General Description

OST15N65PRF 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

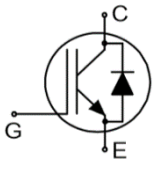
Key Performance Parameters

Parameter	Value	Unit
$V_{CES, min}$ @ 25 °C	650	V
Maximum junction temperature	175	°C
$I_{C, pulse}$	45	A
$V_{CE(sat), typ}$ @ V_{GE}=15 V	1.65	V
Q_g	73	nC

Marking Information

Product Name	Package	Marking
OST15N65PRF	TO220	OST15N65PR

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≤10 μs, D<0.01		±30	V
Continuous collector current[1], T_C=25 °C	I_C	30	A
Continuous collector current[1], T_C=100 °C		15	A
Pulsed collector current[2], T_C=25 °C	$I_{C,\ pulse}$	45	A
Diode forward current[1], T_C=25 °C	I_F	30	A
Diode forward current[1], T_C=100 °C		15	A
Diode pulsed current[2], T_C=25 °C	$I_{F,\ pulse}$	45	A
Power dissipation[3], T_C=25 °C	P_D	250	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_{vj}=150 °C	t_{SC}	10	μs

Thermal Characteristics

Parameter	Symbol	Value	Unit
IGBT thermal resistance, junction-case	$R_{\theta JC}$	0.6	°C/W
Diode thermal resistance, junction-case	$R_{\theta JC}$	2.0	°C/W
Thermal resistance, junction-ambient[4]	$R_{\theta JA}$	75	°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	$V_{CE(sat)}$		1.65	2.0	V	V_{GE}=15 V, I_C=15 A T_{vj}=25 °C
			1.8		V	V_{GE}=15 V, I_C=15 A, T_{vj}=125 °C
			1.9			V_{GE}=15 V, I_C=15 A, T_{vj}=175 °C
Gate-emitter threshold voltage	$V_{GE(th)}$	4.4	5.2	6.0	V	V_{CE}=V_{GE}, I_D=0.5 mA
Diode forward voltage	V_F		1.65	2.0	V	V_{GE}=0 V, I_F=15 A T_{vj}=25 °C
			1.8			V_{GE}=0 V, I_F=15 A, T_{vj}=125 °C
			1.9			V_{GE}=0 V, I_F=15 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}		2015		pF	V_{GE}=0 V, V_{CE}=25 V, f=100 kHz
Output capacitance	C_{oes}		80		pF	
Reverse transfer capacitance	C_{res}		41		pF	
Turn-on delay time	$t_{d(on)}$		50		ns	V_{GE}=15 V, V_{CC}=400 V, R_G=10 Ω, I_C=15 A
Rise time	t_r		36		ns	
Turn-off delay time	$t_{d(off)}$		143		ns	
Fall time	t_f		94		ns	
Turn-on energy	E_{on}		0.62		mJ	
Turn-off energy	E_{off}		0.11		mJ	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		73		nC	V_{GE}=15 V, V_{CC}=520 V, I_C=15 A
Gate-emitter charge	Q_{ge}		22		nC	
Gate-collector charge	Q_{gc}		36		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode reverse recovery time	t_{rr}		94		ns	V_R=400 V, I_F=15 A, di_F/dt=500 A/μs T_{vj}=25 °C
Diode reverse recovery charge	Q_{rr}		1.2		μC	
Diode peak reverse recovery current	I_{rrm}		21.7		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.
4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in square FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

Electrical Characteristics Diagrams

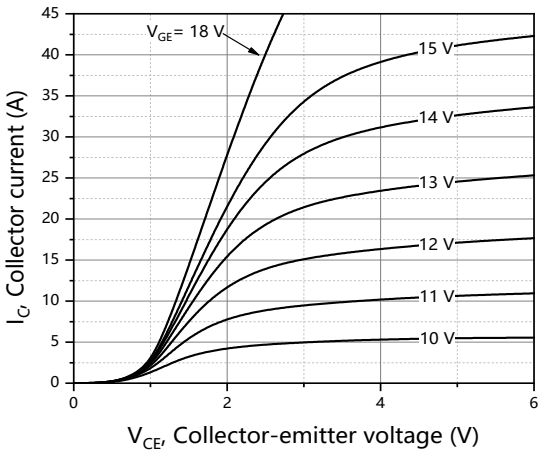


Figure 1. Typical output characteristics
(T_{vj}=25 °C)

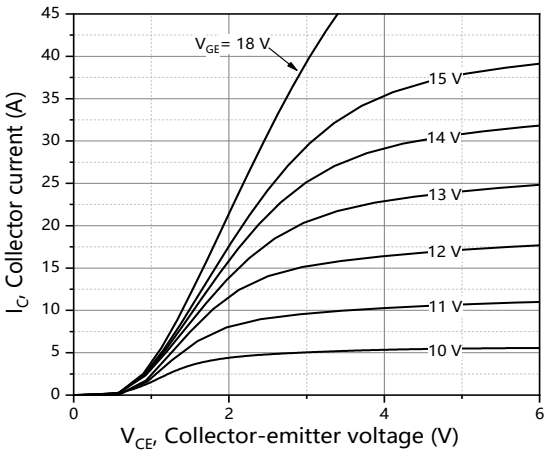


Figure 2. Typical output characteristics
(T_{vj}=150 °C)

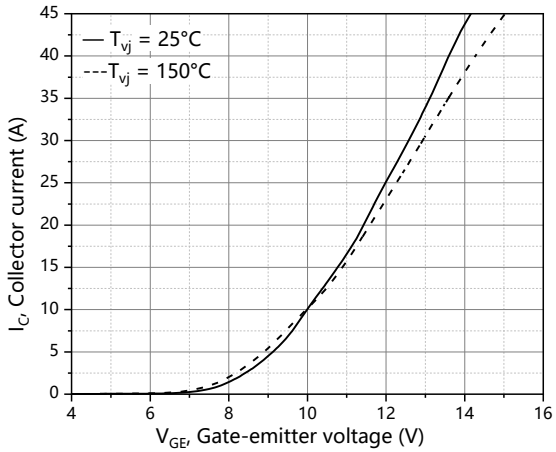


Figure 3. Typical transfer characteristics
(V_{CE}=20 V)

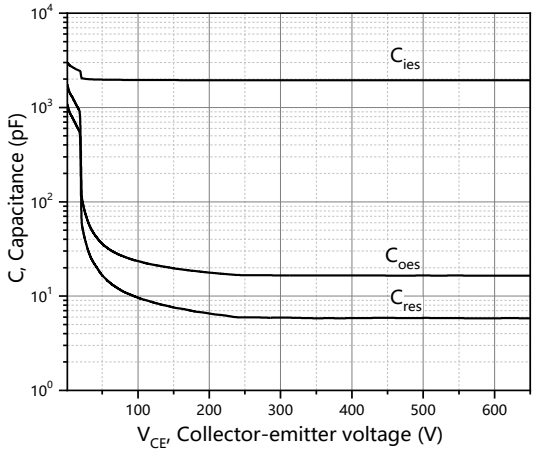


Figure 4. Typical capacitance
(V_{GE}=0V, f=100 kHz)

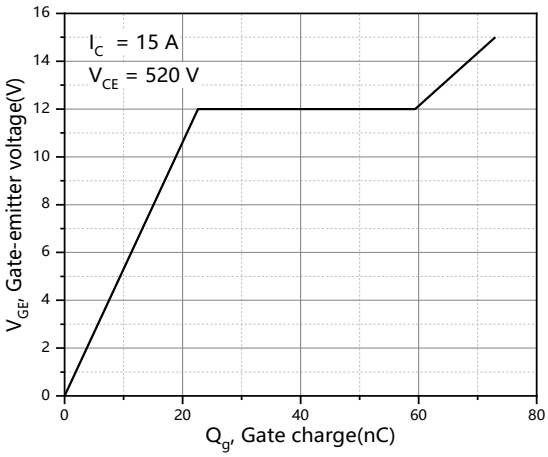


Figure 5. Typical gate charge

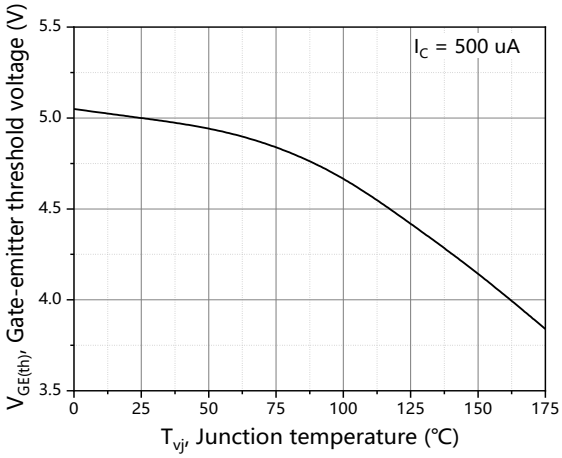


Figure 6. Gate-emitter threshold voltage

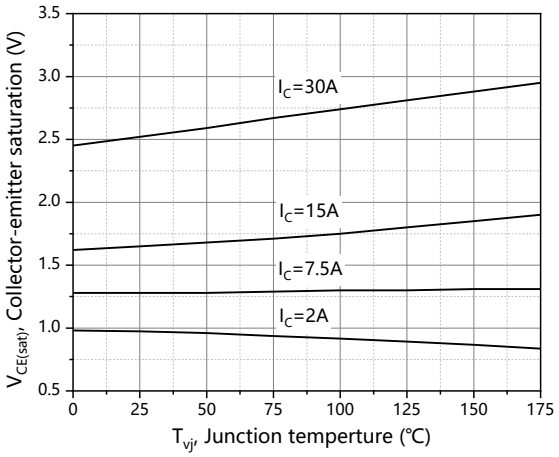


Figure 7. Typical collector-emitter voltage

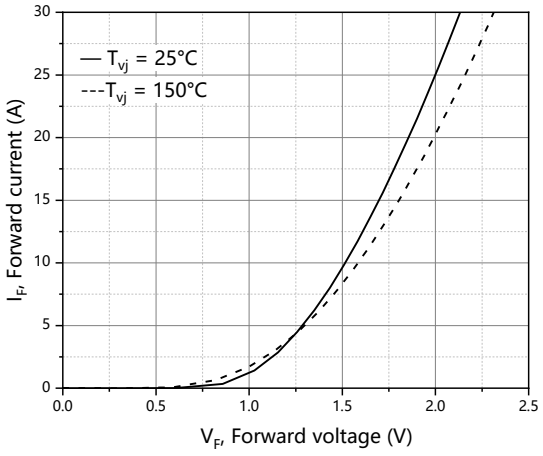


Figure 8. Forward characteristic of diode

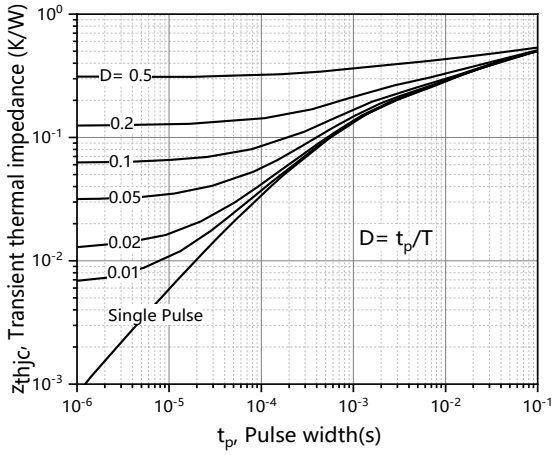


Figure 9. IGBT transient thermal impedance

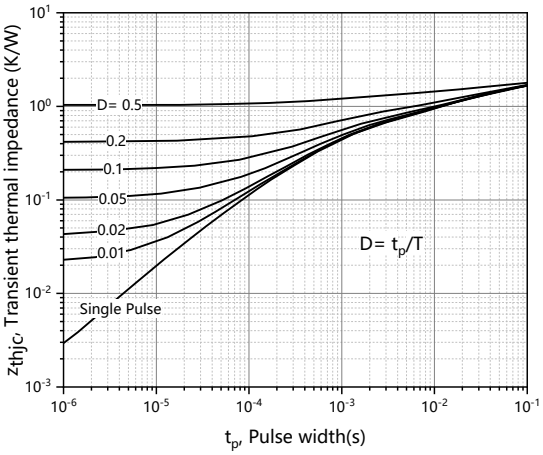
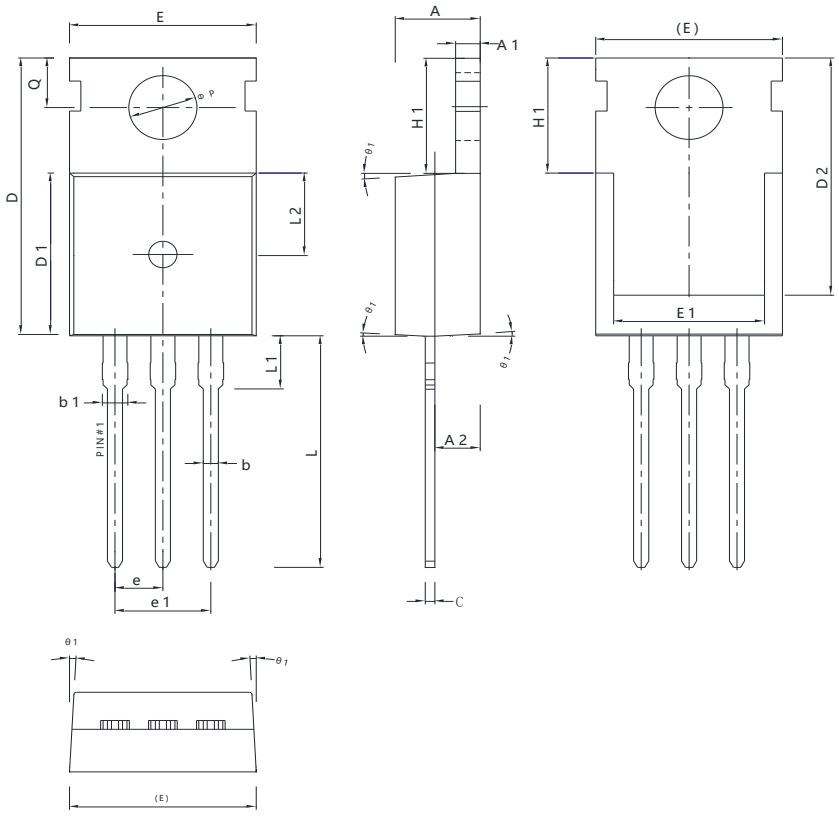


Figure 10. Diode transient thermal impedance

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	-	0.90
b1	1.27	-	1.40
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	-	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54 BSC		
e1	5.08 BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	-	-	3.50
L2	4.60 REF		
ΦP	3.55	3.60	3.65
Q	2.73	-	2.87
θ1	1°	3°	5°

Version 1: TO220-J package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220-J	50	20	1000	5	5000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OST15N65PRF	TO220	yes	yes	yes

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