

STARPOWER

IGBT

GD300HFL170C2S

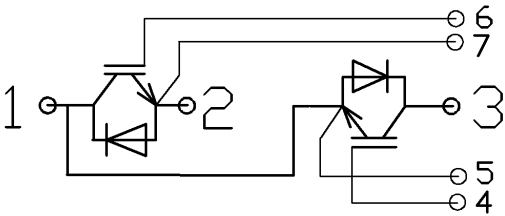
Molding Type Module

1700V/300A 2 in one-package



Features

- Low $V_{CE(sat)}$ SPT+ IGBT technology
- Low switching losses
- 10 μ 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 mains 575-750V AC
- Public transport (auxiliary syst.)

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

Symbol	Description	GD300HFL170C2S	Units
V_{CES}	Collector-Emitter Voltage	1700	V

Symbol	Description	GD300HFL170C2S	Units
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C=25^\circ\text{C}$ @ $T_C=80^\circ\text{C}$	450	A
		300	
$I_{CM(1)}$	Pulsed Collector Current $t_p=1\text{ms}$	600	A
I_F	Diode Continuous Forward Current	300	A
I_{FM}	Diode Maximum Forward Current	600	A
P_D	Maximum Power Dissipation @ $T_j=150^\circ\text{C}$	1623	W
T_{SC}	Short Circuit Withstand Time @ $T_j=125^\circ\text{C}$	10	μs
T_j	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^\circ\text{C}$
$I^2t\text{-value, Diode}$	$V_R=0\text{V}, t=10\text{ms}, T_j=125^\circ\text{C}$	14500	A^2s
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	3400	V
Mounting Torque	Power Terminal Screw:M6	2.5 to 5.0	N.m
	Mounting Screw:M6	3.0 to 5.0	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
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$V_{GE}=0\text{V}, I_C=1.0\text{mA}, T_j=25^\circ\text{C}$	1700			V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_j=25^\circ\text{C}$			3.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_j=25^\circ\text{C}$			500	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=12.0\text{mA}, V_{CE}=V_{GE}, T_j=25^\circ\text{C}$	5.0		6.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=300\text{A}, V_{GE}=15\text{V}, T_j=25^\circ\text{C}$		2.50	2.90	V
		$I_C=300\text{A}, V_{GE}=15\text{V}, T_j=125^\circ\text{C}$		3.00		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=900\text{V}, I_C=300\text{A}, R_G=4.1\Omega, V_{GE}=\pm 15\text{V}, T_j=25^\circ\text{C}$		380		ns
t_r	Rise Time			350		ns
$t_{d(off)}$	Turn-Off Delay Time			750		ns

GD300HFL170C2S**IGBT Module**

t_f	Fall Time	$V_{CC}=900V, I_C=300A,$ $R_G=4.1\Omega, V_{GE}=\pm 15V,$ $T_J=25^\circ C$		320		ns
E_{on}	Turn-On Switching Loss			75		mJ
E_{off}	Turn-Off Switching Loss			58		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=900V, I_C=300A,$ $R_G=4.1\Omega, V_{GE}=\pm 15V,$ $T_J=125^\circ C$		410		ns
t_r	Rise Time			360		ns
$t_{d(off)}$	Turn-Off Delay Time			850		ns
t_f	Fall Time			370		ns
E_{on}	Turn-On Switching Loss			94		mJ
E_{off}	Turn-Off Switching Loss			76		mJ
C_{ies}	Input Capacitance	$V_{CE}=25V, f=1MHz,$ $V_{GE}=0V$		18.0		nF
C_{oes}	Output Capacitance			1.30		nF
C_{res}	Reverse Transfer Capacitance			0.80		nF
I_{SC}	SC Data	$t_{SC}\leq 10\mu s, V_{GE}=15V,$ $T_J=125^\circ C, V_{CC}=1300V,$ $V_{CEM}\leq 1700V$		1200		A
R_{Gint}	Internal Gate Resistance			2		Ω
L_{CE}	Stray Inductance				20	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip	$T_C=25^\circ C$		0.35		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 =300A	T _j =25°C		2.05	2.45	V
			T _j =125°C		2.25		
Q _r	Diode Reverse Recovery Charge	I _F =300A, V _R =900V, di/dt=-1000A/μs, V _{GE} =-15V	T _j =25°C		72		μC
			T _j =125°C		127		
I _{RM}	Diode Peak Reverse Recovery Current		T _j =25°C		175		A
			T _j =125°C		220		
E _{rec}	Reverse Recovery Energy		T _j =25°C		52		mJ
			T _j =125°C		97		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (IGBT Part, per 1/2 Module)		0.077	K/W
$R_{\theta JC}$	Junction-to-Case (DIODE Part, per 1/2 Module)		0.160	K/W
$R_{\theta JC}$	Case-to-Sink (Conductive grease applied)	0.035		K/W
Weight	Weight of Module	300		g

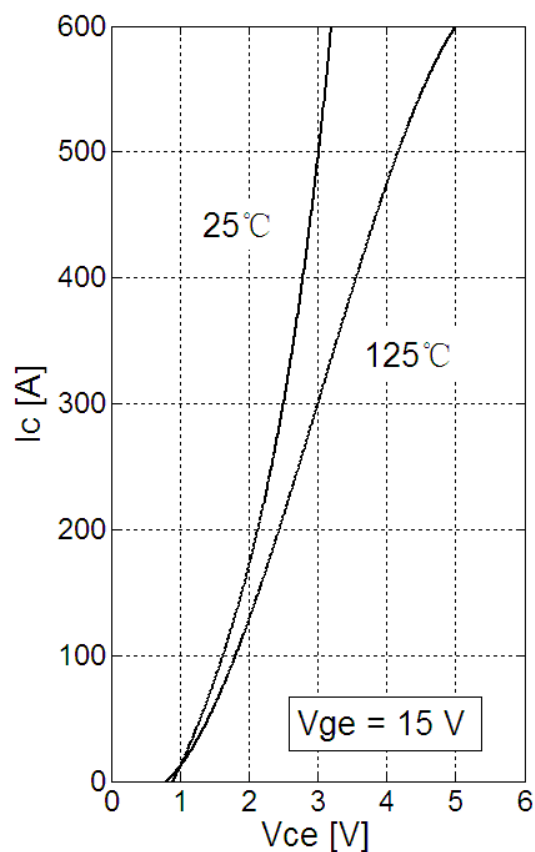


Fig 1. IGBT Typical Output Characteristics

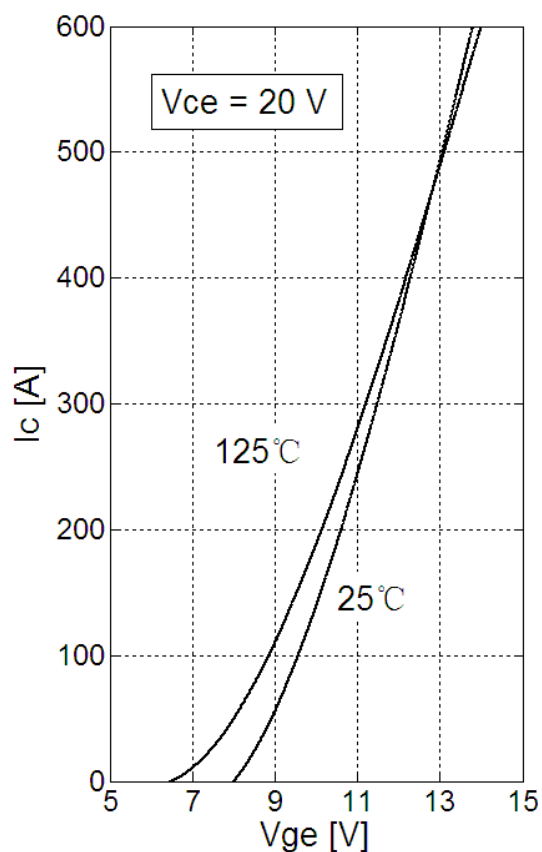
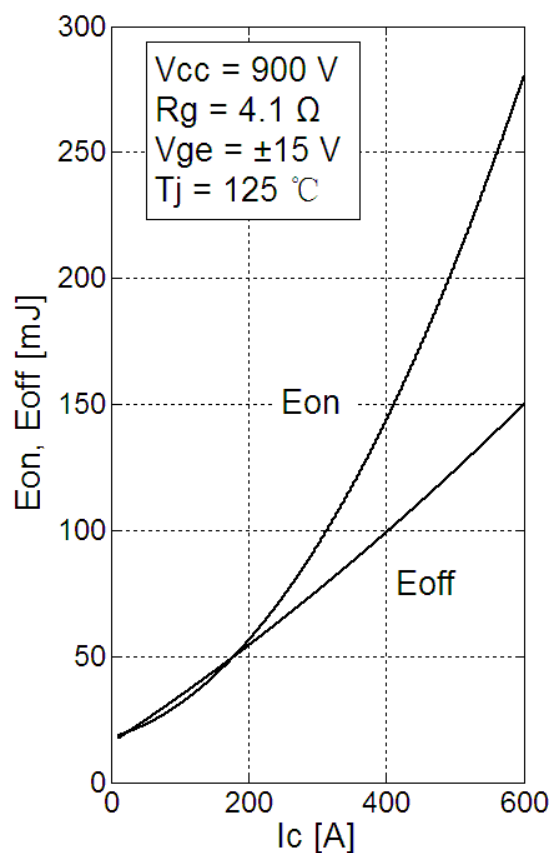
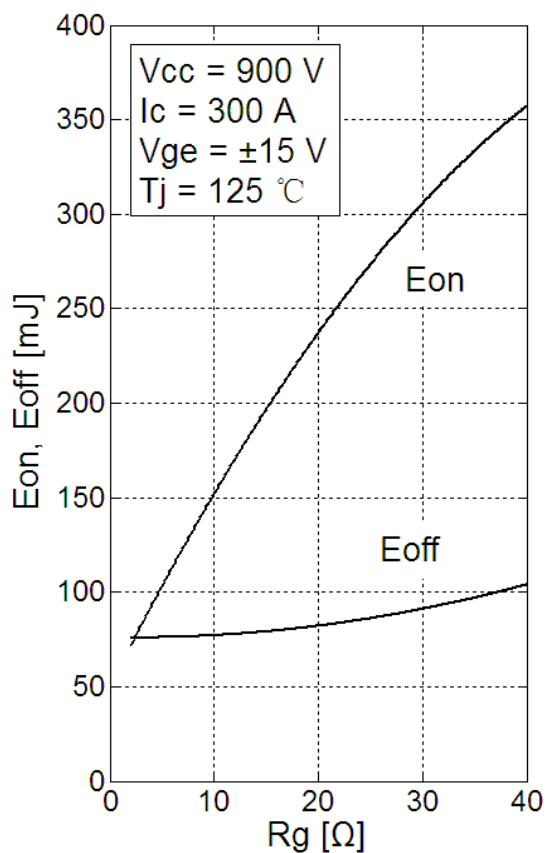


Fig 2. IGBT Typical Transfer Characteristics

Fig 3. IGBT Switching Loss vs. I_c Fig 4. IGBT Switching Loss vs. R_g

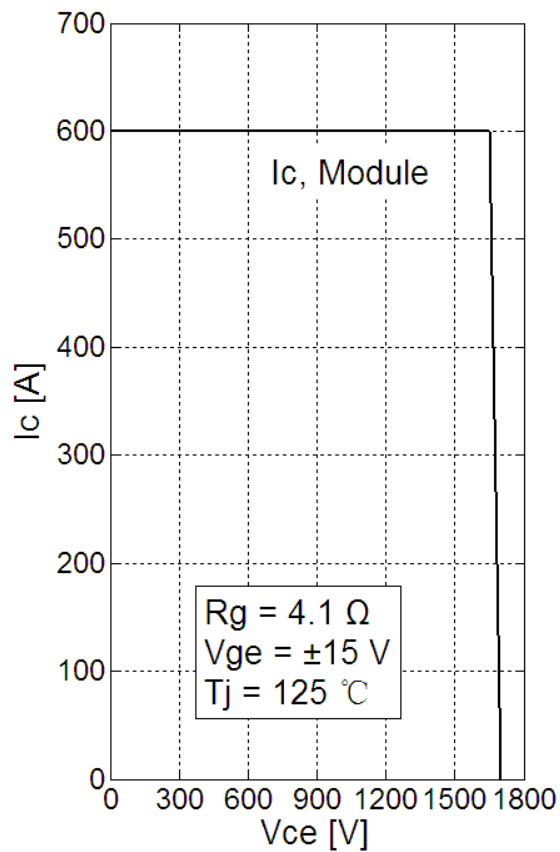


Fig 5. RBSOA

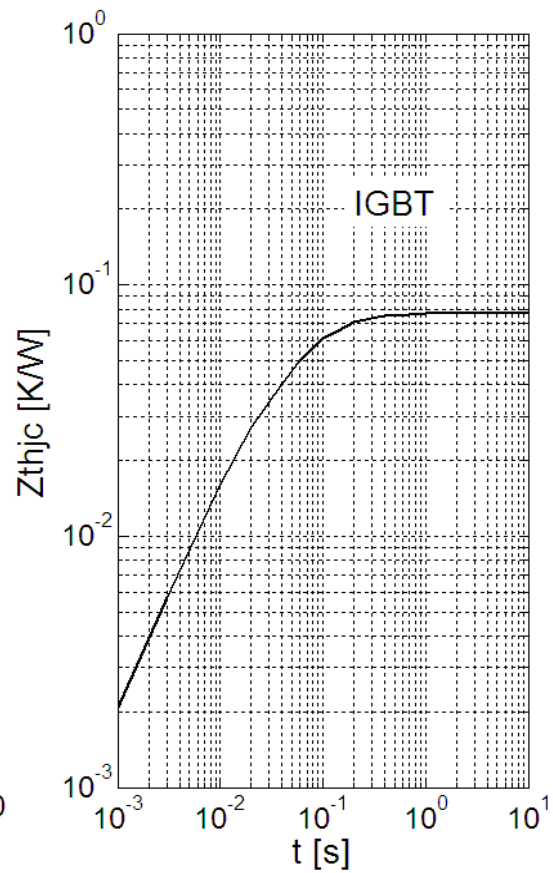


Fig 6. IGBT Transient Thermal Impedance

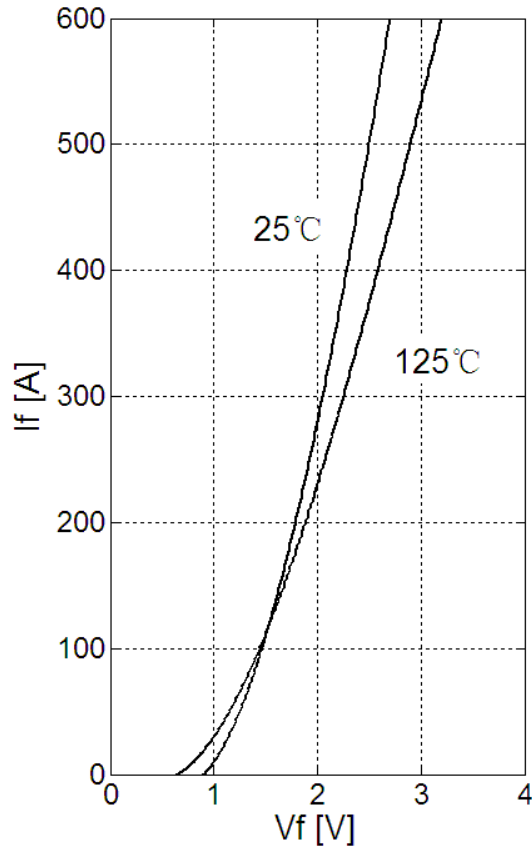
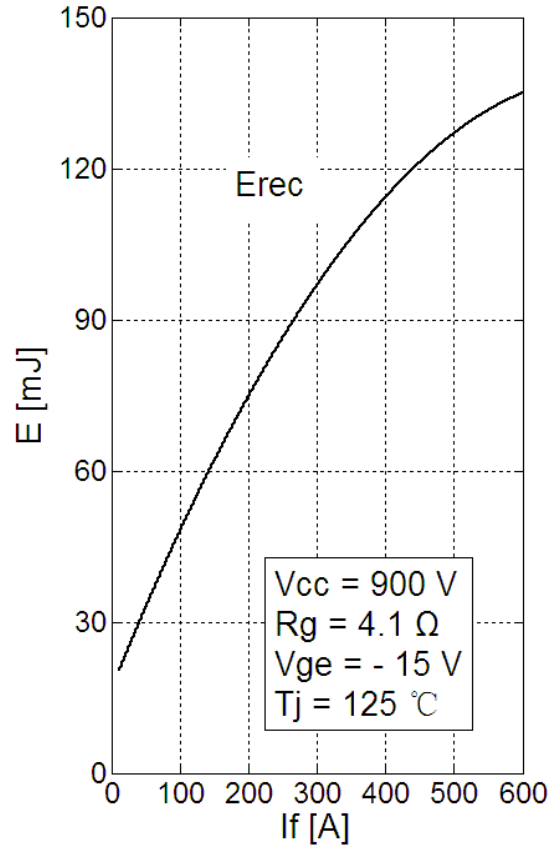


Fig 7. Forward Characteristics of Diode

Fig 8. Diode Switching Loss vs. I_f

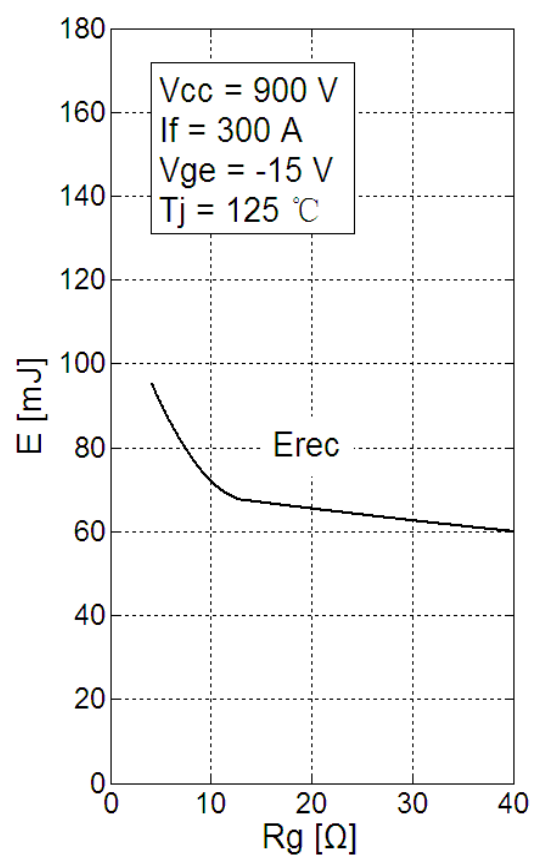
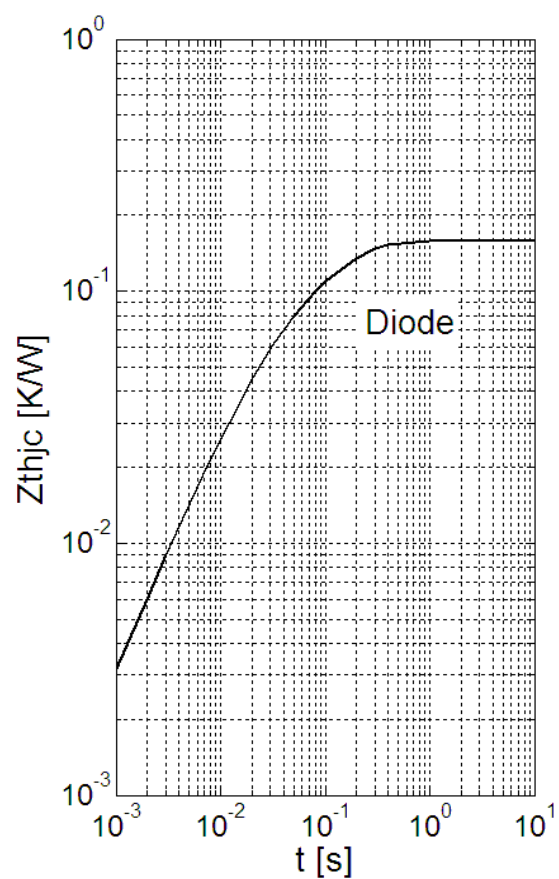
Fig9. Diode Switching Loss vs. R_g 

Fig 10. Diode Transient Thermal Impedance

Package Dimension

Technical drawing of a mechanical part, likely a bracket or base plate, showing dimensions and features. The drawing includes the following specifications:

- Overall width: 26
- Overall height: 30.5
- Height of the main body: 23
- Height of the base: 6.5
- Height of the mounting flange: 7
- Flange thickness: 3.0 X 0.5
- Mounting holes: M6
- Horizontal spacing between mounting holes: 28, 28, 20

