HFS29 IGBT MODULE

c UL us
File No.: E314528

Features

- Half-bridge
- 1200V SPT+ IGBT
- Built-in Fast free-wheeling diodes
- DCB base plate
- Environmental friendly product (RoHS compliant)

Typical Applications

Welding machine, Invertor, UPS, etc

DESCRIPTION

With output rared current at 150A, 200A, 300A, HFS29 is a high integrated, small package and user friendly IGBT module, which is ideal for the applications such as the welding machine, invertor, UPS, etc. Each module consists of two IGBTs in a half bridge configuration. All components and inner connectors are isoluted from the baseplate.

PRECAUTIONS

1. In order to get effective heat dissipation, heat sink flatness should be between -50μm and 100μm. It is important to apply thermally conductive grease with 100 to 200μm on the contact surface, where attached to the heat sink.
2. Keep the module from being damaged by the static electricity.

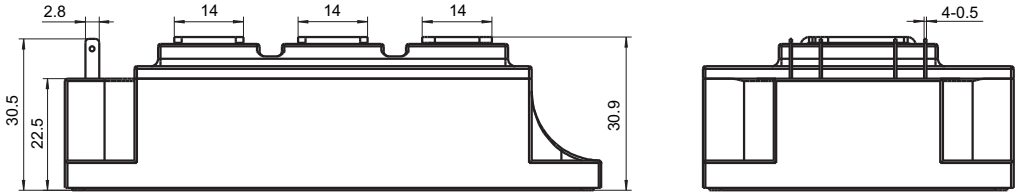
ORDERING INFORMATION

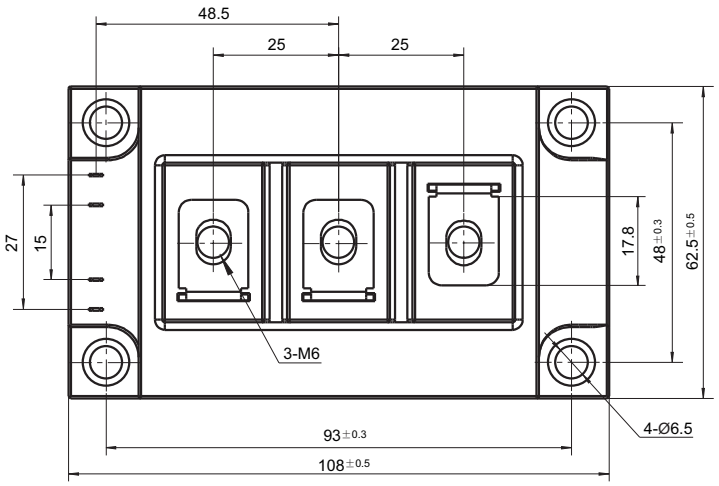
	HFS29 /	PM	150	D	120	(SA)
Type						
Module	**PM:** IGBT module					
Output rating current	**150:** 150A **200:** 200A **300:** 300A					
Unit numbers	**D:** Dual(half bridge)					
IGBT Vces voltage	**120:** 1200V					
IGBT type	**(SA):** SPT+					

OUTLINE DIMENSIONS AND CIRCUIT DIAGRAM

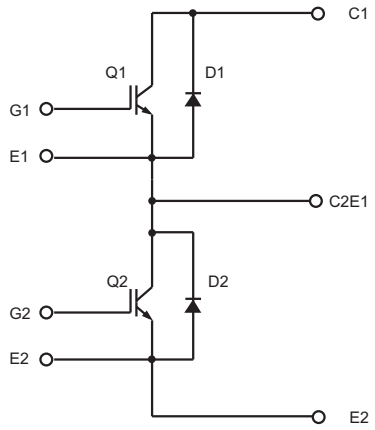
Unit : mm

Outline Dimensions





Circuit Diagram



HFS29/PM150D120(SA)

MAXIMUM RATINGS (Tj=25°C, unless otherwise specified)

Symbol	Item	Condition	Rating	Unit
V_{CES}	Collector-emitter voltage	G、E short	1200	V
V_{GES}	Gate-emitter voltage	C、E short	±20	V
Ic	Collector current	Tc=80°C	165	A
I_{CP}	Peak collector current		300	A
T_{PSC}	Short circuit protection time	V_{CC}=900V; V_{CEM}<1200V V_{GE}≤15V; Tj≤125°C	10	s
Viso	Isolation voltage		2500	VAC
Tj	Junction temperature		-40 ~ 150	°C
Tstg	Storage temperature		-40 ~ 125	°C
I_F	Diode forward current	Tc=25°C(80°C)	150(105)	A
I_{FM}	Diode peak forward current	Tj≤150°C	300	A

ELECTRICAL CHARACTERISTICS (Tj=25°C, unless otherwise specified)

Symbol	Item	Condition	Min.	Typ.	Max.	Units
I_{CES}	Collector-emitter voltage	V_{GE}=0V, V_{CE}=1200V		0.1	1.0	mA
I_{GES}	Gate-emitter leakage current	V_{GE}=±20V, V_{CE}=0V, T_j=125°C	–200		200	μA
$V_{GE(th)}$	Gate-emitter threshold voltage	Ic=3mA, V_{CE}=V_{GE}, T_j=25°C	5	6.2	7	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	Ic=75A, V_{GE}=15V, T_j=25°C		1.8		V
		Ic=75A, V_{GE}=15V, T_j=125°C		2.0		V
C_{ies}	Input capacitance	V_{GE}= 0V, V_{CE}=25V, f=1MHz		16		nF
C_{oes}				1.2		
C_{res}				0.6		
Q_G	Total gate charge			1560		nC
R_{Gint}	Resistance			4		Ω
E_{on}	Turn on energy	Vcc=600V, Ic=75A, R_G=15Ω, T_j=125°C		20.6		mJ
E_{off}	Turn off energy	V_{GE}=±15V, L=60nH, indutive load		15.6		mJ
$t_{d(on)}$	Turn-on delay time	Vcc=600V, Ic=75A		160		ns
tr	Rise time	V_{GE1}=V_{GE2}=±15V,		65		
$t_{d(off)}$	Turn-off delay time	R_G=15Ω		500		
tf	Fall time	indutive load		70		
V_{EC}	Diode forward voltage	Ic= -50A, V_{GE}=0V			2.2	V
trr	Reverse recovery time	Ic= -50A, di/dt= -150A/μs			250	ns

THERMAL RESISTANCE (Tj=25°C, unless otherwise specified)

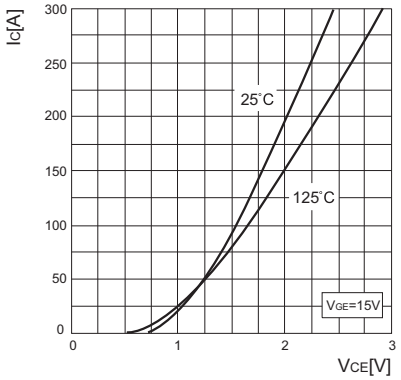
Symbol	Item	Condition	Min.	Typ.	Max.	Units
$R_{th(j-c)}$	Thermal resistance,	Per IGBT	——	——	0.18	°C / W
$R_{th(j-c)}$	Junction to case	Per DIODE	——	——	0.35	
$R_{th(c-h)}$	Contact thermal resistance	——	——	——	0.05	°C / W

MECHANICAL CHARACTERISTICS (Tj=25°C, unless otherwise specified)

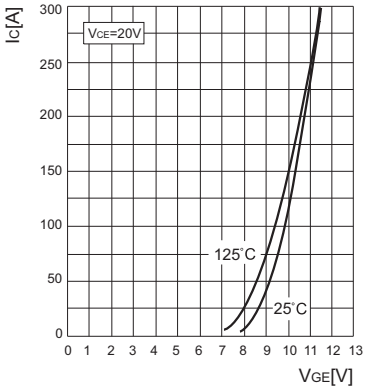
Symbol	Item	Condition	Min.	Typ.	Max.	Units
——	Screw torque	——	2	2.8	3.5	N·m
——	Weight	——	——	370	——	g

CHARACTERISTIC CURVES

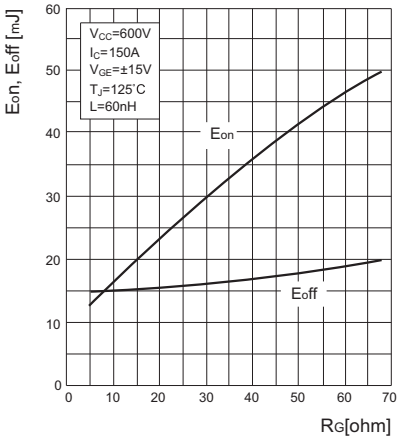
Collector-emitter voltage(V_{CE}) VS collector current(Ic)



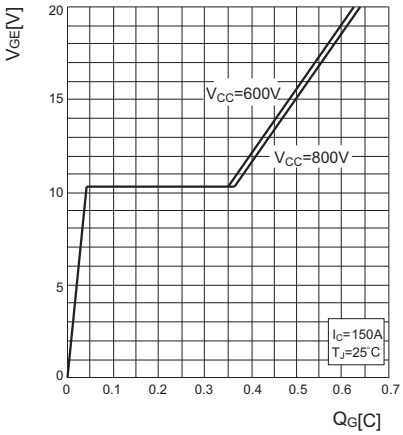
Typ. transfer characteristic



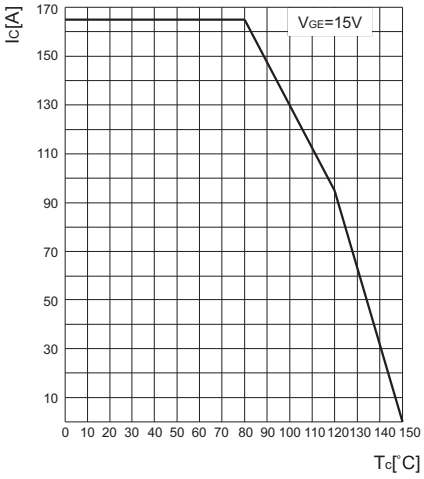
Typ. turn off energy and switching times versus gate resistor



Gate charge curve



Case temperature(Tc)VS collector current(Ic)



HFS29/PM200D120(SA)

MAXIMUM RATINGS (Tj=25˚C, unless otherwise specified)

Symbol	Item	Condition	Rating	Unit
V_{CES}	Collector-emitter voltage	G、E short	1200	V
V_{GES}	Gate-emitter voltage	C、E short	±20	V
Ic	Collector current	Tc=80˚C	205	A
I_{CP}	Peak collector current		400	A
T_{PSC}	Short circuit protection time	V_{CC}=900V; V_{CEM}<1200V $V_{GE}\leqslant$15V; $T_j\leqslant$125˚C	10	s
Viso	Isolation voltage		2500	VAC
Tj	Junction temperature		-40 ~ 150	˚C
Tstg	Storage temperature		-40 ~ 125	˚C
I_F	Diode forward current		200(130)	A
I_{FM}	Diode peak forward current		400	A

ELECTRICAL CHARACTERISTICS (Tj=25˚C, unless otherwise specified)

Symbol	Item	Condition	Min.	Typ.	Max.	Units
I_{CES}	Collector-emitter voltage	V_{GE}=0V, V_{CE}=1200V		0.1	1.0	mA
I_{GES}	Gate-emitter leakage current	V_{GE}=±20V, V_{CE}=0V, T_j=125˚C	–200		200	μA
$V_{GE(th)}$	Gate-emitter threshold voltage	Ic=3mA, V_{CE}=V_{GE}, T_j=25˚C	5	6.2	7	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	Ic=75A, V_{GE}=15V, T_j=25˚C		1.9		V
		Ic=75A, V_{GE}=15V, T_j=125˚C		2.1		V
C_{ies}	Input capacitance	V_{GE}= 0V, V_{CE}=25V, f=1MHz		20		nF
C_{oes}				1.6		
C_{res}				1.0		
Q_G	Total gate charge			2100		nC
R_{Gint}	Resistance			4.5		Ω
E_{on}	Turn on energy	V_{CC}=600V, Ic=75A, R_G=15Ω, T_j=125˚C		24.8		mJ
E_{off}	Turn off energy	V_{GE}=±15V, L=60nH, indutive load		21.6		mJ
$t_{d(on)}$	Turn-on delay time	V_{CC}=600V, Ic=75A		135		ns
tr	Rise time	V_{GE1}=V_{GE2}=±15V,		60		
$t_{d(off)}$	Turn-off delay time	R_G=15Ω		490		
tf	Fall time	indutive load		75		
V_{EC}	Diode forward voltage	Ic= -50A, V_{GE}=0V			2.2	V
trr	Reverse recovery time	Ic= -50A, di/dt= -150A/μs			250	ns

THERMAL RESISTANCE (Tj=25˚C, unless otherwise specified)

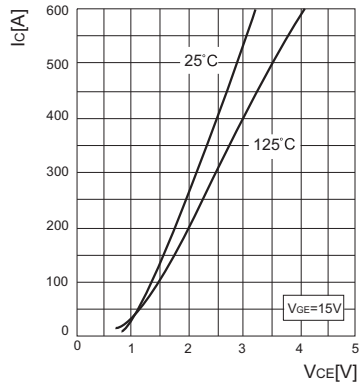
Symbol	Item	Condition	Min.	Typ.	Max.	Units
$R_{th(j-c)}$	Thermal resistance,	per IGBT	——	——	0.11	˚C / W
$R_{th(j-c)}$	Junction to case	per DIODE	——	——	0.32	
$R_{th(c-h)}$	Contact thermal resistance	——	——	——	0.05	˚C / W

MECHANICAL CHARACTERISTICS (Tj=25˚C, unless otherwise specified)

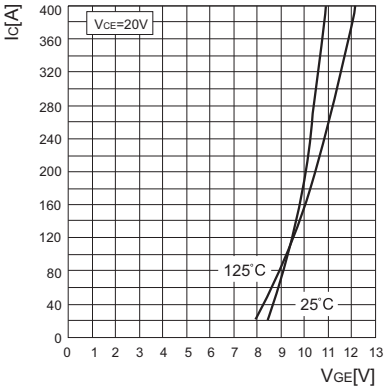
Symbol	Item	Condition	Min.	Typ.	Max.	Units
——	Screw torque	——	2	2.8	3.5	N·m
——	Weight	——	——	370	——	g

CHARACTERISTIC CURVES

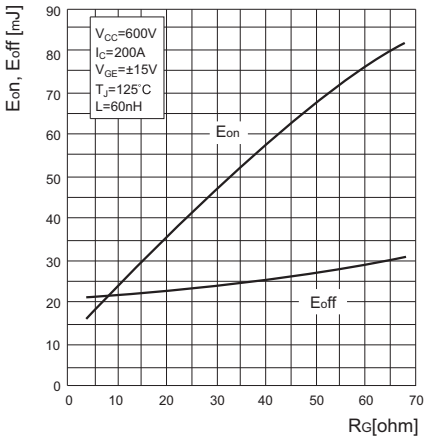
Collector-emitter voltage(V_{CE}) VS collector current(Ic)



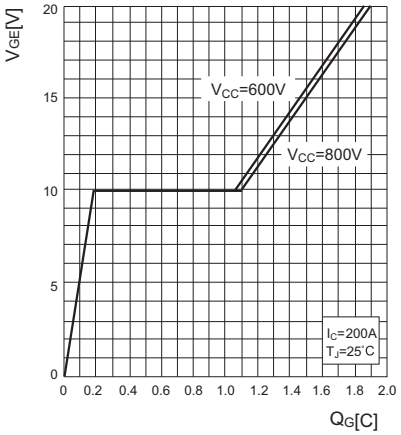
Typ. transfer characteristic



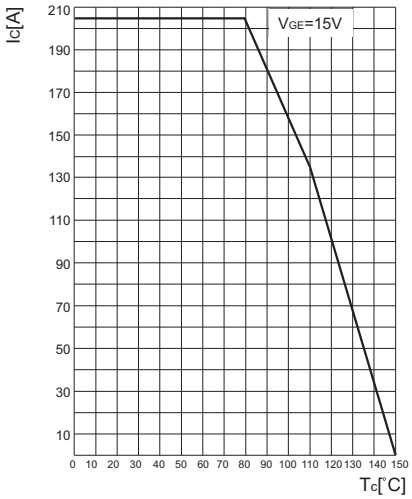
Typ. turn off energy and switching times versus gate resistor



Gate charge curve



Case temperature(Tc) VS collector current(Ic)



HFS29/PM300D120(SA)

MAXIMUM RATINGS (Tj=25°C, unless otherwise specified)

Symbol	Item	Condition	Rating	Unit
V_{CES}	Collector-emitter voltage	G、E short	1200	V
V_{GES}	Gate-emitter voltage	C、E short	±20	V
Ic	Collector current	Tc=80°C	260	A
I_{CP}	Peak collector current		600	A
T_{PSC}	Short circuit protection time	V_{CC}=900V; V_{CEM}<1200V V_{GE}≤15V; Tj≤125°C	10	s
Viso	Isolation voltage		2500	VAC
Tj	Junction temperature		-40 ~ 150	°C
Tstg	Storage temperature		-40 ~ 125	°C
I_F	Diode forward current		300(190)	A
I_{FM}	Diode peak forward current		600	A

ELECTRICAL CHARACTERISTICS (Tj=25°C, unless otherwise specified)

Symbol	Item	Condition	Min.	Typ.	Max.	Units
I_{CES}	Collector-cutoff current	V_{GE}=0V, V_{CE}=1200V		0.1	1.0	mA
I_{GES}	Gate-emitter leakage current	V_{GE}=±20V, V_{CE}=0V, T_j=125°C	–200		200	μA
$V_{GE(th)}$	Gate threshold voltage	Ic=3mA, V_{CE}=V_{GE}, T_j=25°C	5	6.2	7	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	Ic=75A, V_{GE}=15V, T_j=25°C		2.0		V
		Ic=75A, V_{GE}=15V, T_j=125°C		2.3		V
C_{ies}	Input capacitance	V_{GE}= 0V, V_{CE}=25V, f=1MHz		30		nF
C_{oes}				2		
C_{res}				1.6		
Q_G	Total gate charge			3060		nc
R_{Gint}	Resistance			3.5		Ω
E_{on}	Turn on energy	Vcc=600V, Ic=75A, R_G=15Ω, T_j=125°C		33.4		mJ
E_{off}	Turn off energy	V_{GE}=±15V, L=60nH, indutive load		30.6		mJ
$t_{d(on)}$	Turn-on delay time	Vcc=600V, Ic=75A		220		ns
tr	Rise time	V_{GE1}=V_{GE2}=±15V,		60		
$t_{d(off)}$	Turn-off delay time	R_G=15Ω		530		
tf	Fall time	indutive load		75		
V_{EC}	Diode forward voltage	Ic= -50A, V_{GE}=0V			2.2	V
trr	Reverse recovery time	Ic= -50A, di/dt= -150A/μs			250	ns

THERMAL RESISTANCE (Tj=25°C, unless otherwise specified)

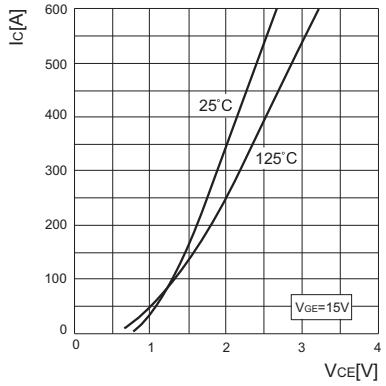
Symbol	Item	Condition	Min.	Typ.	Max.	Units
$R_{th(j-c)}$	Thermal resistance,	per IGBT	——	——	0.09	°C / W
$R_{th(j-c)}$	Junction to case	per DIODE	——	——	0.24	
$R_{th(c-h)}$	contact thermal resistance	——	——	——	0.05	°C / W

MECHANICAL CHARACTERISTICS (Tj=25°C, unless otherwise specified)

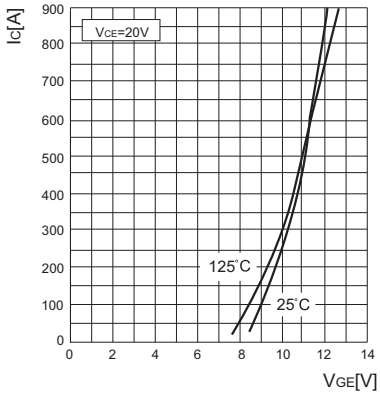
Symbol	Item	Condition	Min.	Typ.	Max.	Units
——	Screw torque	——	2.0	2.8	3.5	N·m
——	Weight	——	——	370	——	g

CHARACTERISTIC CURVES

Collector-emitter voltage(V_{CE}) VS collector current(Ic)



Typ. transfer characteristic



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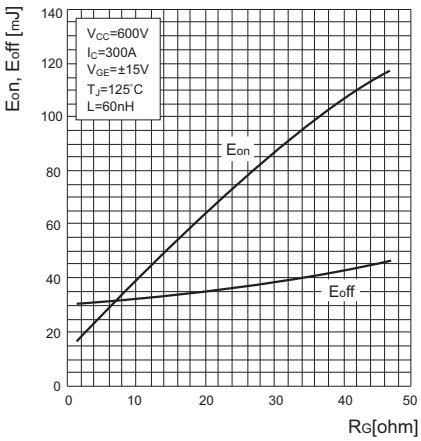
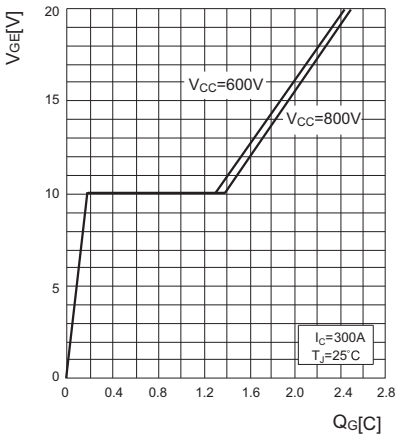
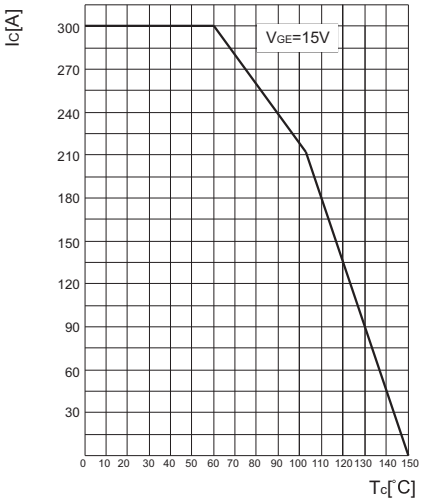


Gate charge curve



Case temperature(Tc)VS collector current(Ic)



Disclaimer

This datasheet is for the customers' reference. All the specifications are subject to change without notice.
We could not evaluate all the performance and all the parameters for every possible application. Thus the user should be in a right position to choose the suitable product for their own application. If there is any query, please contact Hongfa for the technical service. However, it is the user's responsibility to determine which product should be used only.