General Description

OST30N65FMF 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

- PV inverters
- Induction converters
- Uninterruptible power supplies

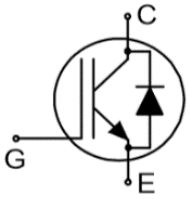
Key Performance Parameters

Parameter	Value	Unit
$V_{CES, min}$ @ 25°C	650	V
Maximum junction temperature	175	°C
$I_{C, pulse}$	120	A
$V_{CE(sat), typ}$ @ V_{GE}=15V	1.5	V
Q_g	54	nC

Marking Information

Product Name	Package	Marking
OST30N65FMF	TO220F	OST30N65FM

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	42	A
Continuous collector current[1], T_C=100℃		30	A
Pulsed collector current[2], T_C=25℃	$I_{C,\ pulse}$	120	A
Diode forward current[1], T_C=25℃	I_F	42	A
Diode forward current[1], T_C=100℃		30	A
Diode pulsed current[2], T_C=25℃	$I_{F,\ pulse}$	120	A
Power dissipation[3], T_C=25℃	P_D	188	W
Power dissipation[3], T_C=100℃		94	W
Operation and storage temperature	T_{stg}, T_{vj}	-55 to 175	°C
Short circuit withstand time V_{GE}=15 V, V_{CC}≤400 V Allowed number of short circuits<1000 Time between short circuits:≥1.0 S	t_{SC}	5	μs

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	0.8	°C/W
Diode thermal resistance, junction-case	$R_{\theta JC}$	1.65	°C/W
Thermal resistance, junction-ambient	$R_{\theta JA}$	65	°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	$V_{CE(sat)}$		1.5	1.63	V	V_{GE}=15 V, I_C=30 A T_{vj}=25°C
			1.7		V	V_{GE}=15 V, I_C=30 A, T_{vj} =125°C
			1.8			V_{GE}=15 V, I_C=30 A, T_{vj} =175°C
Gate-emitter threshold voltage	$V_{GE(th)}$	4.5		5.5	V	V_{CE}=V_{GE}, I_D=0.5 mA
Diode forward voltage	V_F		1.75	1.9	V	V_{GE}=0 V, I_F=30 A T_{vj} =25°C
			1.64			V_{GE}=0 V, I_F=30 A, T_{vj} =125°C
			1.57			V_{GE}=0 V, I_F=30 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}=650 V, V_{GE}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{ies}		3114		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		65		pF	
Reverse transfer capacitance	C_{res}		2.1		pF	
Turn-on delay time	$t_{d(on)}$		25		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=30 A
Rise time	t_r		31		ns	
Turn-off delay time	$t_{d(off)}$		85		ns	
Fall time	t_f		77		ns	
Turn-on energy	E_{on}		0.84		mJ	
Turn-off energy	E_{off}		0.61		mJ	
Turn-on delay time	$t_{d(on)}$		23		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=15 A
Rise time	t_r		13		ns	
Turn-off delay time	$t_{d(off)}$		119		ns	
Fall time	t_f		52		ns	
Turn-on energy	E_{on}		0.38		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		54		nC	V_{GE}=15 V, V_{CC}=520 V, I_C=30 A
Gate-emitter charge	Q_{ge}		26		nC	
Gate-collector charge	Q_{gc}		10		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		91		ns	V_R=400 V, I_F=30 A, di_F/dt=500 A/μs T_{vj} = 25°C
Diode reverse recovery charge	Q_{rr}		678		nC	
Diode peak reverse recovery current	I_{rrm}		14.5		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

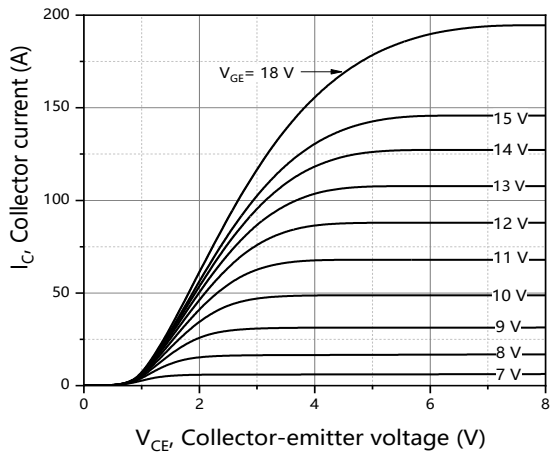


Figure 1. Typical output characteristics
(T_{vj}=25°C)

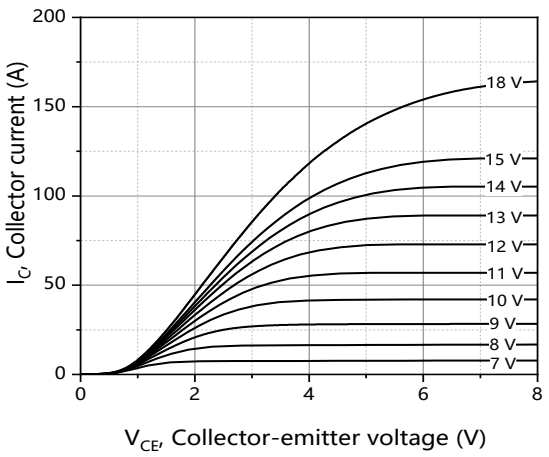


Figure 2. Typical output characteristics
(T_{vj}=150°C)

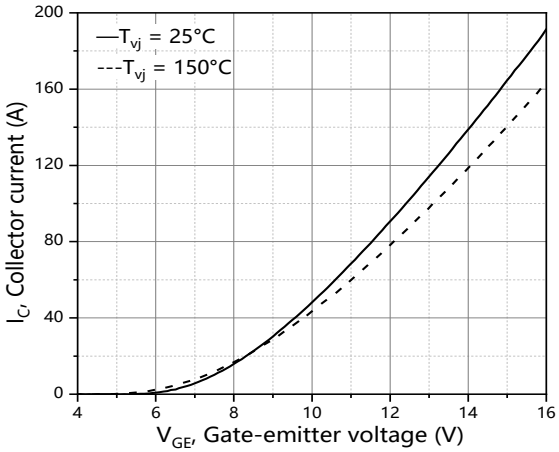


Figure 3. Typical transfer characteristics
(V_{CE}=20V)

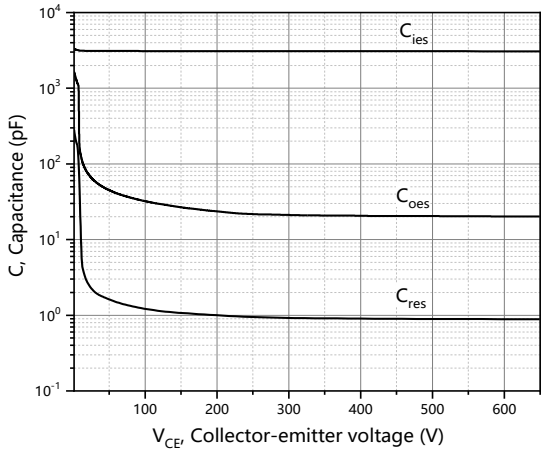


Figure 4. Typical capacitance
(V_{GE}=0V, f=100 kHz)

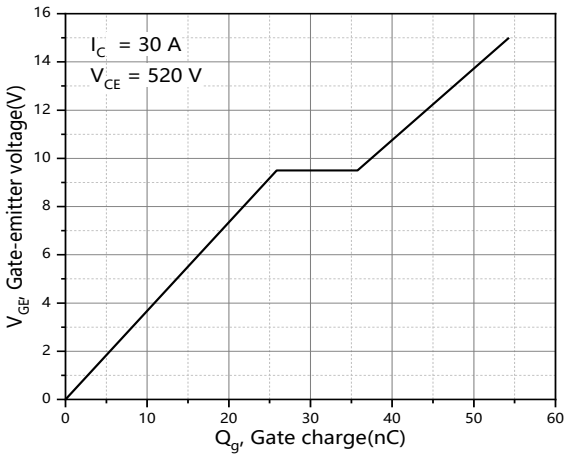


Figure 5. Typical gate charge

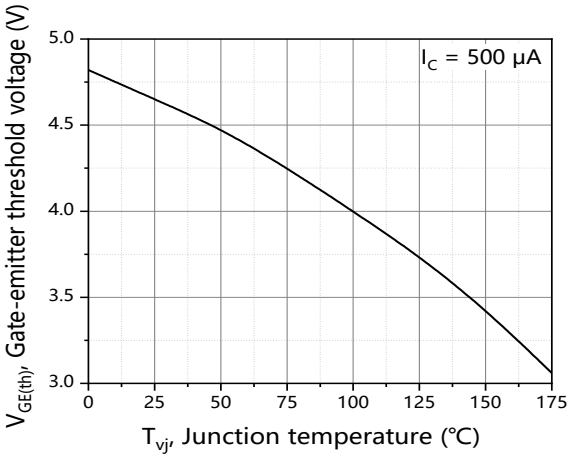


Figure 6. Gate-emitter threshold voltage

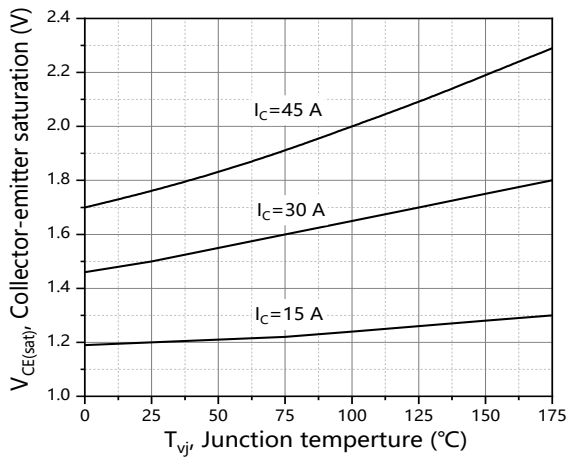


Figure 7. Typical collector-emitter voltage

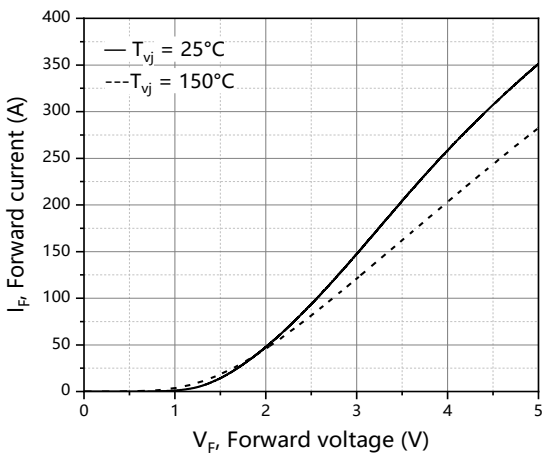


Figure 8. Forward characteristic of diode

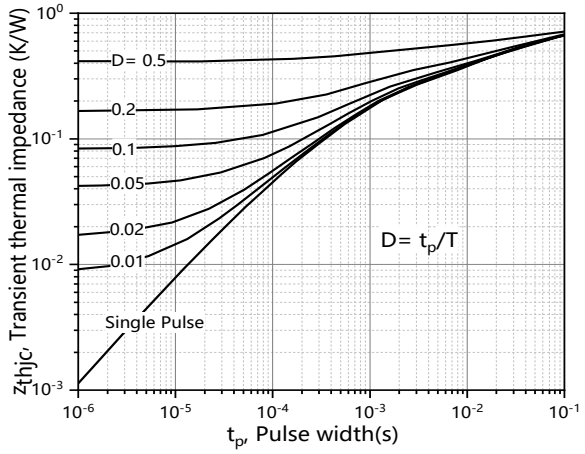


Figure 9. IGBT transient thermal impedance

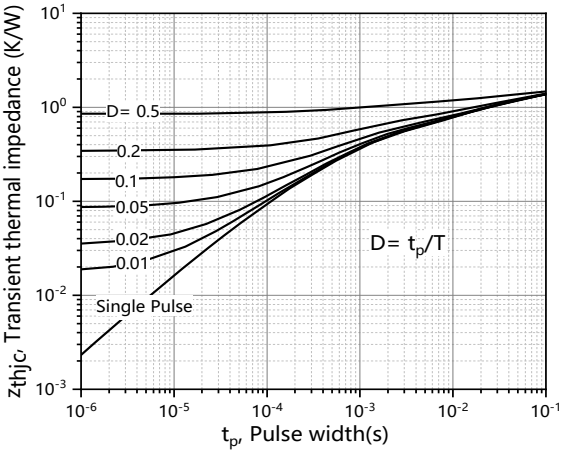
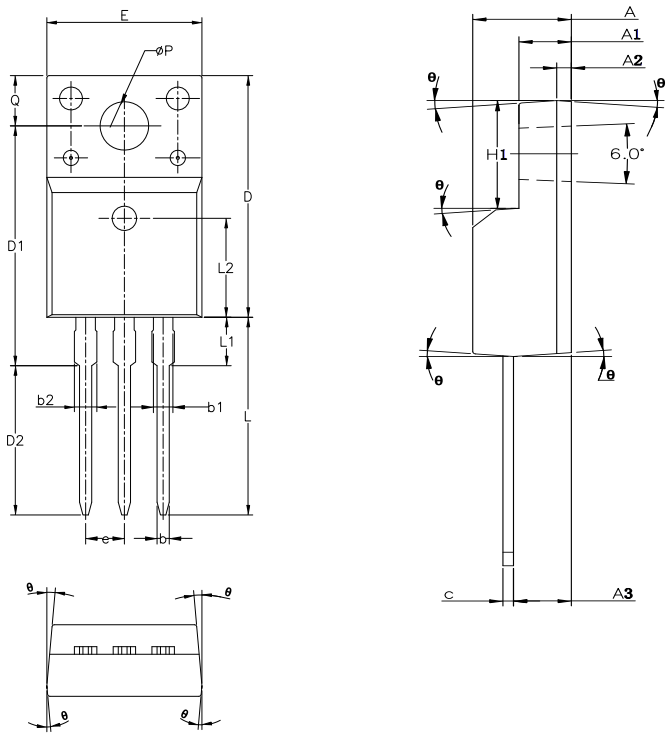


Figure 10. Diode transient thermal impedance

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2		0.70 REF	
A3	2.56	2.76	2.93
b	0.70	-	0.90
b1	1.18	-	1.38
b2	-	-	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.00
E	9.96	10.16	10.36
e		2.54 BSC	
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	-	-	3.50
L2		6.50 REF	
ΦP	3.08	3.18	3.28
Q	3.20	-	3.40
θ	1º	3º	5º

Version 1: TO220F-J package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220F-J	50	20	1000	5	5000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OST30N65FMF	TO220F	yes	yes	yes

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