

IGBT

GD100FFL120C6S

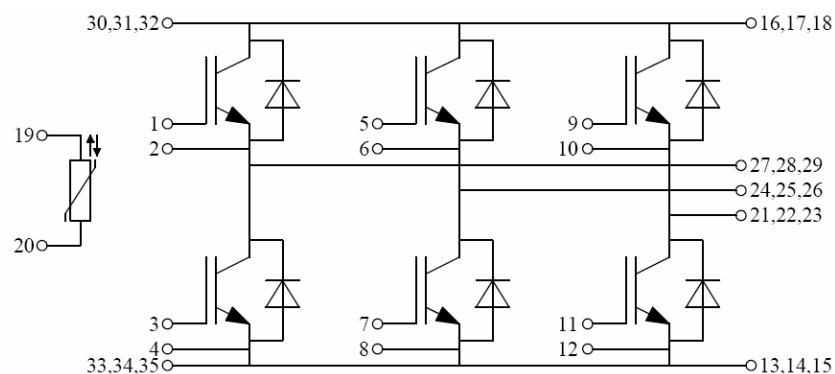
1200V/100A 6 in one-package



Features

- High short circuit capability, self limiting to $6 \cdot I_C$
- $10\mu s$ short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology

Equivalent Circuit Schematic



Typical Applications

- AC inverter drives
- Switching mode power supplies
- Electronic welders at f_{SW} up to 20kHz

Absolute Maximum Ratings $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Description	GD100FFL120C6S	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	$\pm 20\text{V}$	V
I_C	Collector Current @ $T_C=25^{\circ}\text{C}$ @ $T_C=80^{\circ}\text{C}$	140 100	A
$I_{CM(1)}$	Pulsed Collector Current @ $T_C=80^{\circ}\text{C}$	200	A
I_F	Diode Continuous Forward Current	100	A
I_{FM}	Diode Maximum Forward Current	200	A
P_D	Maximum power Dissipation @ $T_j=150^{\circ}\text{C}$	481	W
T_{SC}	Short Circuit Withstand Time @ $T_j=125^{\circ}\text{C}$	10	μs
T_j	Operating Junction Temperature	-40 to +150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
I^2t -value, Diode	$V_R=0\text{V}$, $t=10\text{ms}$, $T_j=125^{\circ}\text{C}$	1950	A^2s
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}$, $t=1\text{min}$	2500	V
Mounting Torque	Mounting Screw:M5	3.0 to 6.0	N.m

Notes:

(1) Repetitive rating: Pulse width limited by max. junction temperature

Electrical Characteristics of IGBT $T_C=25^{\circ}\text{C}$ unless otherwise noted**Off Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	$T_j=25^{\circ}\text{C}$	1200			V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}$, $V_{GE}=0\text{V}$, $T_j=25^{\circ}\text{C}$			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}$, $V_{CE}=0\text{V}$, $T_j=25^{\circ}\text{C}$			400	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=4.0\text{mA}$, $V_{CE}=V_{GE}$, $T_j=25^{\circ}\text{C}$	5.0	6.2	7.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=100\text{A}$, $V_{GE}=15\text{V}$, $T_j=25^{\circ}\text{C}$		1.9		V
		$I_C=100\text{A}$, $V_{GE}=15\text{V}$, $T_j=125^{\circ}\text{C}$		2.1		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=100A,$ $R_G=3\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		95		ns
t_r	Rise Time			38		ns
$t_{d(off)}$	Turn-Off Delay Time			360		ns
t_f	Fall Time			45		ns
E_{on}	Turn-On Switching Loss			6.5		mJ
E_{off}	Turn-Off Switching Loss			5.7		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=100A,$ $R_G=3\Omega, V_{GE}=\pm 15V,$ $T_j=125^\circ C$		110		ns
t_r	Rise Time			45		ns
$t_{d(off)}$	Turn-Off Delay Time			420		ns
t_f	Fall Time			60		ns
E_{on}	Turn-On Switching Loss			9.8		mJ
E_{off}	Turn-Off Switching Loss			8.7		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1MHz,$ $V_{GE}=0V$		7.43		nF
C_{oes}	Output Capacitance			0.52		nF
C_{res}	Reverse Transfer Capacitance			0.34		nF
I_{SC}	SC Data	$T_P \leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$		470		A
L_{CE}	Stray inductance			21		nH
$R_{CC'+EE'}$	Module lead resistance, terminal to chip	$T_C=25^\circ C$		1.80		m Ω

Electrical Characteristics of DIODE $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V _F	Diode Forward Voltage	I _F =100A	T _j =25°C		2.0	2.3	V
			T _j =125°C		2.2	2.5	
Q _r	Diode Reverse Recovered charge	I _F =100A, V _R =600V, di/dt=-3600A/μs, V _{GE} =-15V	T _j =25°C		10		μC
			T _j =125°C		16		
I _{RM}	Diode Peak Reverse Recovery Current		T _j =25°C		90		A
			T _j =125°C		120		
E _{rec}	Reverse Recovery Energy		T _j =25°C		3.5		mJ
			T _j =125°C		6.0		

Electrical Characteristics of NTC $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{25}	Rated resistance			5.0		$\text{k}\Omega$
$\Delta R/R$	Deviation of R_{100}	$R_{100}=439\Omega$	5		5	%
P_{25}	Power dissipation				20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$		3375		K

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.26	K/W
$R_{\theta JC}$	Junction-to-Case (per DIODE)		0.48	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.009		K/W
Weight	Weight of Module	300		g

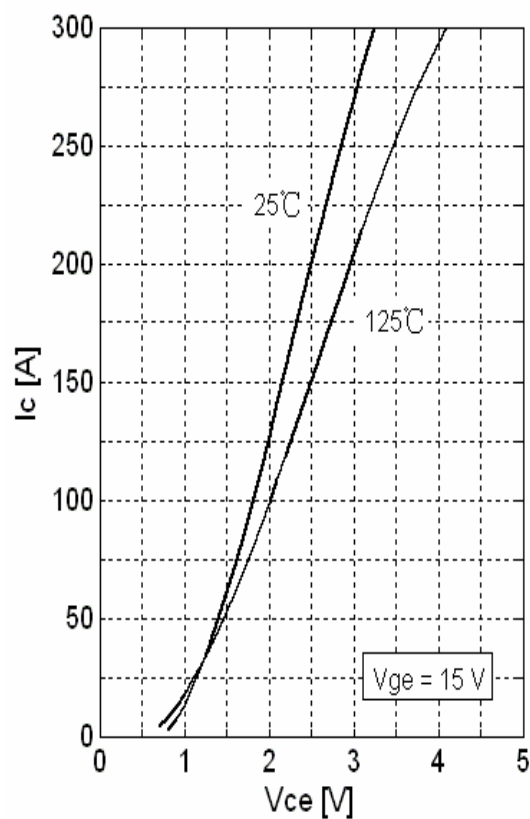


Fig 1. Typical Output Characteristics

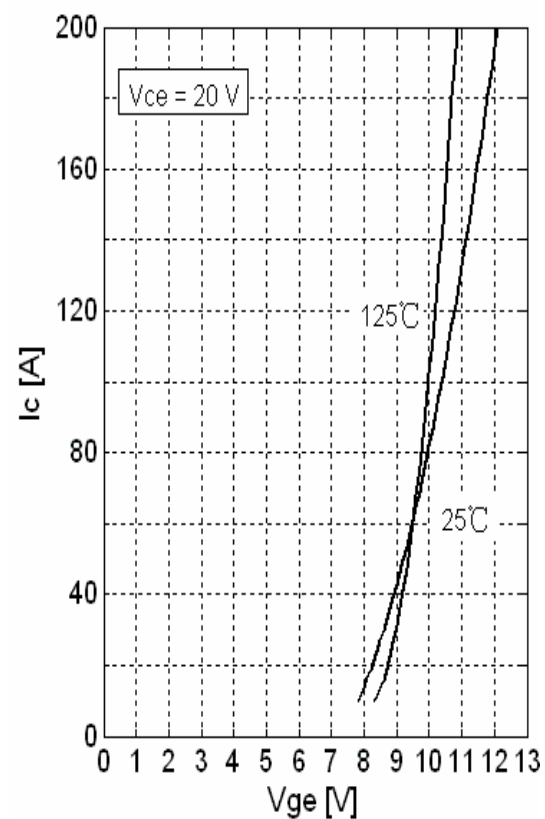


Fig 2. Typical Transfer Characteristics

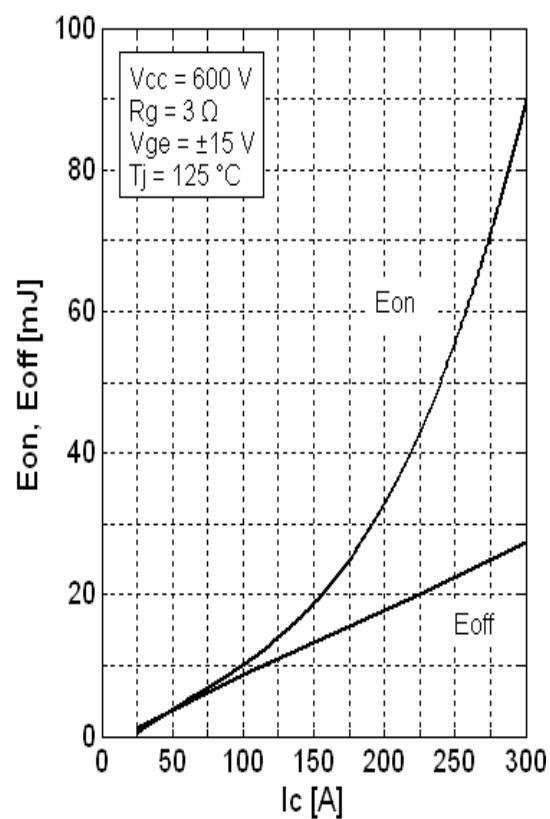


Fig 3. Switching Loss vs Collector Current

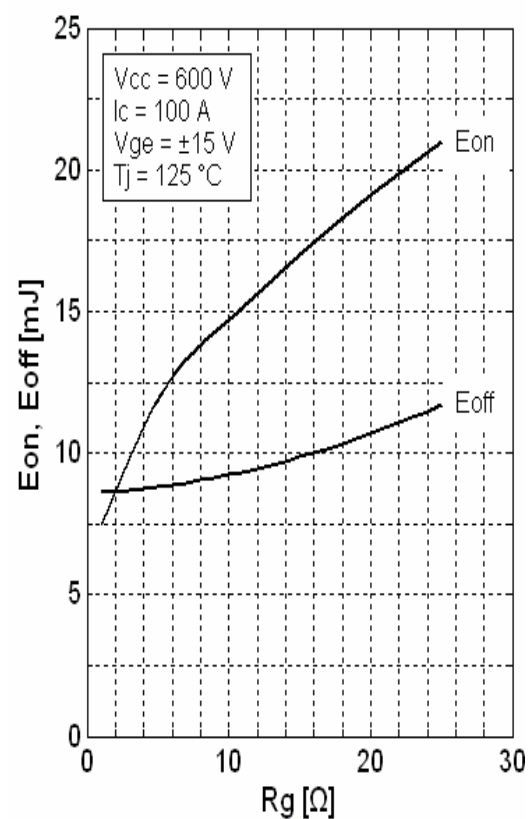


Fig 4. Switching Loss vs Gate Resistor

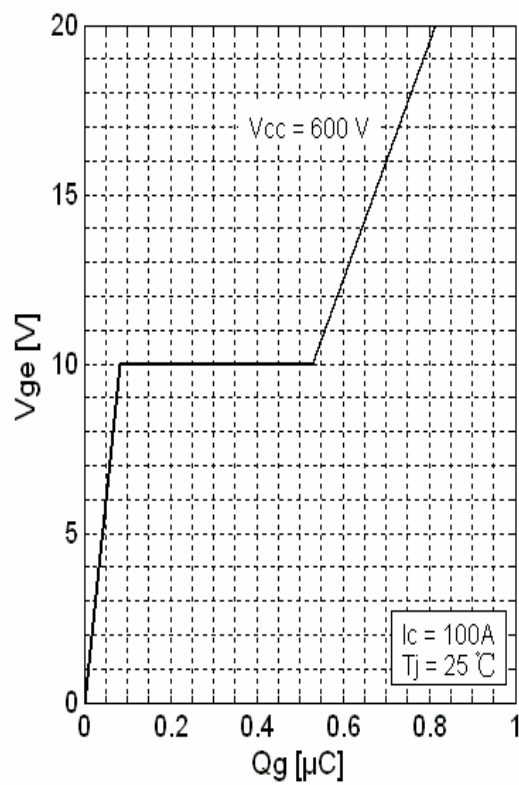
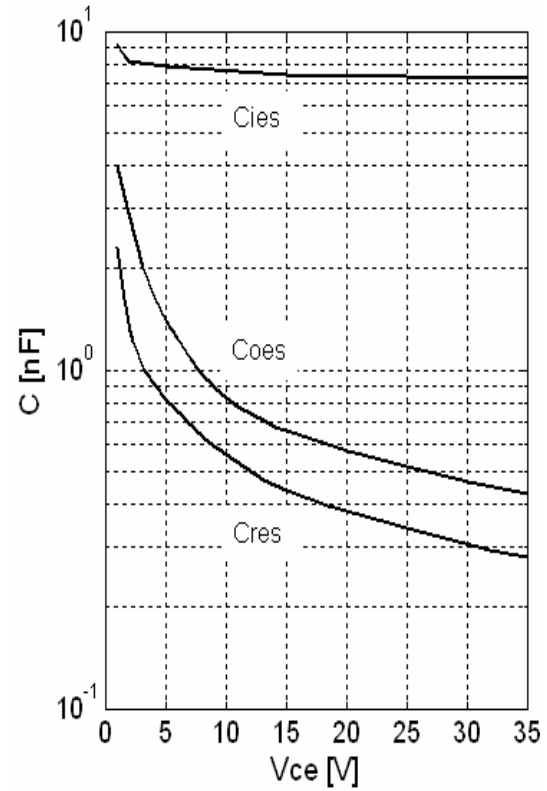
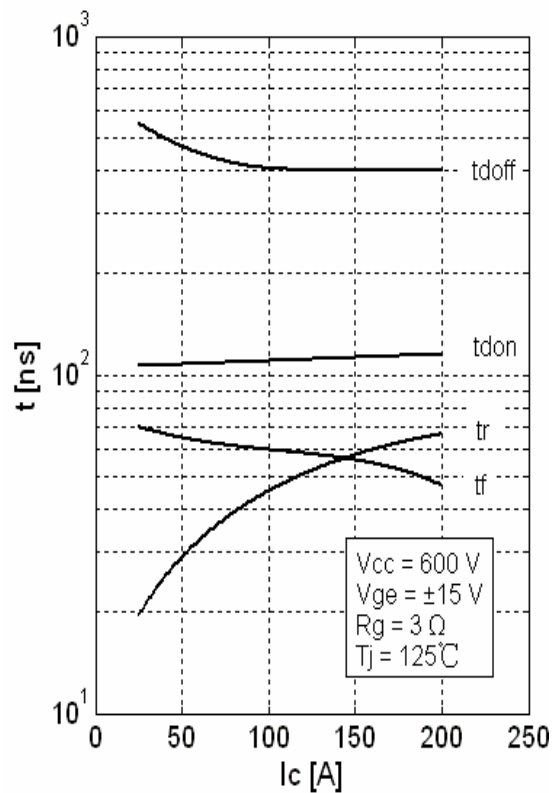
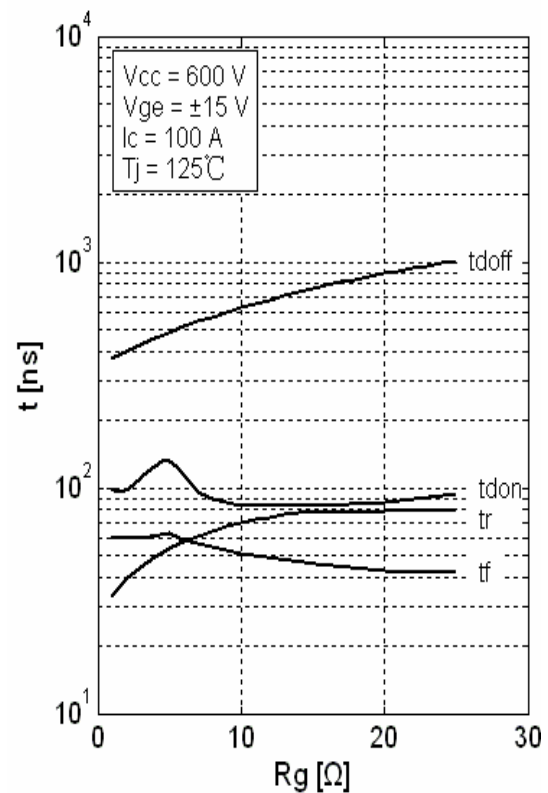


Fig 5. Gate Charge Characteristics.

Fig 6. Typical Capacitance vs
Collector-Emitter VoltageFig 7. Typical Switching Times vs. I_c Fig 8. Typical Switching Times vs. Gate
Resistance R_g

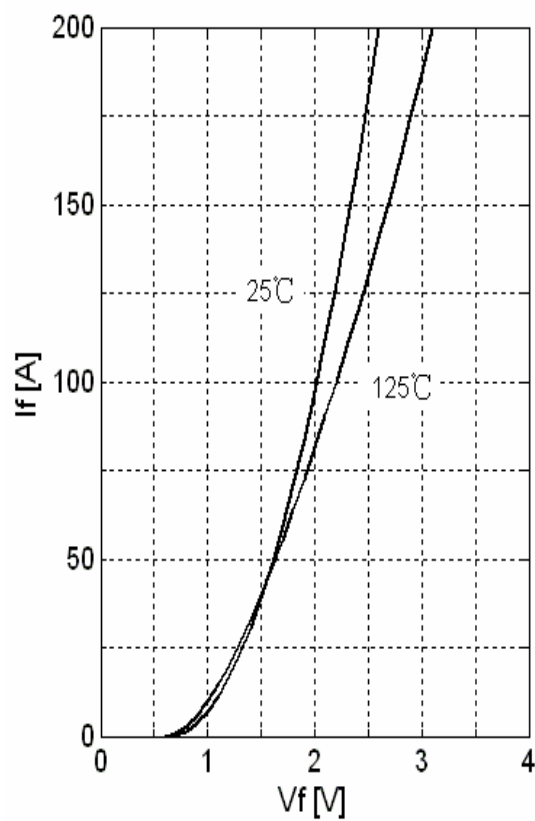


Fig 9. Typical Forward Characteristics (diode)

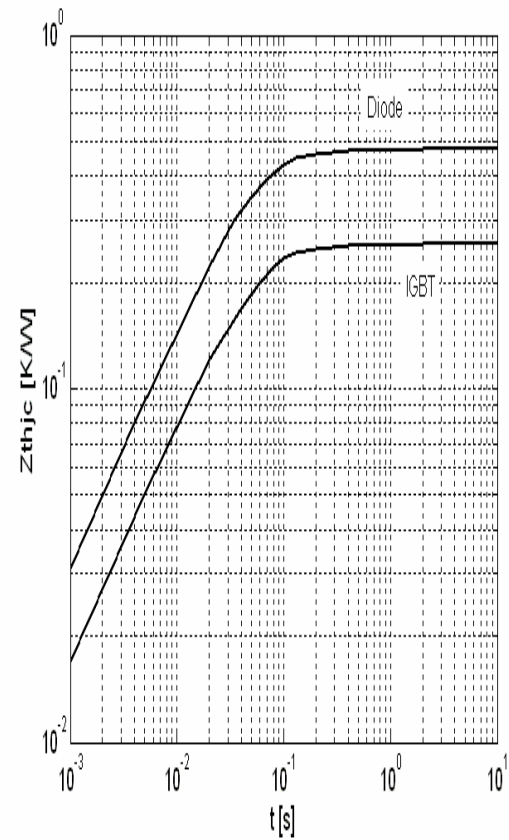


Fig 10. Transient thermal impedance

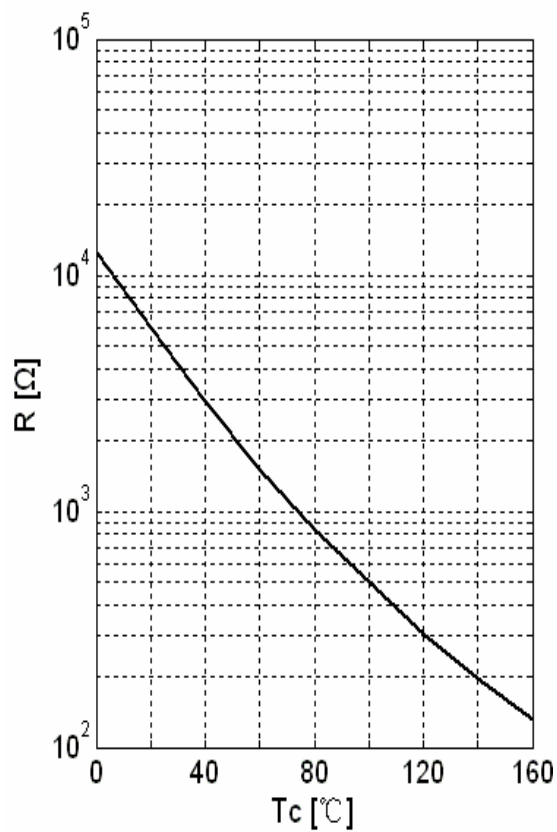


Fig 11. NTC-temperature characteristic

Package Dimension

Dimensions in Millimeters

