IGW40N60F

General Description:

Using advanced IGBT technology, the 600V IGBT.

Offers superior conduction and switching performances.

Lead Free Package and Finish

V_{CES}	$V_{CE(sat)}$	I_C
600V	2.2V	40A

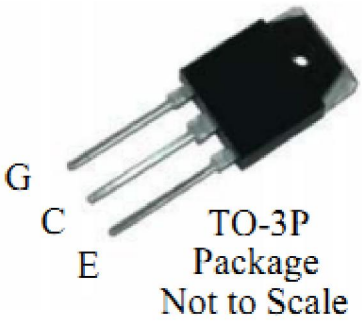
Features:

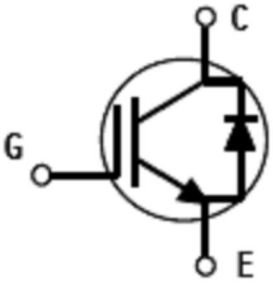
●Low saturation voltage: $V_{CE(sat)}$,typ=2.2V @I_C=40A,V_{GE}=15V;

●RoHS Compliant;

Applications:

- Inverter welder
- Solar inverters
- UPS
- High switching frequency inverter





Ordering Information

Part Number	Package	Brand
IGW40N60F	TO-3P	***IPS***

Absolute Maximum Ratings（Ta= 25℃，unless otherwise specified）

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GES}	Gate- Emitter Voltage	±20	V
I_C	Collector Current	80	A
	Collector Current @T_C=100℃	40	
I_{CM}[a1]	Pulsed Collector Current @T_C=25℃	120	A
I_F	Diode Continuous Forward Current@T_C=100℃	20	A
I_{FM}	Diode Maximum Forward Current	100	A
P_D	Power Dissipation @T_C=25℃	280	W
	Power Dissipation @T_C=100℃	110	
	Power Dissipation @T_A=25℃	3.125	
T_J	Operating Junction	150	℃
T_{stg}	Storage Temperature Range	-55～150	℃
T_L	Maximum Temperature for Soldering	300	℃

a1：Repetitive rating; pulse width limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction to case for IGBT	--	0.446	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to case for Diode	--	1.25	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	--	40	℃/W

Electrical Characteristics of the IGBT (T_a= 25℃, unless otherwise specified)

Symbol	Parameter	Test Conditions	Rating			Units
			Min	Typ.	Max.	
OFF Characteristics						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	V_{GE}=0V,I_{CE}=250uA	600	--	--	V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V,V_{CE}=600V	--	--	1.0	mA
$I_{GES(F)}$	Gate to Emitter Forward Leakage	V_{GE}=+20V	--	--	+250	nA
$I_{GES(R)}$	Gate to Source Reverse Leakage	V_{GE} =-20V	--	--	-250	nA
ON Characteristics						
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=40A ,V_{GE}=15V	--	2.2	2.7	V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=1mA ,V_{CE}=V_{GE}	3.5	5.0	6.5	V
Pulse width tp≤380μs,δ≤2%						
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE}=30V,V_{GE}=0V f=1MHz	--	1830	--	pF
C_{oes}	Output Capacitance		--	169	--	
C_{res}	Reverse Transfer Capacitance		--	47	--	
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{CE}=400V,I_C=40A, R_g=10Ω,V_{GE}=15V, Inductive Load, Ta=25℃,	--	37	--	ns
t_r	Rise Time		--	46	--	
$t_{d(off)}$	Turn-Off Delay Time		--	130	--	
t_f	Fall Time		--	30	--	
E_{on}	Turn-On Switching Loss		--	2.1	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.53	--	
E_{ts}	Total Switching Loss		--	2.63	--	
Q_g	Total Gate Charge	V_{CE}=400V,I_C=40A, V_{GE}=15V,	--	94	--	nC
Q_{ge}	Gate to Emitter Charge		--	18	--	
Q_{gc}	Gate to Collector Charge		--	46	--	
Electrical Characteristics of the Diode						
V_F	Diode Forward Voltage	I_F=20A	--	1.8	2.6	V
Trr	Reverse Recovery Time	I_F=20A di/dt=200A/uS	--	80	--	ns
Irr	Diode Peak Reverse Recovery Current		--	6	--	A
Qrr	Reverse Recovery Charge		--	240	--	nC

Characteristics Curve：

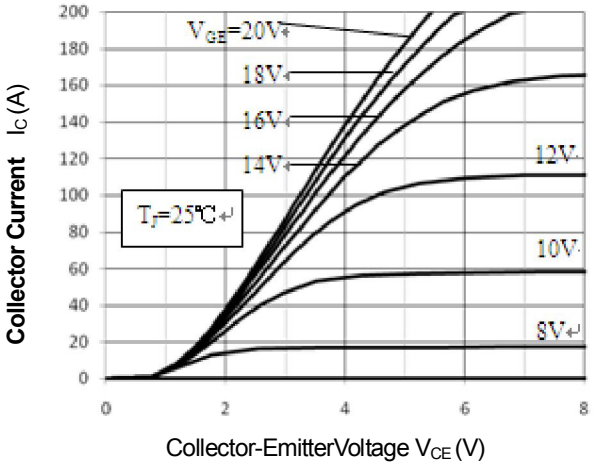


Figure 1.Typical Output Characteristics

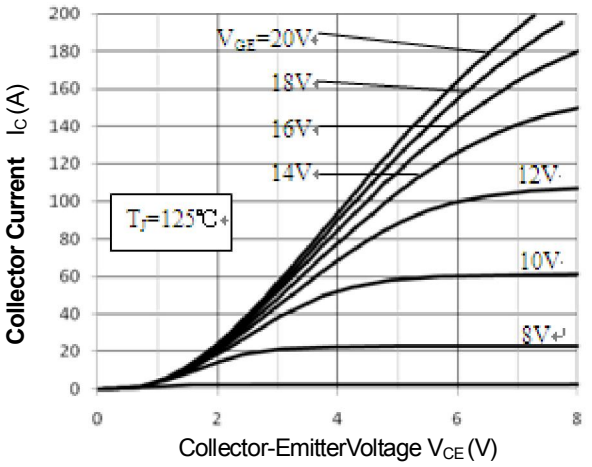


Figure 2.Typical Output Characteristics

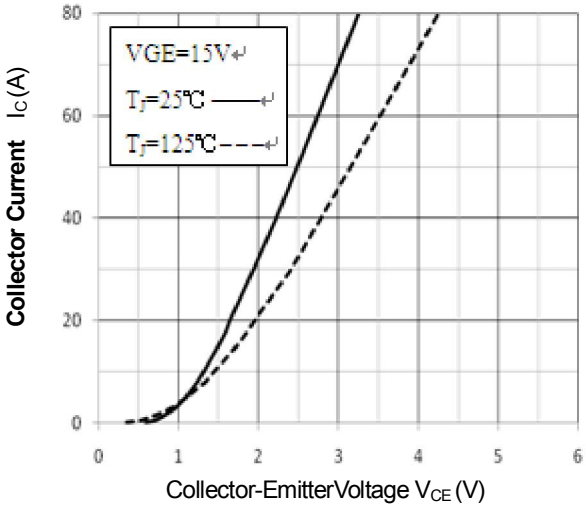


Figure 3.Saturation Voltage Characteristics

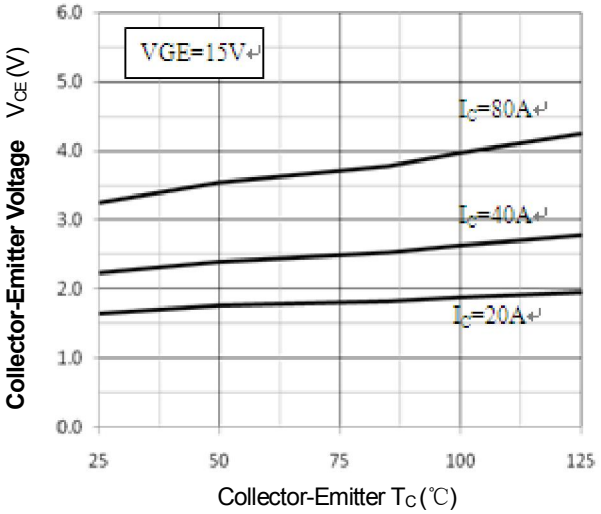


Figure 4. Saturation Voltage –T_C Characteristics

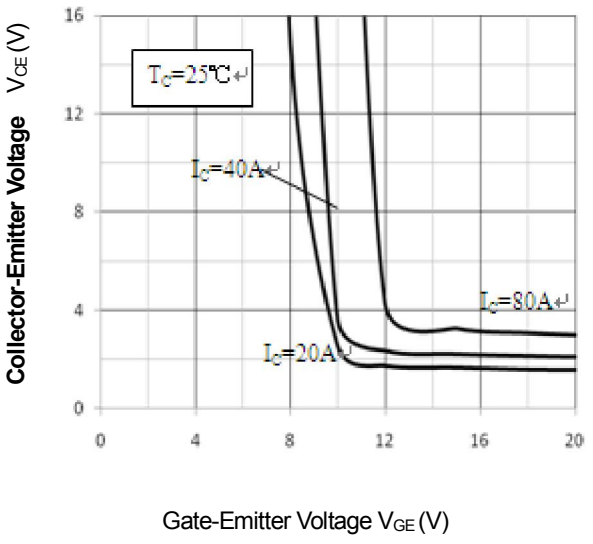


Figure 5. $V_{CE(sat)}$— V_{GE} Characteristics

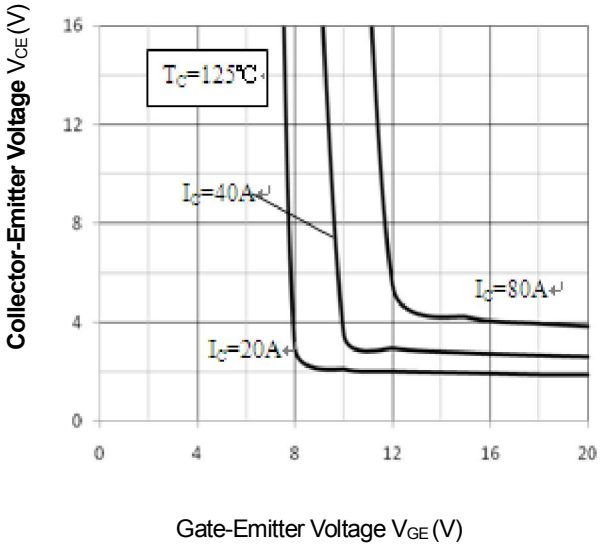


Figure 6. $V_{CE(sat)}$— V_{GE} Characteristics

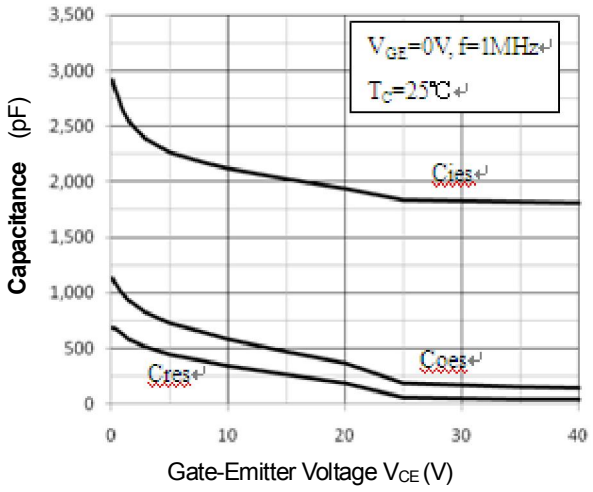


Figure 7. Capacitance Characteristics

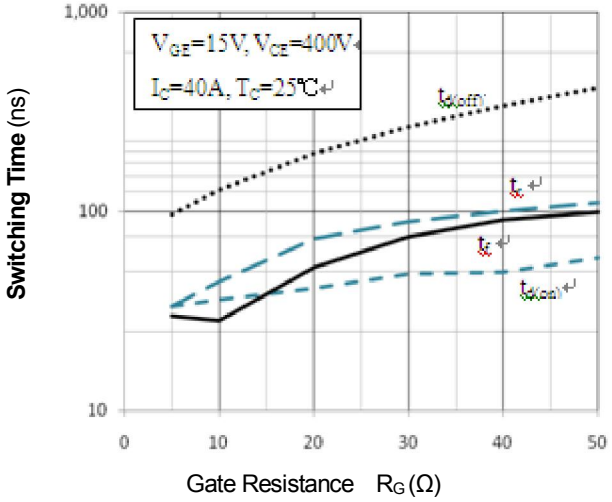


Figure 8. Switching Time—R_G Characteristics

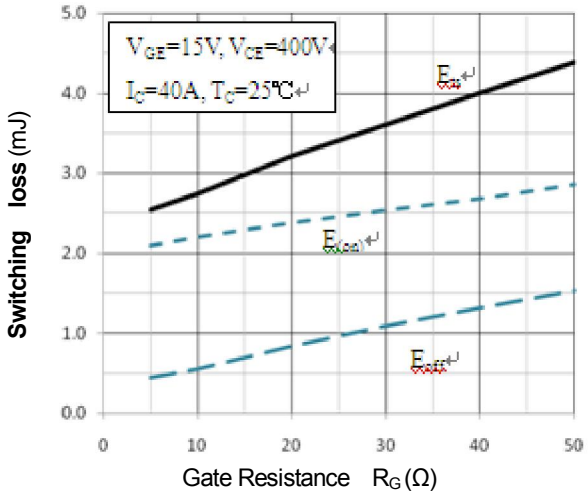


Figure 9. Switching loss—R_G Characteristics

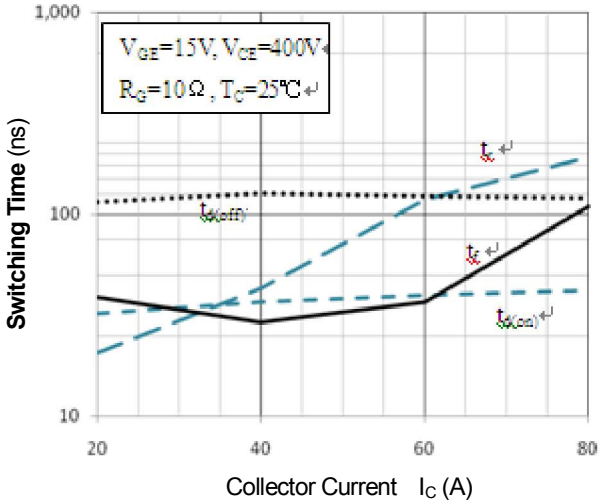


Figure 10. Switching Time—I_C Characteristics

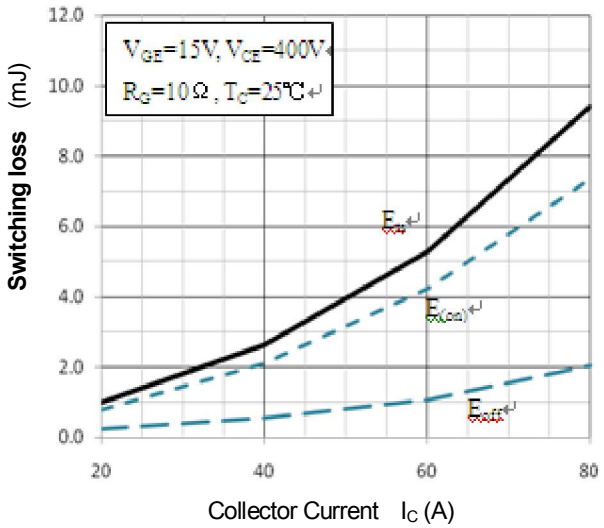


Figure 11. Switching loss—I_C Characteristics

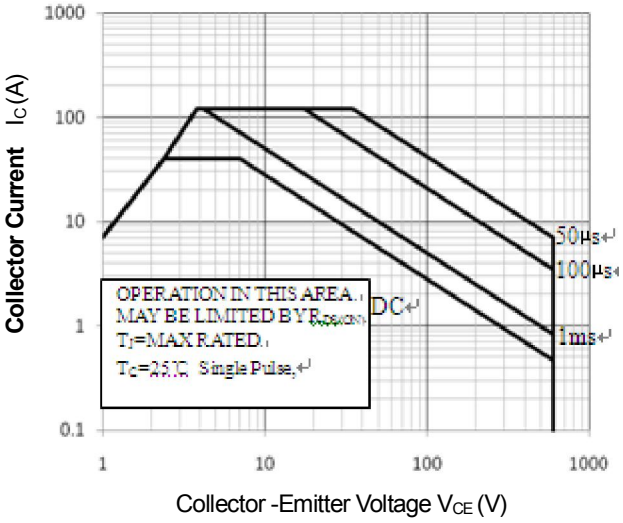


Figure 12. Safe Operating Area

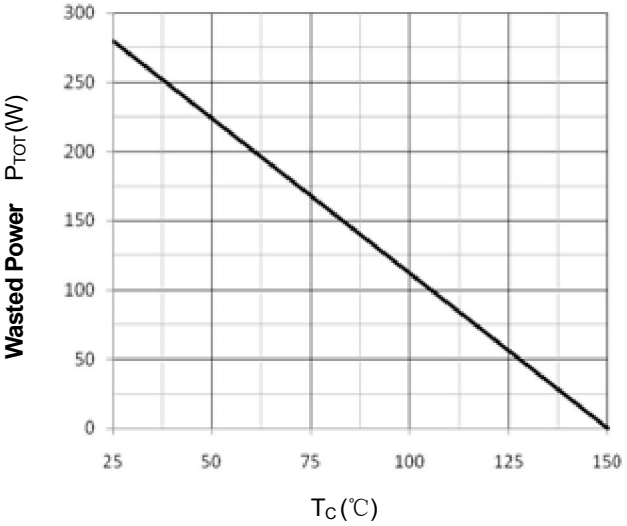


Figure 13. Power Dissipation—T_C Characteristics

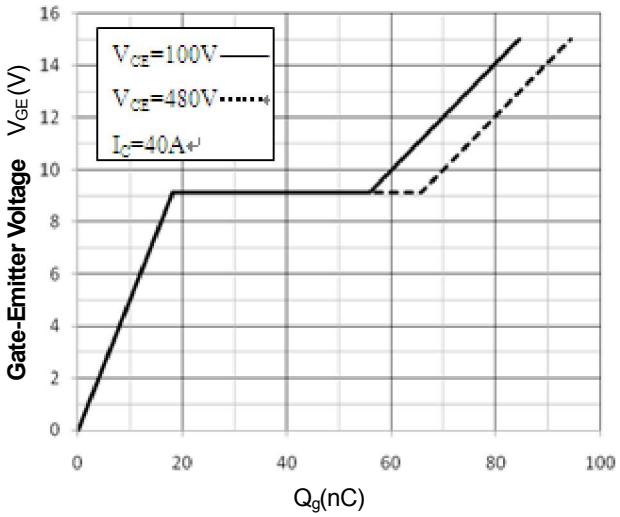


Figure 14. Gage Charge Characteristics

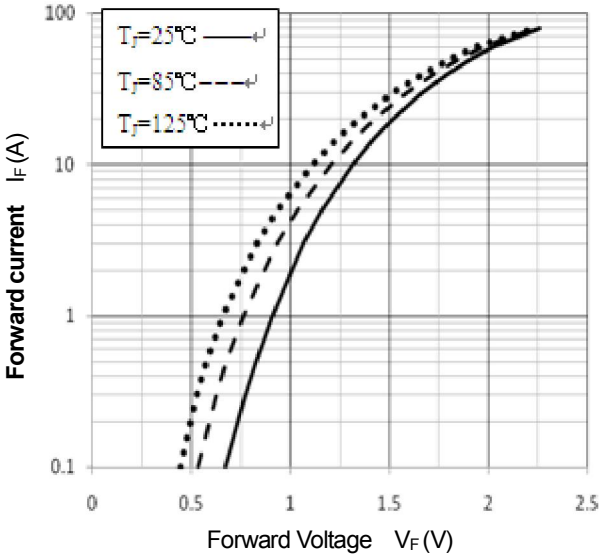


Figure 15. Diode Forward Characteristics

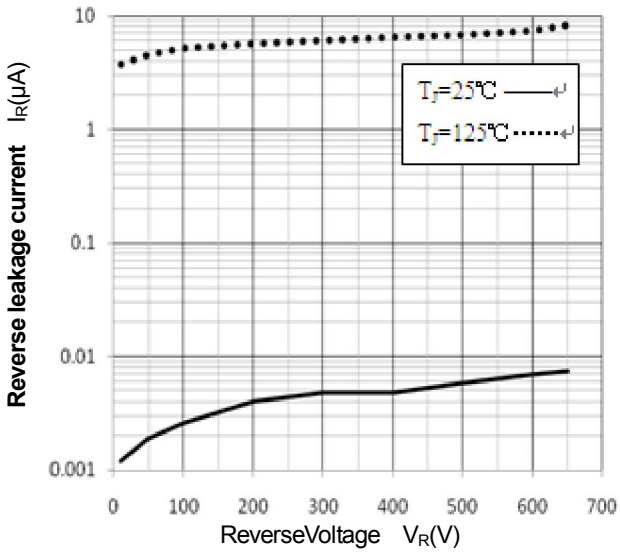


Figure 16. Diode Reverse Characteristics

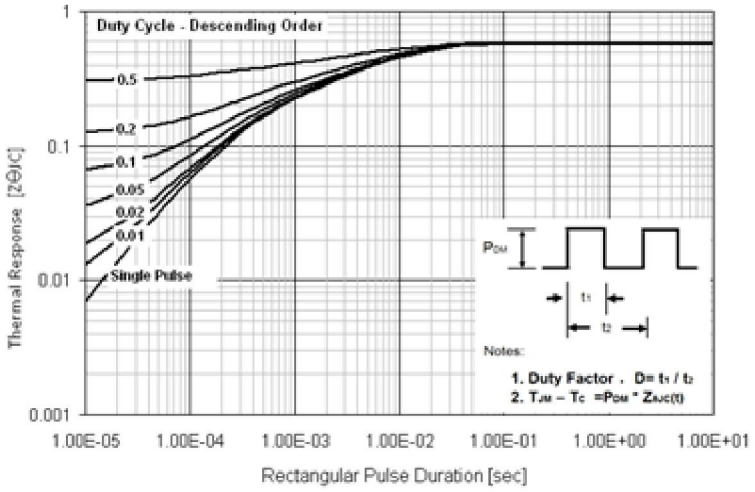


Figure 17. IGBT Transient Thermal Impedance

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