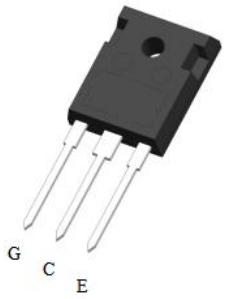
TPGW75N65NS

IGBT Discrete with Anti-Parallel Diode

General Description

Topdiode TPGW75N65NS 75A, 650V IGBT Discrete provides ultra-low conduction loss as well as short circuit ruggedness. They are designed for the applications such as general inverters and UPS.

Package TO-247-3



Features

High Breakdown Voltage up to 650V for Improved Reliability

Trench-Stop Technology Offering

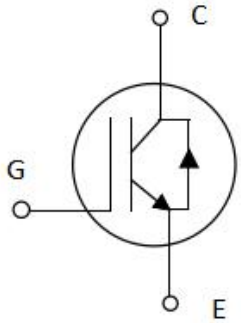
High Ruggedness, Temperature Stable

Low V_{CEsat}

Easy Parallel Switching Capability due to Positive Temperature Coefficient in V_{CEsat}

Enhanced Avalanche Capability

Equivalent Schematic



Applications

Uninterruptible Power Supplies

Inverter

Welding Converters

PFC Applications

Summary

Symbol	Value
V_{CE}	650V
I_C	75A
$V_{CE(SAT)}$ $I_{C=75A}$	1.61V

Maximum Ratings (T_C = 25°C unless otherwise specified)

Symbol	Description	Value	Unit
IGBT Ratings			
V_{CES}	Collector-Emitter Voltage, T_{vj}=25°C	650	V
V_{GE}	Gate-Emitter Voltage	±20	V
$I_{C\ nom}$	Continuous DC Collector Current,T_C = 100°C , $T_{vj\ max}$=175°C	75	A
I_{CRM}	Repetitive Peak Collector Current, t_p =1ms	150	A
P_{tot}	Total Power Dissipation， T_C = 25°C , T_{vjmax}=175°C	395	W
Diode Ratings			
V_{RRM}	Repetitive Peak Reverse Voltage, T_{vj}=25°C	650	V
I_F	Continuous DC Forward Current, T_C = 100°C , $T_{vj\ max}$=175°C	60	A
I_{FRM}	Repetitive Peak Forward Current, t_p =1ms	120	A
T_{vjop}	Temperature under Switching Conditions	-40 to +175	°C

Thermal Characteristics

Symbol	Description	Max.	Unit
R_{thJC}	IGBT Thermal Resistance, Junction - Case	0.38	K/W
R_{thJC}	Diode Thermal Resistance, Junction - Case	0.45	K/W

Electrical Characteristics (Tj= 25℃ unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
IGBT Characteristics							
V_{CEsat}	Collector-Emitter Saturatioin Voltage	V_{GE}=15V, I_C=75A, T_{vj}=25℃			1.61	2.10	V
		V_{GE}=15V, I_C=75A, T_{vj}=125℃			1.95		
		V_{GE}=15V, I_C=75A, T_{vj}=150℃			2.06		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}=V_{CE}, I_C=0.75mA, T_{vj}=25℃		4.2	4.35	6.0	V
G_{fs}	Transfer Conductance	V_{CE}=20V, I_C=75A			91		S
C_{ies}	Input Capacitance	F=1MHz， V_{CE}=25V， V_{GE}=0V， T_{vj}=25℃			7.44		nF
C_{oes}	Output Capacitance				0.24		
C_{res}	Reverse Transfer Capacitance				0.13		
I_{CES}	Collector-Emitter cut-off Current	V_{CE}=650V, V_{GE}=0V, T_{vj}=25℃				1	mA
I_{GES}	Collector-Emitter Leakage Current	V_{CE}=0V, V_{GE}=20V, T_{vj}=25℃				200	nA
T_{don}	Turn-on Delay Time	I_C=75A, V_{CE}=400V V_{GE}=±15V, R_g=8Ω Inductive load	T_{vj}=25℃		34		ns
			T_{vj}=125℃		30		
			T_{vj}=150℃		32		
T_r	Rise Time	I_C=75A, V_{CE}=400V V_{GE}=±15V, R_g=8Ω Inductive load	T_{vj}=25℃		153		ns
			T_{vj}=125℃		149		
			T_{vj}=150℃		146		
T_{doff}	Turn-off Delay Time	I_C=75A, V_{CE}=400V V_{GE}=±15V, R_g=8Ω Inductive load	T_{vj}=25℃		183		ns
			T_{vj}=125℃		198		
			T_{vj}=150℃		208		
T_f	Fall Time	I_C=75A, V_{CE}=400V V_{GE}=±15V, R_g=8Ω Inductive load	T_{vj}=25℃		64		ns
			T_{vj}=125℃		68		
			T_{vj}=150℃		70		
E_{on}	Turn-on Energy Loss Per Pulse	I_C=75A, V_{CE}=400V V_{GE}=±15V, R_g=8Ω Inductive load	T_{vj}=25℃		4.28		mJ
			T_{vj}=125℃		4.35		
			T_{vj}=150℃		4.51		
E_{off}	Turn-off Energy Loss Per Pulse	I_C=75A, V_{CE}=400V V_{GE}=±15V, R_g=8Ω Inductive load	T_{vj}=25℃		1.08		mJ
			T_{vj}=125℃		1.12		
			T_{vj}=150℃		1.20		

Diode Characteristics							
V_F	Forward Voltage	V_{GE}=0V , I_F=75A,T_{vj}=25℃			1.30		V
		V_{GE}=0V , I_F=75A,T_{vj}=125℃			1.61		
		V_{GE}=0V , I_F=75A,T_{vj}=150℃			1.62		
I_{RM}	Peak Reverse Recovered Current	I_F=75A -dif/dt=462A/us V_R=400V, V_{GE}=-15V	T_{vj}=25℃		17		A
			T_{vj}=125℃		23		
			T_{vj}=150℃		25		
Q_{rr}	Peak Reverse Recovered Charge	I_F=75A -dif/dt=462A/us V_R=400V, V_{GE}=-15V	T_{vj}=25℃		2.43		μC
			T_{vj}=125℃		3.37		
			T_{vj}=150℃		3.72		
t_{rr}	Reverse Recovery Time	I_F=75A -dif/dt=462A/us V_R=400V, V_{GE}=-15V	T_{vj}=25℃		200		ns
			T_{vj}=125℃		211		
			T_{vj}=150℃		227		
E_{rec}	Reverse Recovered Energy	I_F=75A -dif/dt=462A/us V_R=400V, V_{GE}=-15V	T_{vj}=25℃		0.68		mJ
			T_{vj}=125℃		0.91		
			T_{vj}=150℃		0.99		

Typical Performance

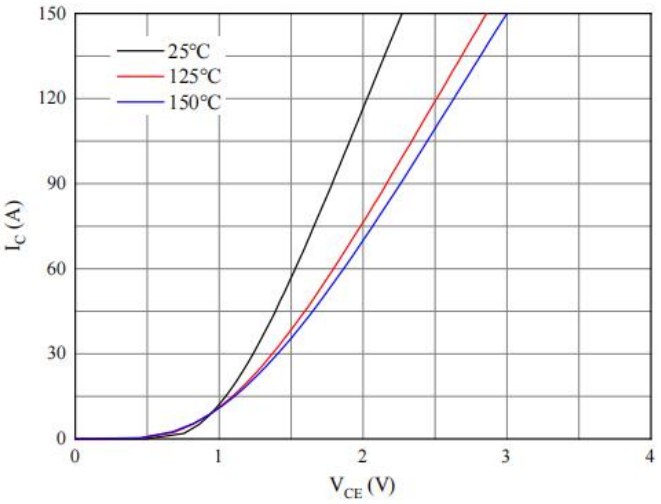


Figure1: Typical Output Characteristics(V_{GE}=15V)

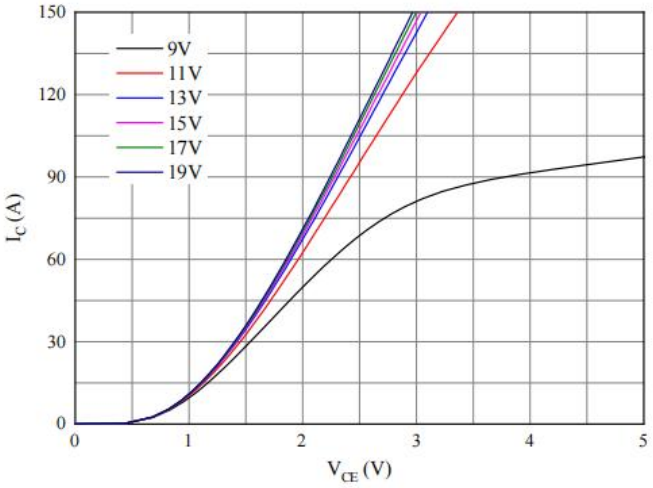


Figure 2: Typical Output Characteristics(T_{vj}=150°C)

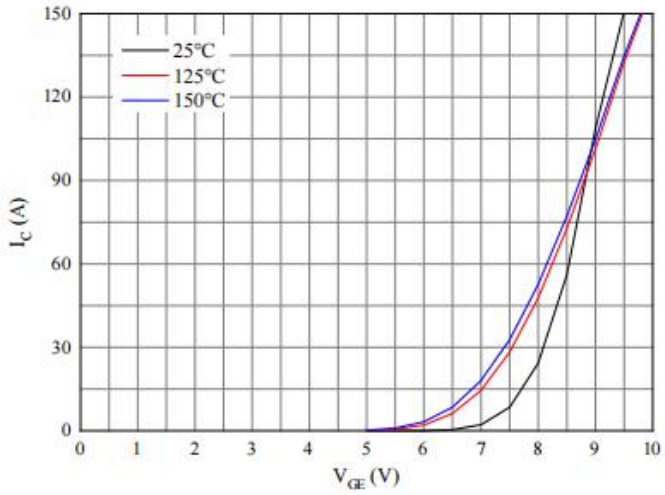


Figure 3: Typical Output Characteristics(V_{GE}=15V)

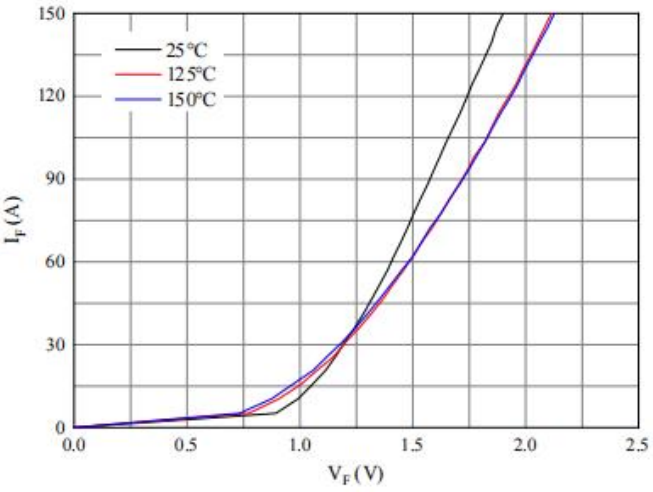


Figure 4: Forward Characteristic of Diode

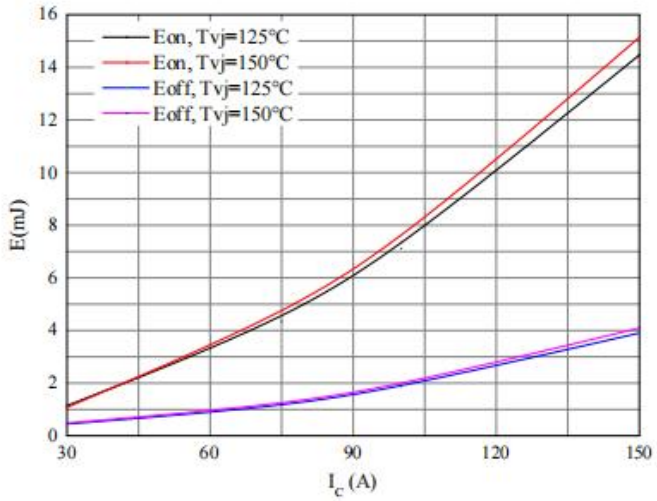


Figure 5: Switching Losses of IGBT
V_{GE}=±15V,R_g=8Ω,V_{CE}=400V

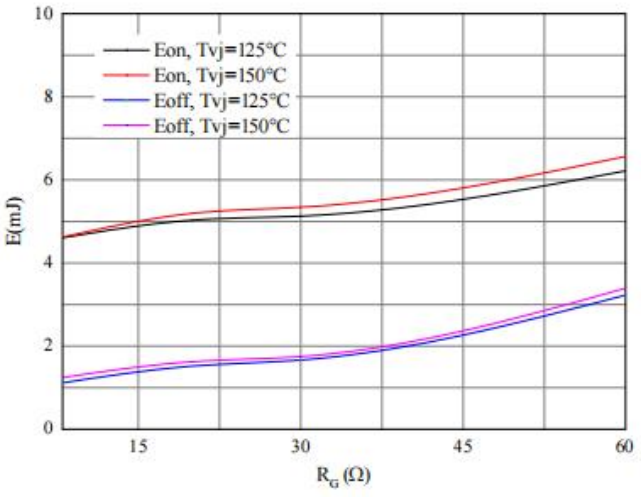


Figure 6: Switching Losses of IGBT
V_{GE}=±15V,I_C=75A,V_{CE}=400V

Typical Performance

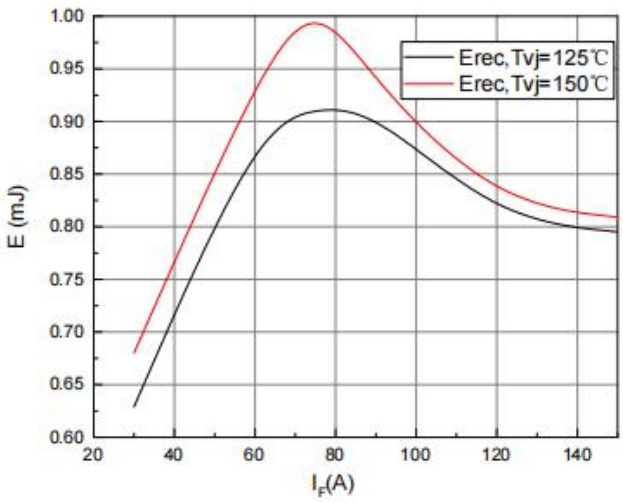


Figure 7: Switching Losses of Diode
R_g=8Ω,V_{CE}=400V

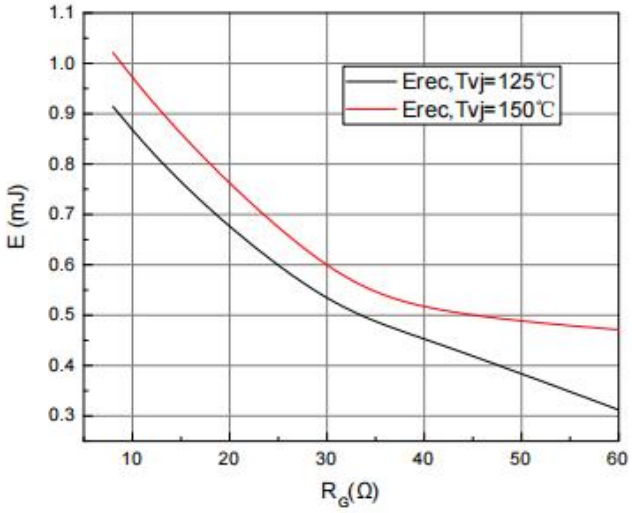


Figure 8: Switching Losses of Diode
I_C=75A,V_{CE}=400V

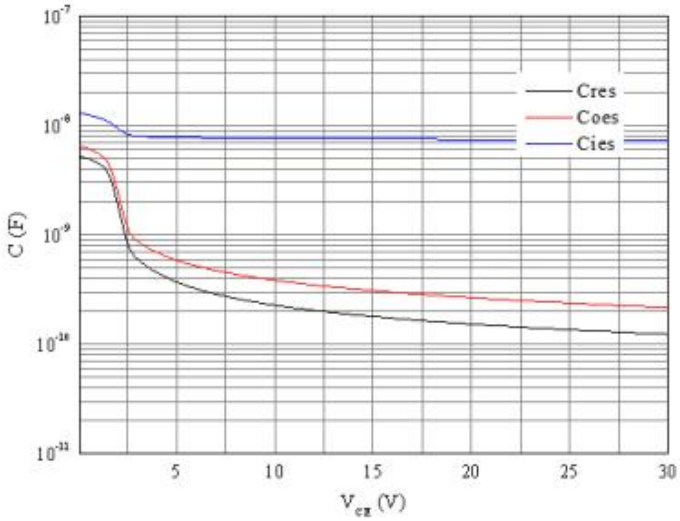
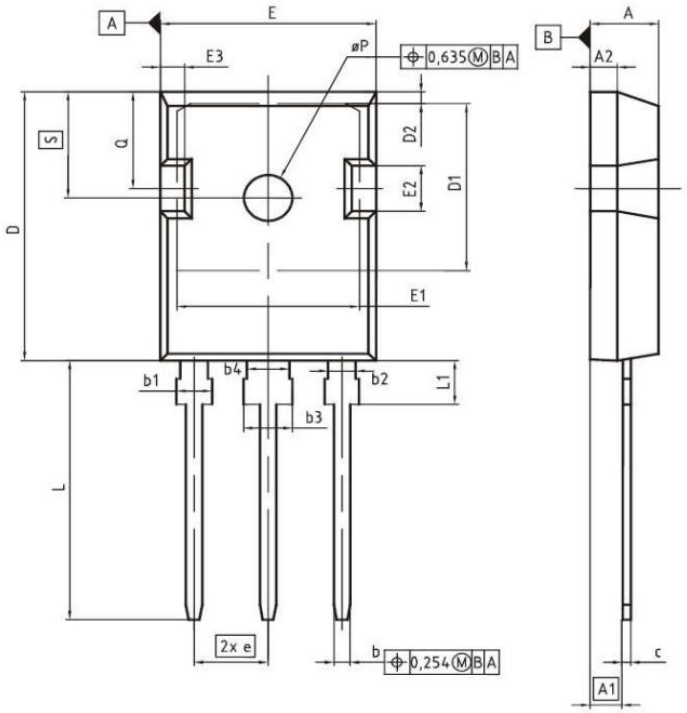


Figure 9: Capacitance Characteristics

Package Dimensions

TO-247-3



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.27	2.54	0.089	0.100
A2	1.85	2.16	0.073	0.085
b	1.07	1.33	0.042	0.052
b1	1.90	2.41	0.075	0.095
b2	1.90	2.16	0.075	0.085
b3	2.87	3.38	0.113	0.133
b4	2.87	3.13	0.113	0.123
c	0.55	0.68	0.022	0.027
D	20.80	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
E	15.70	16.13	0.618	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	2.60	0.039	0.102
e	5.44(BSC)		0.214(BSC)	
N	3		3	
L	19.80	20.32	0.780	0.800
L1	4.10	4.47	0.161	0.176
ΦP	3.50	3.70	0.138	0.146
Q	5.49	6.00	0.216	0.236
S	6.04	6.30	0.238	0.248

UNIT:mm