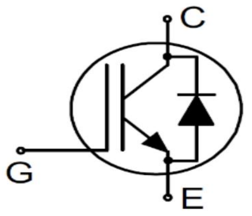
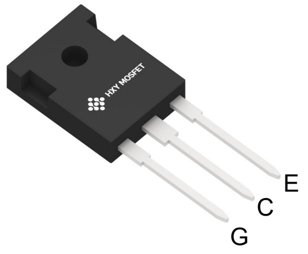
Features

- 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 °C)	$V_{CE(SAT)}$ (T_{VJ} = 25 °C, V_{GE} = 15 V)	Tvjmax	Package
IGW100N60H3	650V	100A	1.45	175°C	TO-247

Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{CE}	Collector emitter voltage	T_{VJ} = 25°C	650	V
I_C	DC collector current,limited by Tvjmax	T_C = 25°C	150	A
		T_C = 100°C	100	A
I_{Cpuls}	Pulsed collector current,limited by Tvjmax		300	A
I_F	Maximum Diode forward current, limited by Tvjmax	T_C = 25°C	150	A
		T_C = 100°C	100	A
I_{Fpuls}	Diode pulsed current, limited by Tvjmax		300	A
V_{GE}	Gate-Emitter voltage	T_{VJ} = 25°C	±20	V
P_{tot}	Power Dissipation	T_C = 25°C	429	W
		T_C = 100°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°C	650	-	-	V
V_{CESAT}	Collector - Emitter Saturation Voltage	V_{GE} = 15V , I_C = 100A ,T_{VJ} = 25°C	-	1.45	-	V
		V_{GE} = 15V , I_C = 100A ,T_{VJ} = 175°C	-	1.75	-	V
V_F	Diode forward voltage	V_{GE} = 0V , I_C = 100A ,T_{VJ} = 25°C	-	1.55	-	V
		V_{GE} = 0V , I_C = 100A ,T_{VJ} = 175°C	-	1.6	-	V
$V_{GE(th)}$	Gate-Emitter threshold voltage	V_{GE} = V_{CE}, I_C = 0.88mA， T_{VJ} = 25°C	-	4	-	V
I_{CES}	Zero Gate voltage Collector current	V_{CE} = 650V , V_{GE} = 0V， T_{VJ} = 25°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 = 100K Hz	-	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 °C, V_{CE} = 400 V, I_C = 100 A, V_{GE} = 0 / 15 V, $R_{G(on)}$ = 10 Ω, $R_{G(off)}$ = 10 Ω	-	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 °C, V_{CE} = 400 V, I_C = 100 A, V_{GE} = 0 / 15 V, $R_{G(on)}$ = 10 Ω, $R_{G(off)}$ = 10 Ω	-	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 °C V_{CE} = 400 V, I_C = 100 A V_{GE} = 0 / 15 V $R_{G(on)}$ = 10 Ω, $R_{G(off)}$ = 10 Ω	-	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 °C V_{CE} = 400 V, I_C = 100 A V_{GE} = 0 / 15 V $R_{G(on)}$ = 10 Ω, $R_{G(off)}$ = 10 Ω	-	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

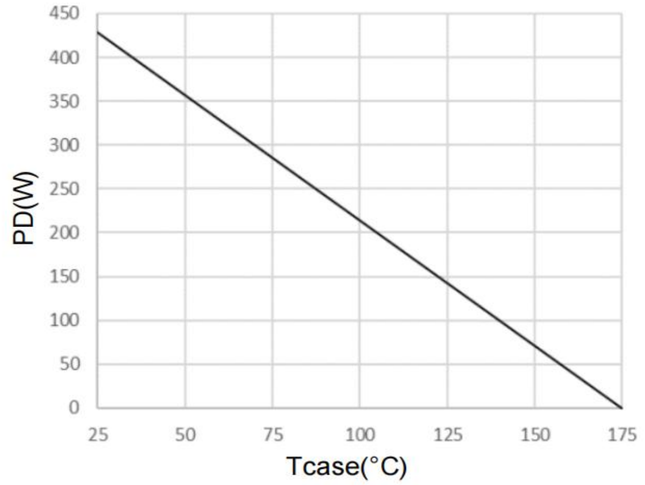


Figure 1:Power De-rating

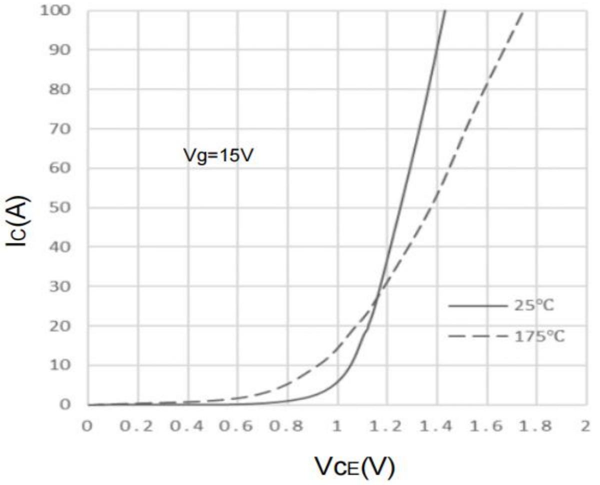


Figure 2:Typical Output charatceristics

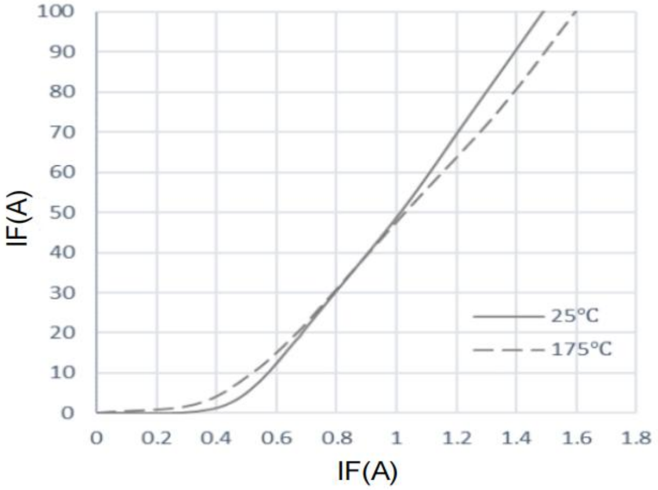


Figure 3:Diode Forward current characteristics

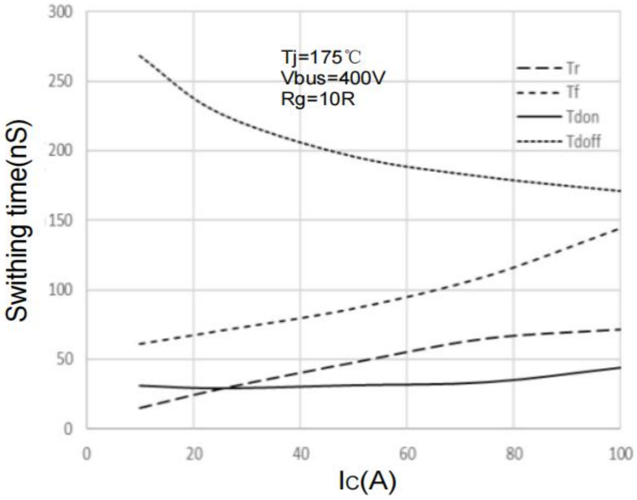


Figure 4:Switching time(nS)

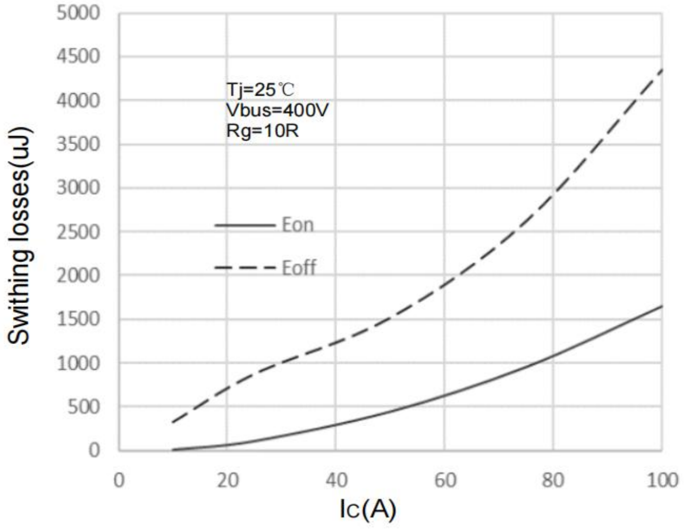


Figure 5:Switching losses(uJ)

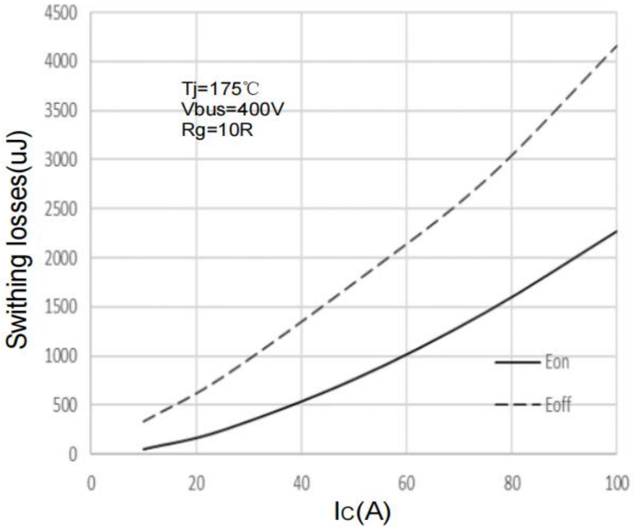


Figure 6:Switching losses(uJ)

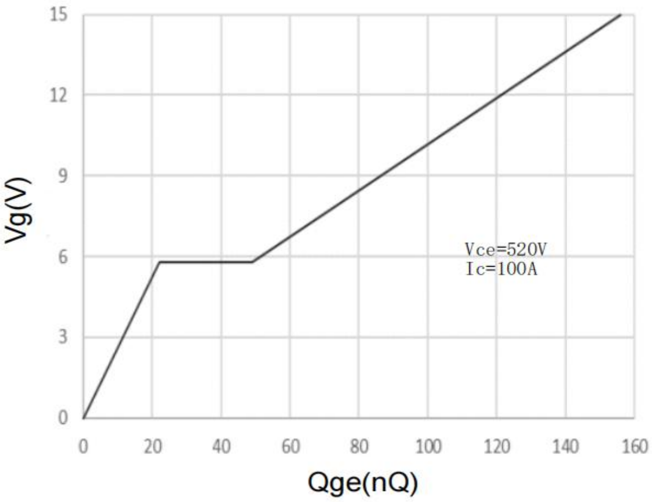


Figure 7:Gate-Charge characteristics

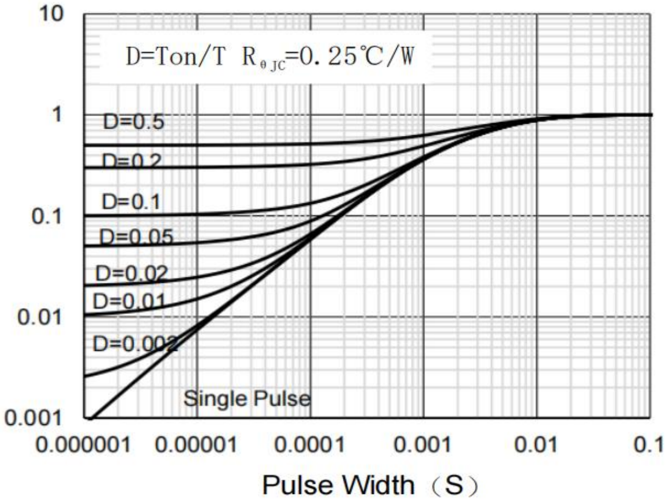


Figure 8:Normalized Maximum IGBT transient thermal impedance

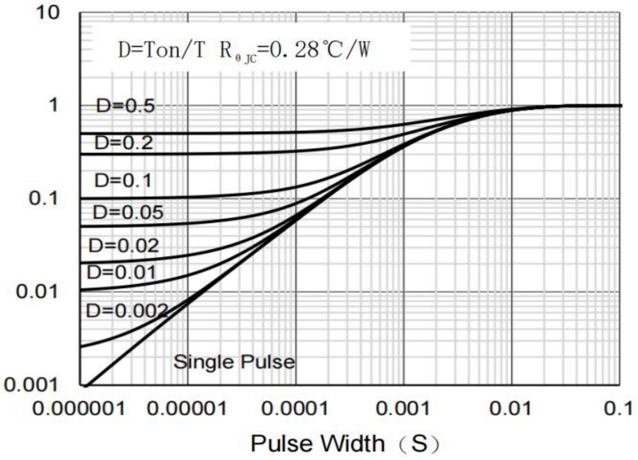
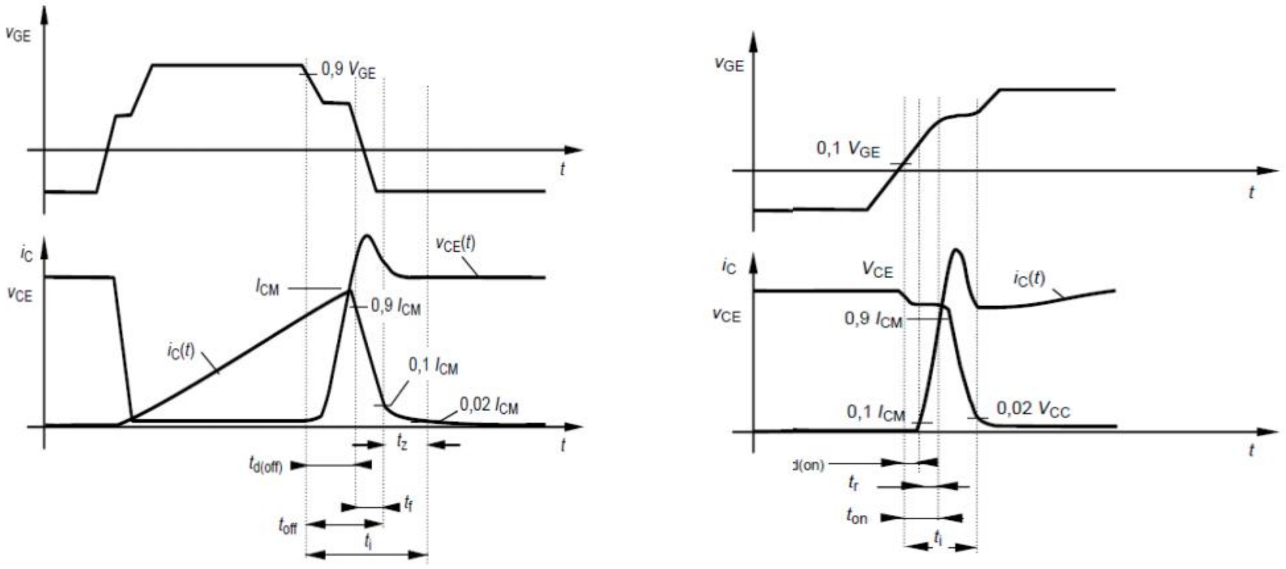


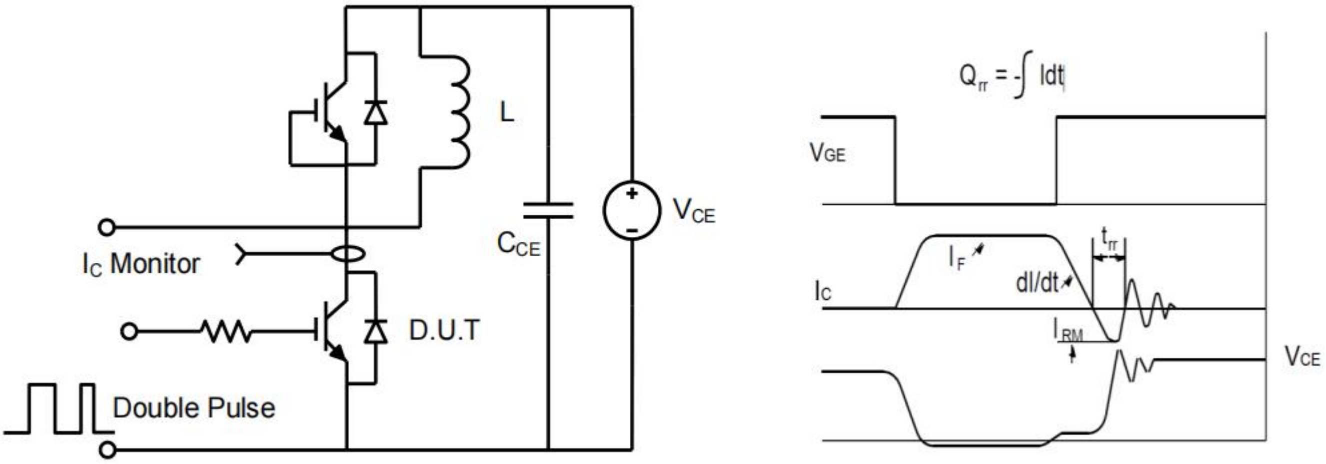
Figure 9:Normalized Maximum Diode transient thermal impedance

Test Circuit

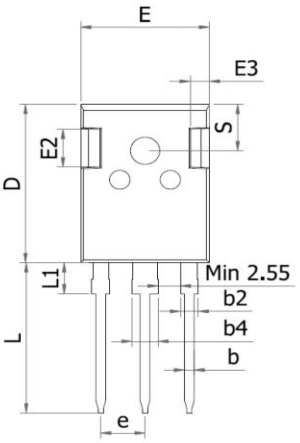
Switching Test Circuit & Waveforms

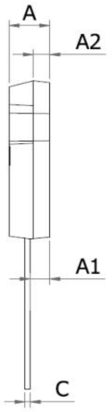


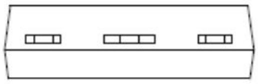
Diode Recovery Test Circuit & Waveforms

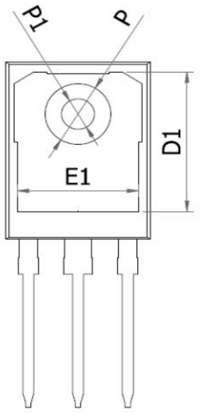


Package Mechanical Data(TO-247)









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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