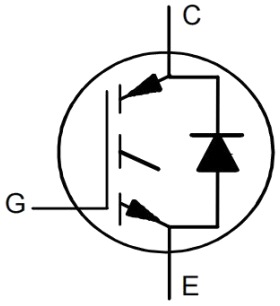
VGTD065N150NA

Datasheet

General Description

V_{CE}	650	V
I_C	15	A
V_{CEsat}.Typ T_{vj} = 25 °C	1.65	V
T_{jmax}	150	℃

Symbol

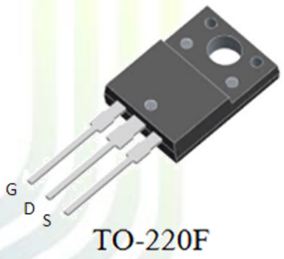


Symbol of VGTD065N150NA

Features

- Offers high breakdown voltage to 650V
- Low V_{CEsat}
- Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- IGBT copacked with fast and soft antiparallel diode
- Qualified according to JEDEC for target applications
- Pb-Free lead plating; RoHS Product
- Halogen and Antimony Free. "Green" Device

Package Type



Package Type of VGTD065N150NA

Application

- UPS
- Air Condition
- Motor Drives
- PFC

Ordering Information

Product Name	Package
VGTD065N150NA	TO-220F

Absolute Maximum Ratings (T_A= 25 ºC, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Collector-emitter voltage		V_{CE}	650	V
DC collector current, limited by $T_{vj\ max}$	Tc = 25 °C	I_C	30	A
	Tc = 100 °C		15	
Pulsed collector current, tp limited by $T_{vj\ max}$		$I_{C,pulse}$	60	A
Diode forward current, limited by T_{vjmax}	Tc = 25 °C	I_F	30	A
	Tc = 100 °C		15	
Diode pulsed current, tp limited by T_{vjmax}		$I_{F,pulse}$	60	A
Gate-emitter voltage		V_{GE}	±20	V
Short circuit withstand time V_{GE} =15V, V_{CC}≤360V, Allowed number of short circuits<1000,Times between short circuits: ≥1.0s, T_j ≤ 25°C		tsc	12	us
Power dissipation	Tc = 25 °C	Ptot	91	W
Operating junction temperature		Tstg	-55 to 150	ºC
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s		T_L	260	ºC

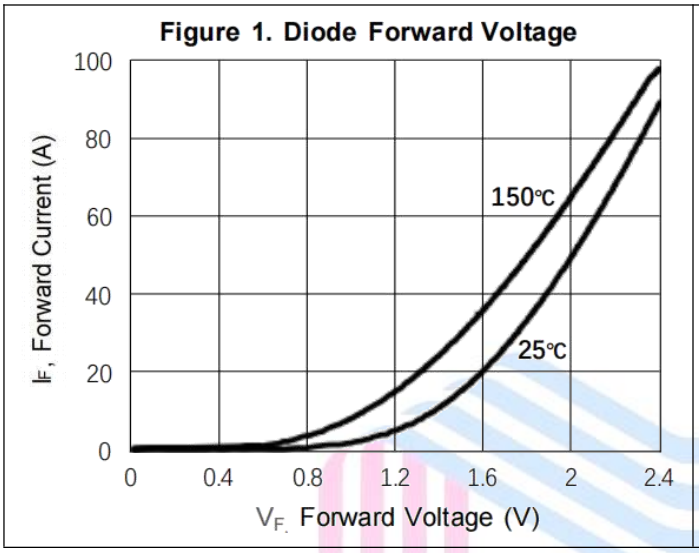
Thermal Resistance

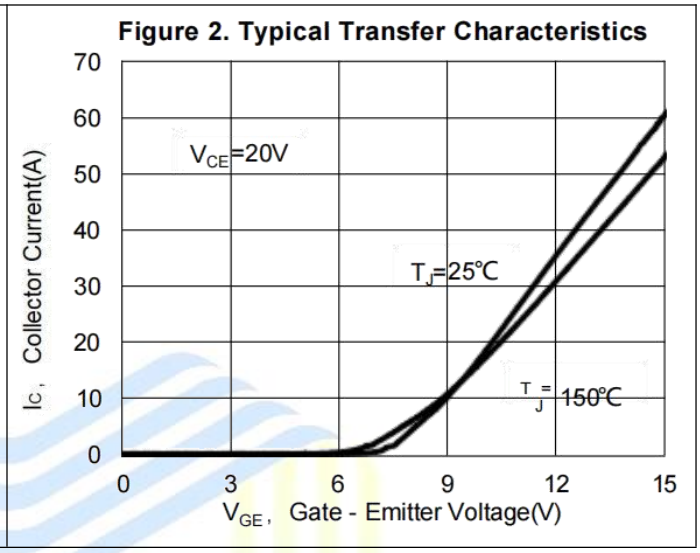
Parameter	Symbol	Min	Typ	Max	Unit
IGBT Thermal Resistance, Junction to Case max.	$R_{θJC}$	-	1.37	-	ºC/W
Diode Thermal Resistance, Junction to Case max.	$R_{θJC}$	-	1.98	-	
Thermal Resistance, Junction to Ambient max.	$R_{θJA}$	-	39.2	-	

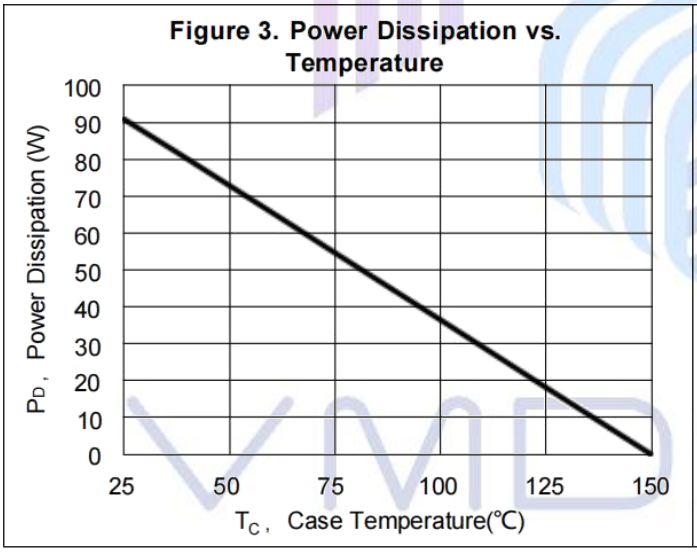
Electrical Characteristics (T_A= 25 ºC, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{CE}=0V, I_C=250uA	650	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=15A,T_{vj}=25ºC	-	1.65	1.9	V
Diode forward voltage	V_F	V_{GE}=0V, I_C=15A,T_{vj}=25ºC	-	1.45	1.7	V
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=250uA	4.5	-	6.5	V
Zero voltage gate collector current	I_{CES}	V_{CE}=650V,V_{GE}=0V,T_{vj}=25ºC	-	-	1	uA
Gate-emitter leakage current	I_{GES}	V_{GE}=±20V, V_{GE}=0V	-	-	100	nA
Dynamic Characteristics						
Input Capacitance	C_{ies}	V_{CE}=25V	-	1270.3	-	pF
Output Capacitance	C_{oes}	V_{GE}=0V	-	78.0	-	pF
Reverse Transfer Capacitance	C_{res}	f=1MHz	-	28.3	-	pF
Gate total charge	Q_G	V_{CE}=520V	-	42	-	nC
Gate-Emitter charge	Q_{GE}	V_{GE}=15V	-	10.7	-	
Gate-Collector charge	Q_{GC}	I_C=15A	-	18.3	-	
Short circuit collector current Max.1000 short circuits, Times between short circuits: ≥ 1.0s	I_{SC}	V_{CC} ≤ 360V V_{GE} =15V t_{SC} ≤ 8us ,T_J ≤ 25°C	-	100	-	A
Switching Characteristic, Inductive Load IGBT Characteristic, @Tvj = 25°C						
Turn-on delay time	$t_{d(on)}$	T_{Vj} = 25°C V_{CE}=400V V_{GE}=10V I_C=15A R_G=10Ω	-	12	-	ns
Rise time	t_r		-	26	-	ns
Turn-off delay time	$t_{d(off)}$		-	30	-	ns
Fall time	t_f		-	244	-	ns
Turn-on energy	Eon		-	0.24	-	mj
Turn-off energy	Eoff		-	0.57	-	mj
Diode Characteristics @Tvj = 25°C						
Diode reverse recovery time	t_{rr}	T_{Vj} = 25°C V_{CE}=400V I_F=15A, di/dt=200A/us	-	36	-	ns
Diode reverse recovery charge	Q_{rr}		-	85	-	nC
Diode peak reverse recovery current	I_{rrm}		-	4.6	-	A

Typical Performance Characteristics







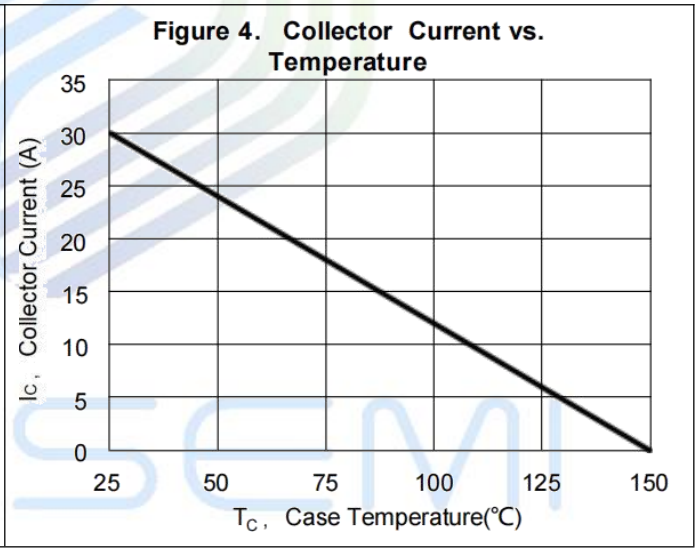


Figure 5. Typical Output Characteristics

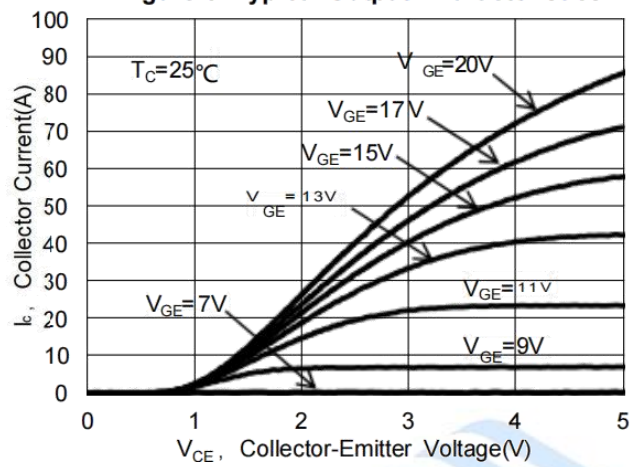


Figure 6. Gate-Charge Characteristics

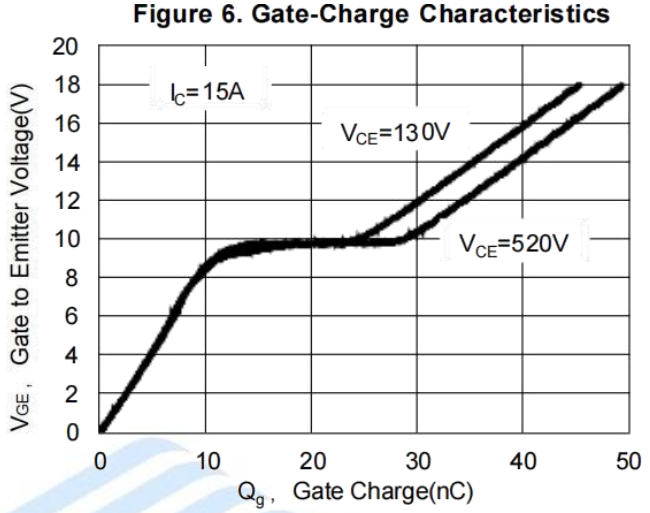


Figure 7. Capacitance Characteristics

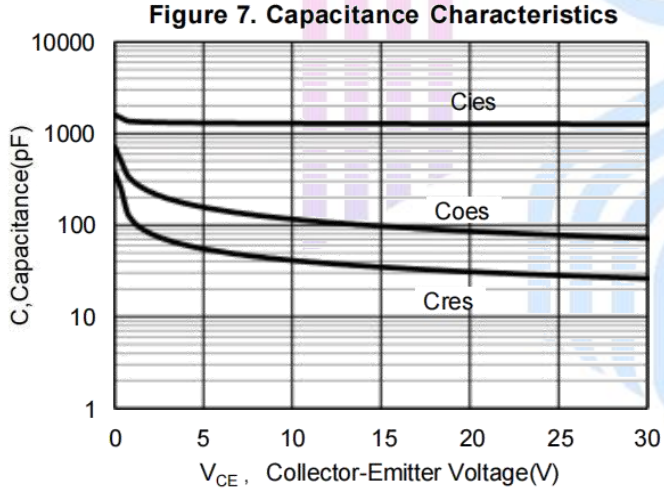


Figure 8. Safe Operating Area

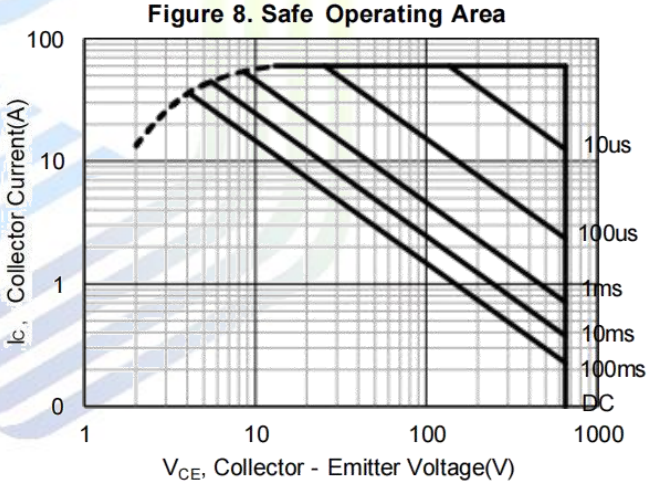


Figure 9. IGBT Thermal Impedance

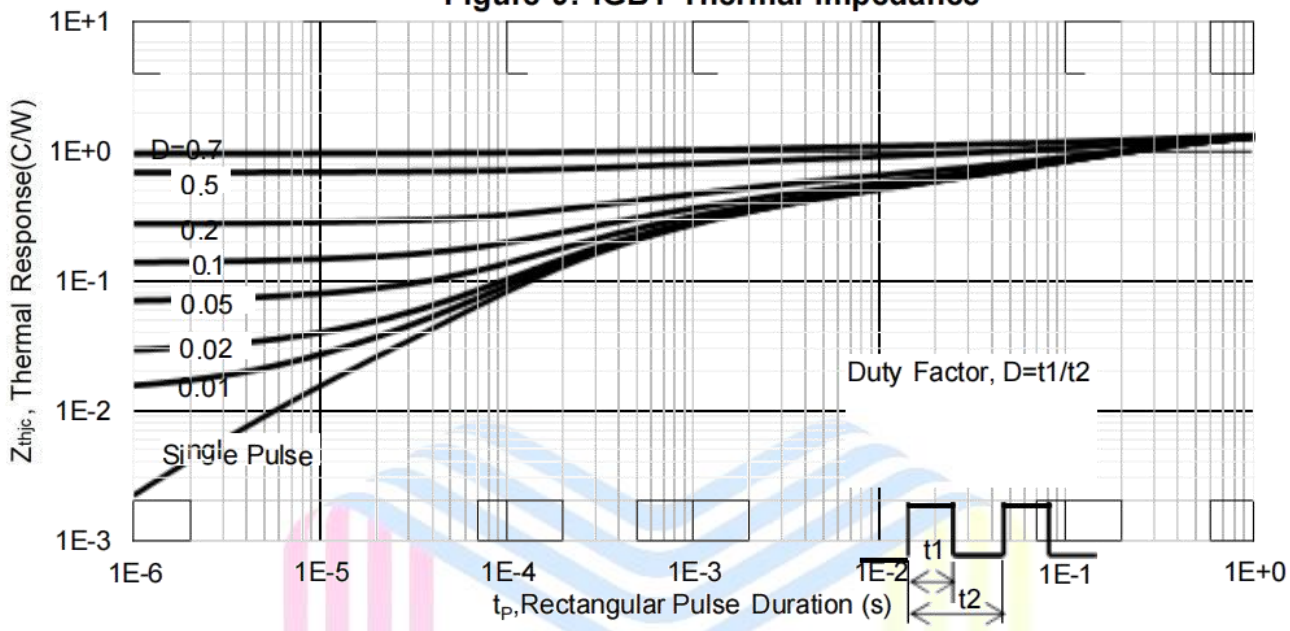
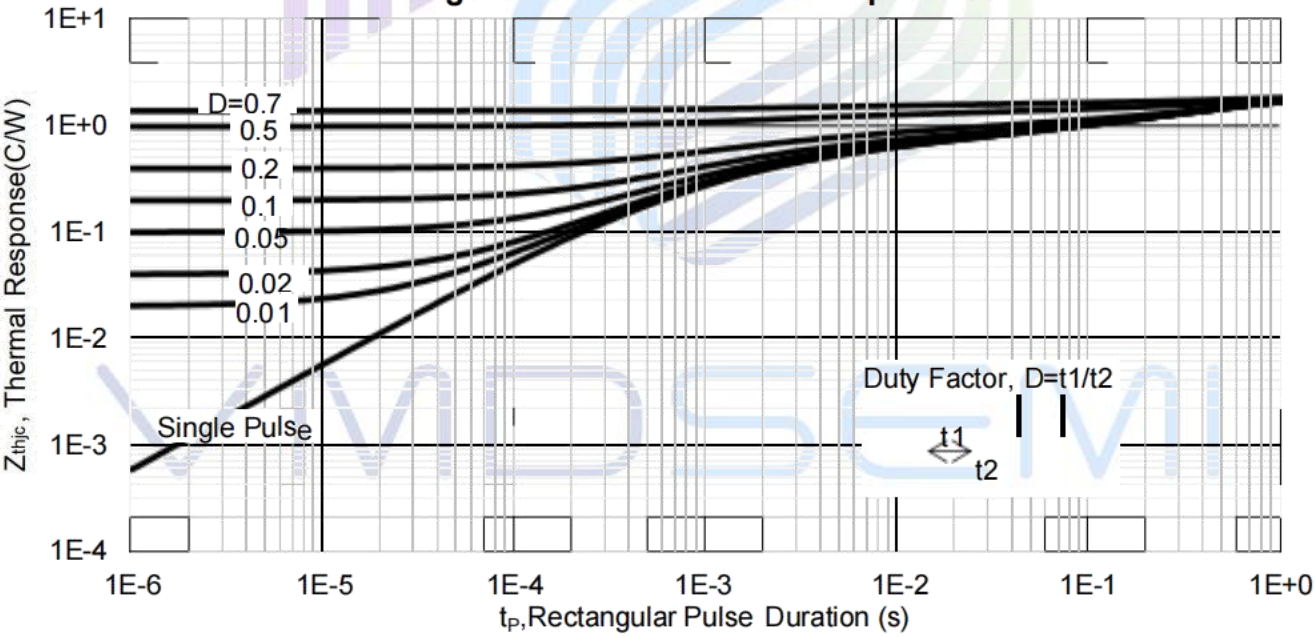
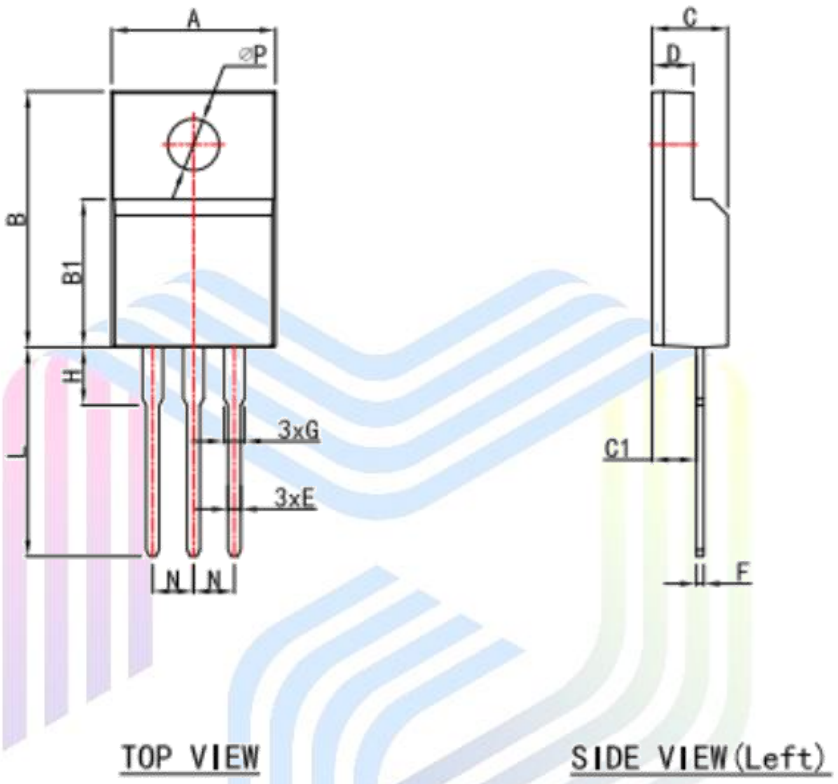


Figure 10. Diode Thermal Impedance



Mechanical Dimensions

TO220F Package Information



SYMBOL	MIN	TYP	MAX
A	9.60	10.00	10.40
B	15.40	15.80	16.20
B1	8.90	9.20	9.50
C	4.30	4.60	4.90
C1	2.10	2.55	3.00
D	2.40	2.70	3.00
E	0.60	0.80	1.00
F	0.3	0.45	0.6
G	1.12	1.27	1.42
H	3.40	-	3.80
	2.40	-	2.90
L	12.00	13.00	14.00
N	2.34	2.54	2.74
Q	3.15	3.35	3.55
ΦP	2.90	3.10	3.30
All Dimensions in mm			

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