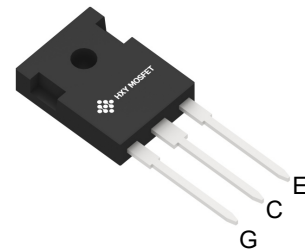
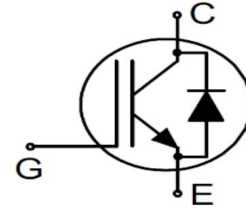




Features

- 650V, 100A IGBT
- High Input Impedance
- Low Saturation Voltage $V_{CE(SAT)}$
- Low Switching Losses
- Low Conduction for a High Efficiency
- Rugged Transient Reliability
- Low EMI



Application

- Industrial UPS
- EV-Charging
- String inverter
- Welding

Key Performance and Package Parameters

Device	V_{CE}	I_C ($T_C = 25^\circ\text{C}$)	$V_{CE(SAT)}$ ($T_{VJ} = 25^\circ\text{C}$, $V_{GE} = 15\text{ V}$)	T_{vjmax}	Package
STGWA100H65DFB2	650V	100A	1.45	175°C	TO-247

Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{CE}	Collector emitter voltage	$T_{VJ} = 25^\circ\text{C}$	650	V
I_C	DC collector current, limited by T_{vjmax}	$T_C = 25^\circ\text{C}$	150	A
		$T_C = 100^\circ\text{C}$	100	A
I_{Cpuls}	Pulsed collector current, limited by T_{vjmax}		300	A
I_F	Maximum Diode forward current, limited by T_{vjmax}	$T_C = 25^\circ\text{C}$	150	A
		$T_C = 100^\circ\text{C}$	100	A
I_{Fpuls}	Diode pulsed current, limited by T_{vjmax}		300	A
V_{GE}	Gate-Emitter voltage	$T_{VJ} = 25^\circ\text{C}$	± 20	V
P_{tot}	Power Dissipation	$T_C = 25^\circ\text{C}$	429	W
		$T_C = 100^\circ\text{C}$	214	W
T_{VJ}	Operating Junction Temperature Range		-55 to +175	°C
T_{STG}	Storage Temperature Range		-55 to +175	°C
T_{vjOP}	Temperature under switching conditions		-40 to +150	°C



Thermal Resistance

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R_{thJC}	IGBT Thermal resistance: junction - case	IGBT	-	0.25	0.35	°C/W
R_{thJC}	Diode Thermal resistance: junction - case	Diode	-	0.28	0.38	°C/W

Static Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)CES}$	Collector - Emitter Breakdown Voltage	$V_{GE} = 0V$, $I_C = 1mA$, $T_{VJ} = 25^\circ C$	650	-	-	V
V_{CESAT}	Collector - Emitter Saturation Voltage	$V_{GE} = 15V$, $I_C = 100A$, $T_{VJ} = 25^\circ C$	-	1.45	-	V
		$V_{GE} = 15V$, $I_C = 100A$, $T_{VJ} = 175^\circ C$	-	1.75	-	V
V_F	Diode forward voltage	$V_{GE} = 0V$, $I_C = 100A$, $T_{VJ} = 25^\circ C$	-	1.55	-	V
		$V_{GE} = 0V$, $I_C = 100A$, $T_{VJ} = 175^\circ C$	-	1.6	-	V
$V_{GE(th)}$	Gate-Emitter threshold voltage	$V_{GE} = V_{CE}$, $I_C = 0.88mA$, $T_{VJ} = 25^\circ C$	-	4	-	V
I_{CES}	Zero Gate voltage Collector current	$V_{CE} = 650V$, $V_{GE} = 0V$, $T_{VJ} = 25^\circ C$	-	-	100	μA
I_{GES}	Gate-Emitter leakage current	$V_{GE} = 20V$, $V_{CE} = 0V$	-	-	100	nA
		$V_{GE} = -20V$, $V_{CE} = 0V$	-100	-	-	nA

Dynamic Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$, $V_{CE} = 25V$, $f = 100KHz$	-	3452	-	pF
C_{oes}	Output Capacitance		-	223	-	pF
C_{res}	Reverse Transfer Capacitance		-	26	-	pF
Q_g	Gate Charge	$V_{GE} = 0$ to $15V$ $V_{CE} = 520V$, $I_C = 100A$	-	156	-	nC

Switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On DelayTime	$T_{vj} = 25^\circ C$, $V_{CE} = 400V$, $I_C = 100A$, $V_{GE} = 0 / 15V$, $R_{G(on)} = 10\Omega$, $R_{G(off)} = 10\Omega$	-	27	-	ns
t_r	Turn-On Rise Time		-	58	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	195	-	ns
t_f	Turn-Off Fall Time		-	66	-	ns
E_{on}	Turn-on energy		-	3.3	-	mJ
E_{off}	Turn-off energy		-	1.65	-	mJ
E_{ts}	Total switching energy		-	4.35	-	mJ
$t_{d(on)}$	Turn-On DelayTime	$T_{vj} = 175^\circ C$, $V_{CE} = 400V$, $I_C = 100A$, $V_{GE} = 0 / 15V$, $R_{G(on)} = 10\Omega$, $R_{G(off)} = 10\Omega$	-	27	-	ns
t_r	Turn-On Rise Time		-	50	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	215	-	ns
t_f	Turn-Off Fall Time		-	58	-	ns
E_{on}	Turn-on energy		-	3.77	-	mJ
E_{off}	Turn-off energy		-	2.07	-	mJ
E_{ts}	Total switching energy		-	5.84	-	mJ



Diode Recovery Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
T_{rr}	Reverse recovery time	$T_{vj} = 25\text{ }^{\circ}\text{C}$ $V_{CE} = 400\text{ V}, I_C = 100\text{ A}$ $V_{GE} = 0 / 15\text{ V}$ $R_{G(on)} = 10\text{ }\Omega, R_{G(off)} = 10\text{ }\Omega$	-	123	-	ns
Q_{rr}	Reverse recovery charge		-	1.95	-	μC
I_{rrm}	Peak reverse recovery current		-	30.8	-	A
E_{rec}	Reverse recovery energy		-	0.47	-	mJ
T_{rr}	Reverse recovery time	$T_{vj} = 175\text{ }^{\circ}\text{C}$ $V_{CE} = 400\text{ V}, I_C = 100\text{ A}$ $V_{GE} = 0 / 15\text{ V}$ $R_{G(on)} = 10\text{ }\Omega, R_{G(off)} = 10\text{ }\Omega$	-	150	-	ns
Q_{rr}	Reverse recovery charge		-	3.85	-	μC
I_{rrm}	Peak reverse recovery current		-	44.1	-	A
E_{rec}	Reverse recovery energy		-	0.98	-	mJ



Typical Performance Characteristics

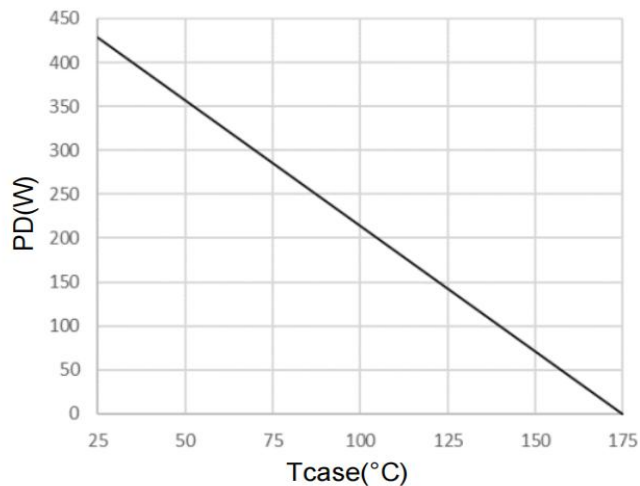


Figure 1: Power De-rating

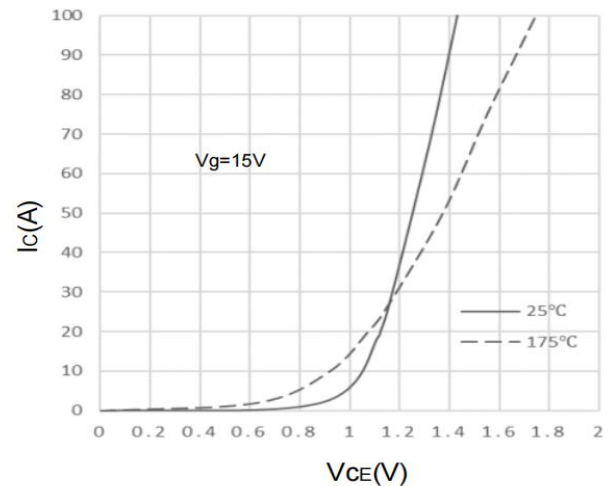


Figure 2: Typical Output charatceristics

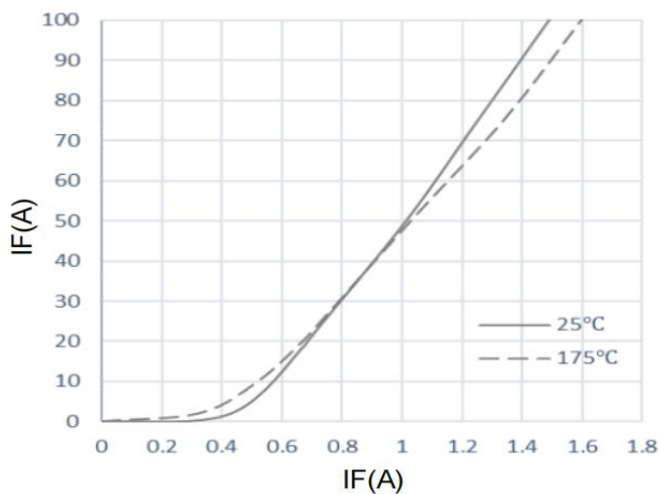


Figure 3: Diode Forward current characteristics

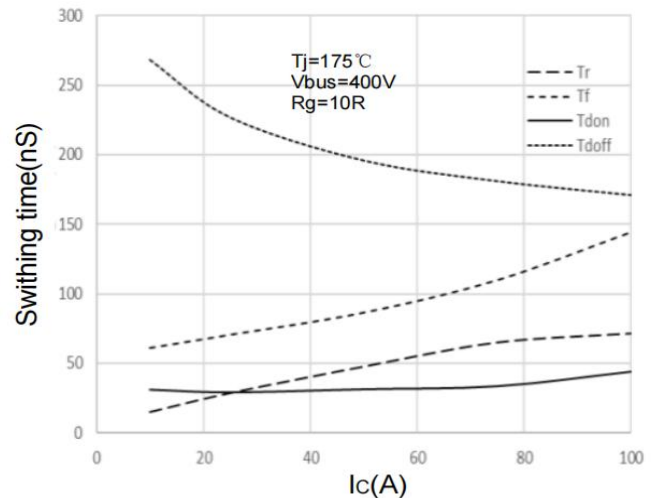


Figure 4: Switching time(nS)

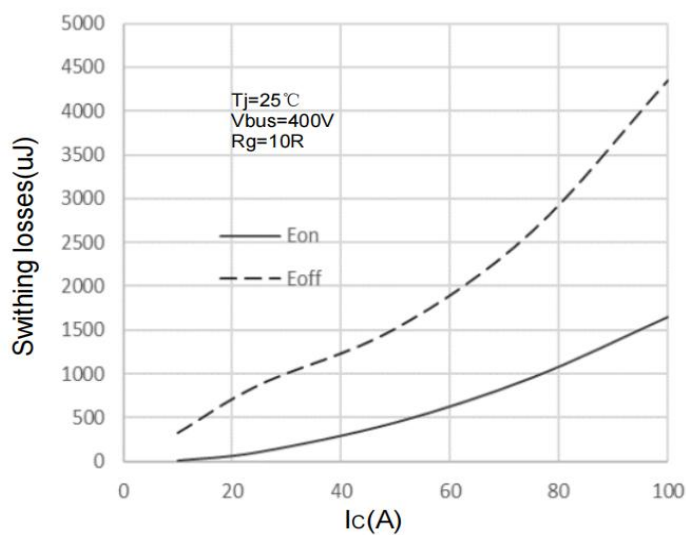


Figure 5: Switching losses(uJ)

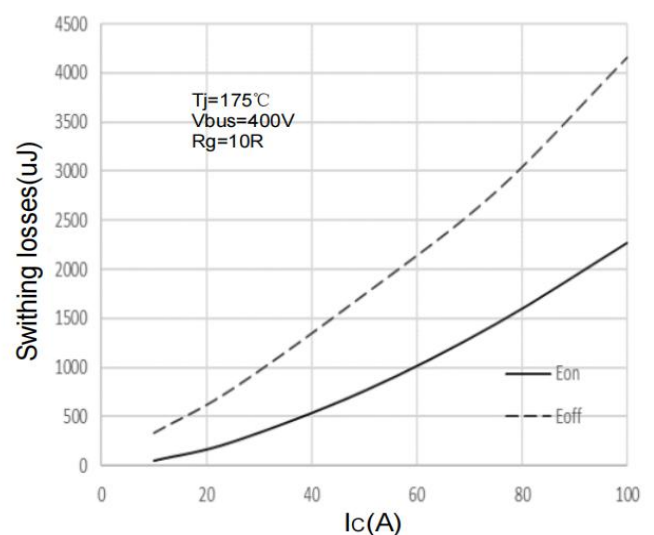


Figure 6: Switching losses(uJ)

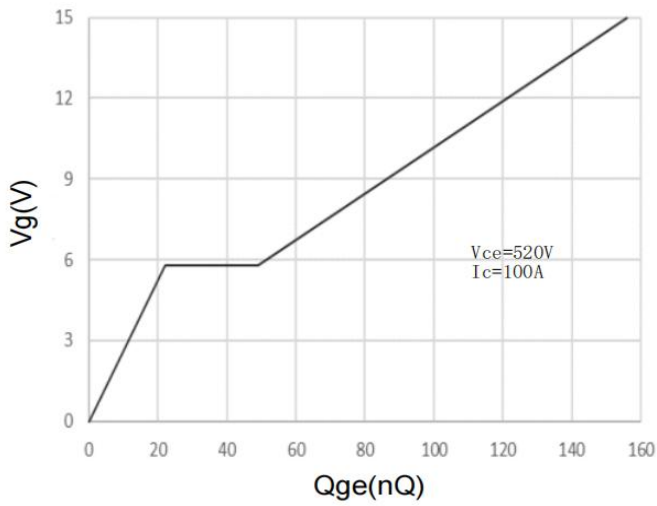


Figure 7: Gate-Charge characteristics

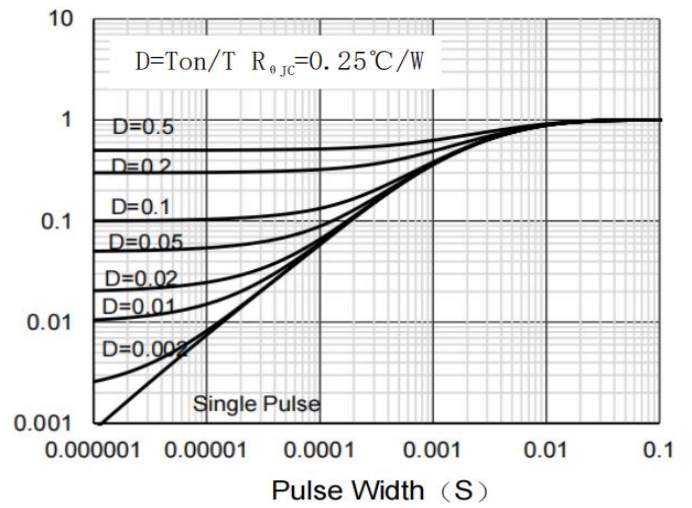


Figure 8: Normalized Maximum IGBT transient thermal impedance

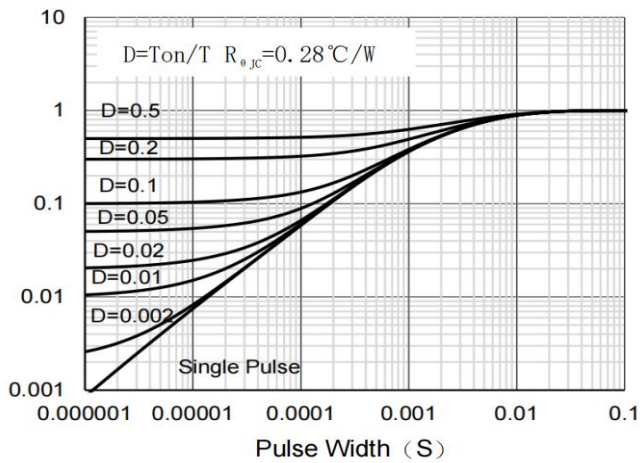
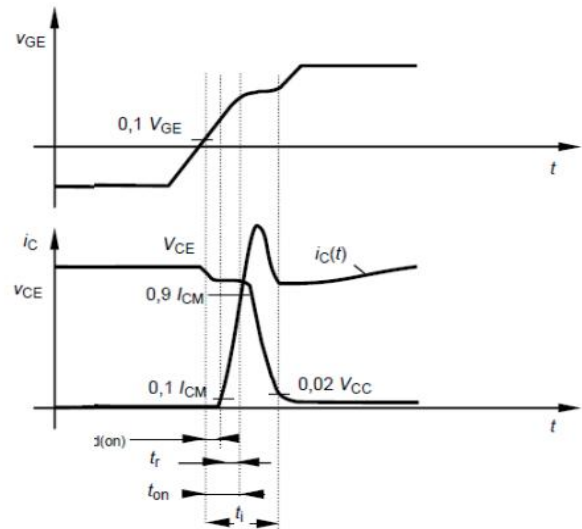
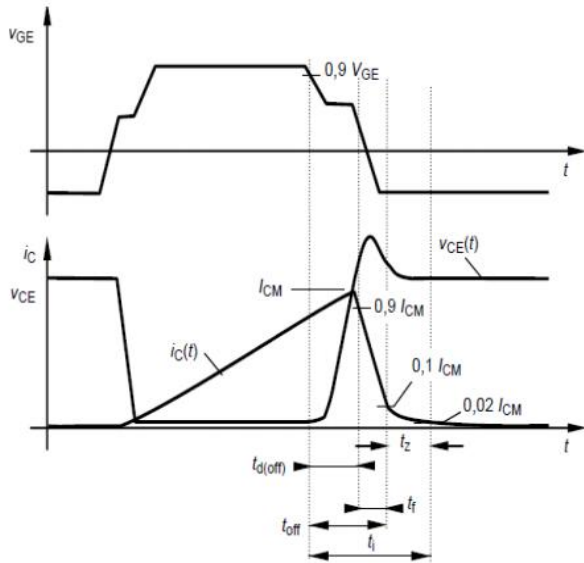


Figure 9: Normalized Maximum Diode transient thermal impedance

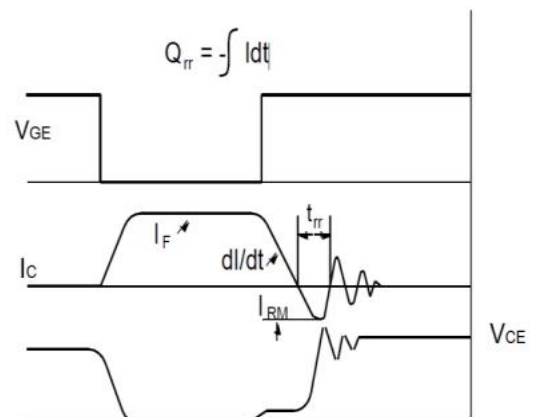
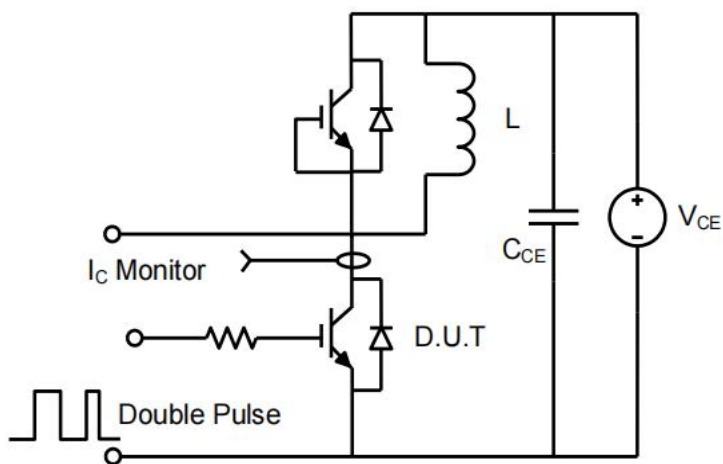


Test Circuit

Switching Test Circuit & Waveforms

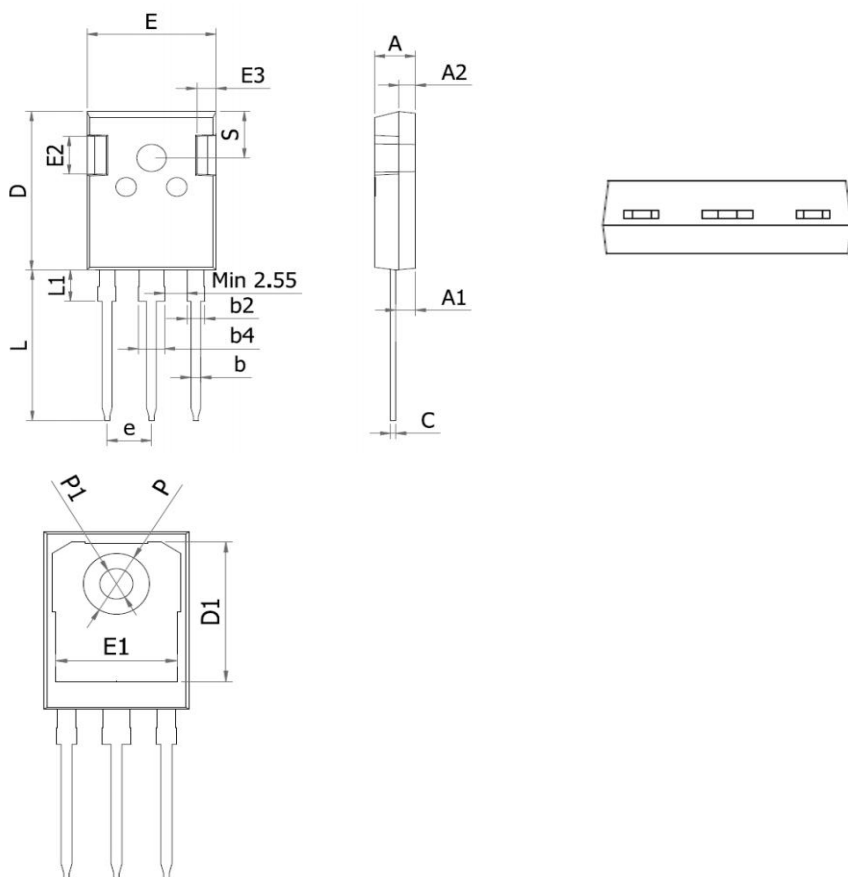


Diode Recovery Test Circuit & Waveforms





Package Mechanical Data(TO-247)



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.56
A2	1.85	2.00	2.15
b	1.10	1.20	1.35
b2	1.90	2.10	2.20
b4	2.90	3.10	3.20
c	0.50	0.60	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.72	19.92	20.12
L1	-	-	4.30
ØP1	3.40	3.60	3.80
ØP	-	-	7.30
S	6.15BSC		



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