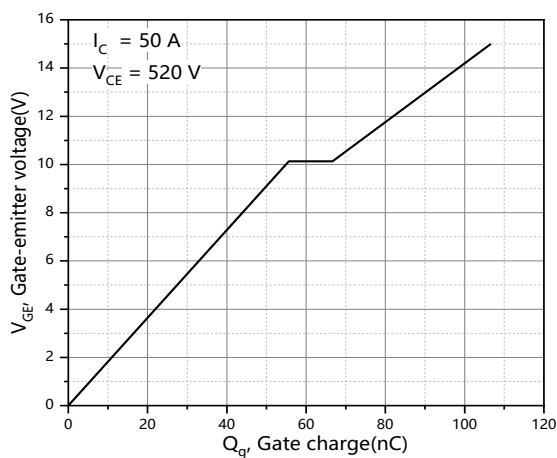


Figure 5. Typical gate charge

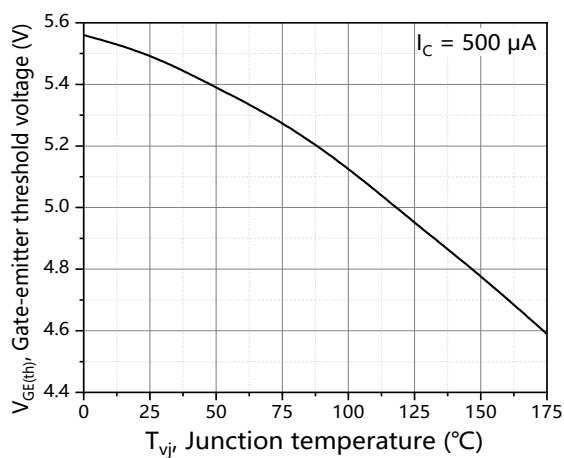
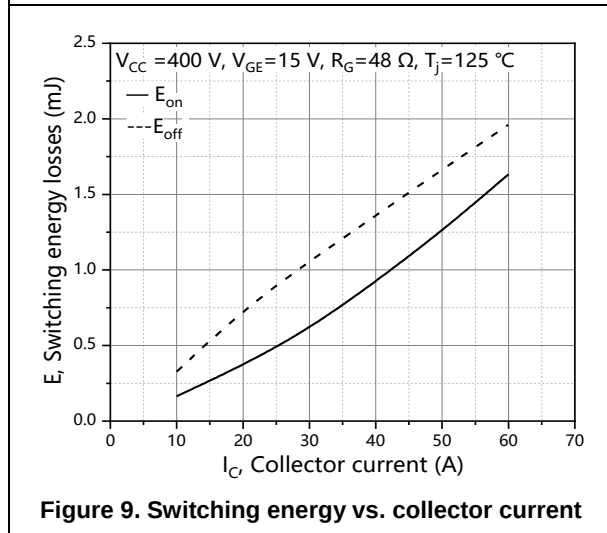
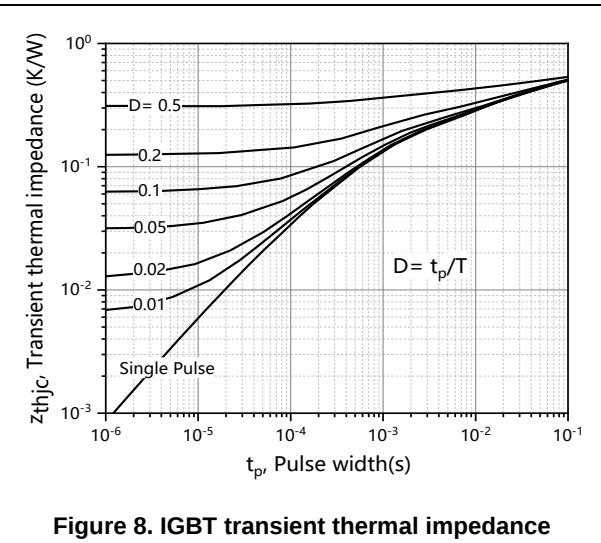
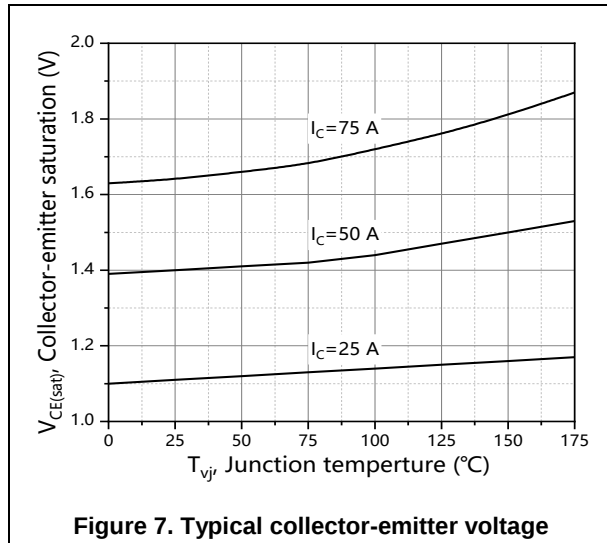
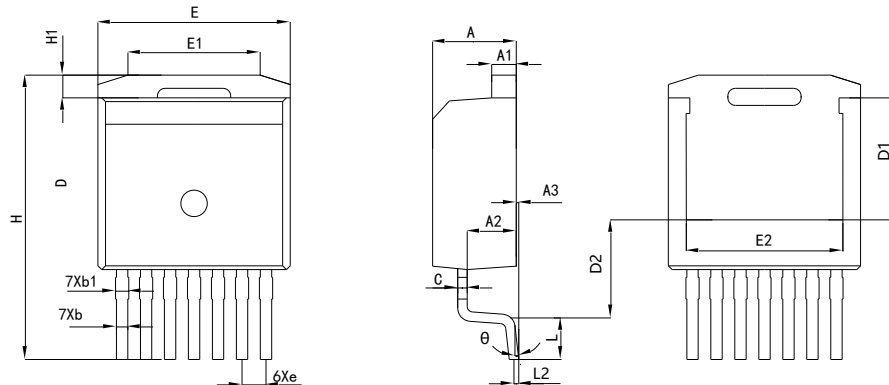


Figure 6. Gate-emitter threshold voltage



Package Information



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	Tubes/ 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
OST50N65K7MAF	TO263-7L	yes	yes	yes

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