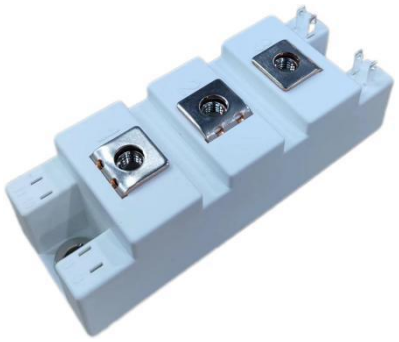
1200V 100A CoolFAST™ IGBT7 Power Module

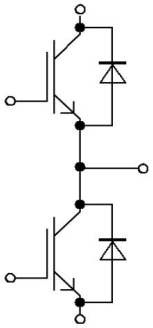
Electrical Features:

- 1200V 100A, $V_{CE(sat)}$ =1.7V@25°C
- High RBSOA Capability
- Trench/FS Technology
- Low Reverse-recovery Losses
- High SC Capability



Applications:

- Motor Drives
- Solar Applications
- UPS Systems
- Commercial Electric Vehicles
- Wind Turbines



Equivalent circuit

Mechanical Features:

- High Power and Thermal Cycling Capability
- Maximum Junction Temperature 175℃
- High Power Density
- PressFIT Contact Technology
- Isolated Base Plate

Maximum Ratings and Characteristics

Absolute Maximum Ratings at T_c= 25°C (unless otherwise specified)

Items	Symbols	Values	Units	Remarks
Collector-Emitter voltage	V_{CES}	1200	V	
Gate-Emitter voltage	V_{GES}	±30	V	
DC Collector Current	I_C	100	A	T_C= 100°C
Pulsed Collector Current	I_{CP}	200	A	Note *1
Diode Forward Current	I_F	100	A	
Repetitive Peak Forward Current	I_{FRM}	200	A	
Operating Junction Temperature	T_{vj}	-40 ~ +150	°C	
Storage Temperature	T_{stg}	-40 ~ +125	°C	

Note *1 : Pulse width limited by T_{vjmax}.

Electrical characteristics (unless otherwise specified)

IGBT, Inverter

Description	Symbols	Conditions		Values			Unit
				Min	Typ	Max	
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}= 1200V, V_{GE}= 0V T_{vj}= 25°C				200	μA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}= 0V, V= 20V, T_{vj}= 25°C				±300	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE}= V_{GE}, I_C= 100mA		6.2	6.7	7.2	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}= 15V I_C= 100A	T_{vj}= 25°C		1.7	2.2	V
			T_{vj}= 125°C		2.08		
			T_{vj}= 150°C		2.14		
Input Capacitance	C_{ies}	V_{CE}= 25V, V_{GE}= 0V f= 1MHz			25		nF
Reverse Transfer Capacitance	C_{res}				0.13		nF
Gate Charge	Q_G	V_{CC}= 600V, V_{GE}= 15V			950		nC
Internal Gate Resistor	R_{Gint}	T_{vj}= 25°C			3.0		Ω
Turn-On Delay Time, Inductive load	$t_{d(on)}$	V_{CC}= 600V I_C= 100A V_{GE}= 15V R_G= 10Ω	T_{vj}= 25°C		0.21		μs
			T_{vj}= 125°C		0.25		
			T_{vj}= 150°C		0.26		
Rise Time, Inductive load	t_r		T_{vj}= 25°C		0.09		μs
			T_{vj}= 125°C		0.10		
			T_{vj}= 150°C		0.11		
Turn-Off Delay Time, Inductive load	$t_{d(off)}$		T_{vj}= 25°C		0.29		μs
			T_{vj}= 125°C		0.30		
			T_{vj}= 150°C		0.31		
Fall Time, Inductive load	t_f		T_{vj}= 25°C		0.15		μs
			T_{vj}= 125°C		0.21		
			T_{vj}= 150°C		0.22		
Turn-On Energy	E_{on}		T_{vj}= 25°C		6.38		mJ
			T_{vj}= 125°C		12.02		
			T_{vj}= 150°C		13.29		
Turn-Off Energy	E_{off}		T_{vj}= 25°C		5.26		mJ
			T_{vj}= 125°C		6.19		
			T_{vj}= 150°C		6.50		
SC Data	I_{SC}	V_{CC}= 600V R_G= 20Ω V_{GE}≤ 15V V_{CEmax}=V_{CE}-L_{SCE}*di/dt	t_P≤ 10μs T_{vj}= 150°C		400		A

Diode, Inverter

Description	Symbols	Conditions		Values			Unit
				Min	Typ	Max	
Forward Voltage	V_F	I_F= 100A V_{GE}= 0V	T_{vj}= 25°C		2.04	2.5	V
			T_{vj}= 125°C		1.63		
			T_{vj}= 150°C		1.56		
Recovery Charge	Q_r	I_F= 100A,V_R= 600V -di_F/dt= 1200A/us V_{GE}= -15V	T_{vj}= 25°C		4.35		µC
			T_{vj}= 125°C		12.36		
			T_{vj}= 150°C		15.31		
Reverse Recovery Energy	E_{rec}	I_F= 100A, V_R= 600V -di_F/dt=1200A/us V_{GE}= -15V	T_{vj}= 25°C		1.81		mJ
			T_{vj}= 125°C		4.41		
			T_{vj}= 150°C		5.52		

Thermal resistance

Items	Symbols	Values			Unit
		Min	Typ	Max	
Thermal Resistance, Per IGBT Junction to Case	$R_{th(j-c)}$			0.15	K/W
Thermal Resistance, Per Diodes Junction to Case	$R_{th(j-c)}$			0.25	

Module

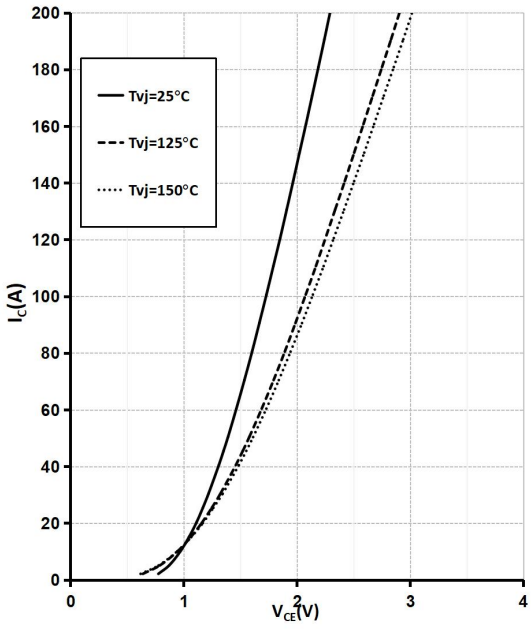
Description	Symbols	Conditions	Values	Unit
Isolation Test Voltage	V_{ISOL}	RMS, f =50Hz, t= 1min	4.0	KV
Material of Module Base plat			Cu	
Internal Isolation			Al_2O_3	
Creepage Distance	d_{Creep}	Terminal to terminal	20.1	mm
Clearance	d_{Clear}	Terminal to terminal	9.5	mm
Comparative Tracking Index	CTI		200	

Description	Symbols	Conditions	Values			Unit
			Min	Typ	Max	
Stray Inductance Module	L_{sCE}			29.2		nH
Module Lead Resistance，Terminals-Chip	$R_{CC'+EE'}$	T_C= 25°C，Per switch		0.66		mΩ
Mounting Torque for Module Mounting	M	Screw M5	3.0		5.0	Nm
Weight	G			156		g

Output characteristic (typical), IGBT, Inverter

$I_C = f(V_{CE})$

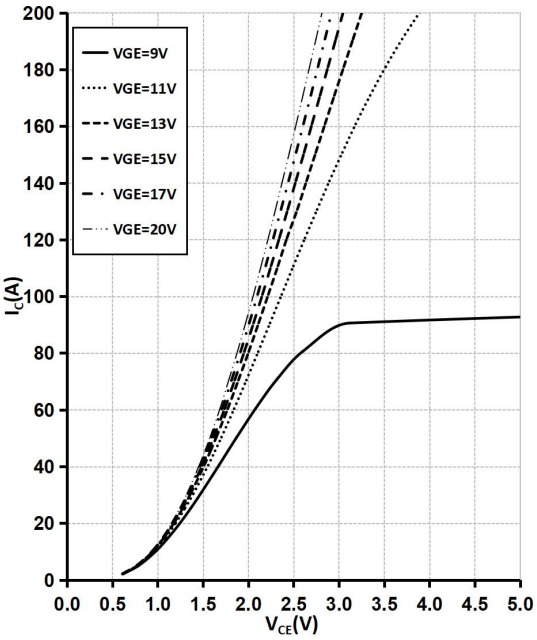
V_{GE}= 15V



Output characteristic (typical), IGBT, Inverter

$I_C = f(V_{CE})$

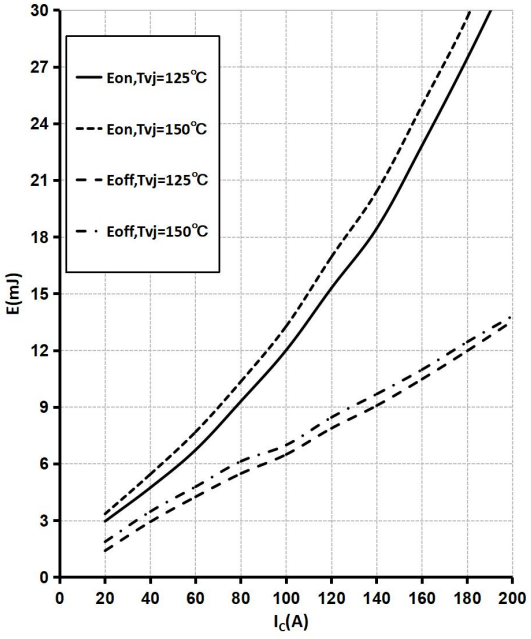
T_{vj}= 150°C



Switching losses (typical), IGBT, Inverter

$E = f(I_C)$

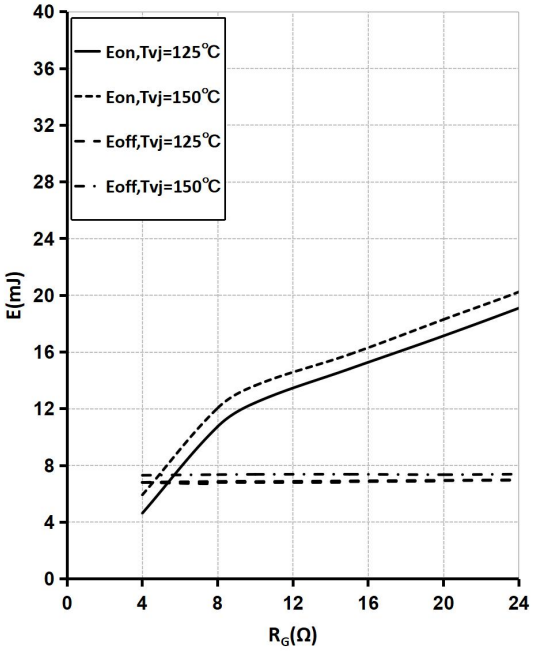
R_{Goff}= 10Ω, R_{Gon}=10Ω, V_{GE}= ±15V, V_{CC}= 600V



Switching losses (typical), IGBT, Inverter

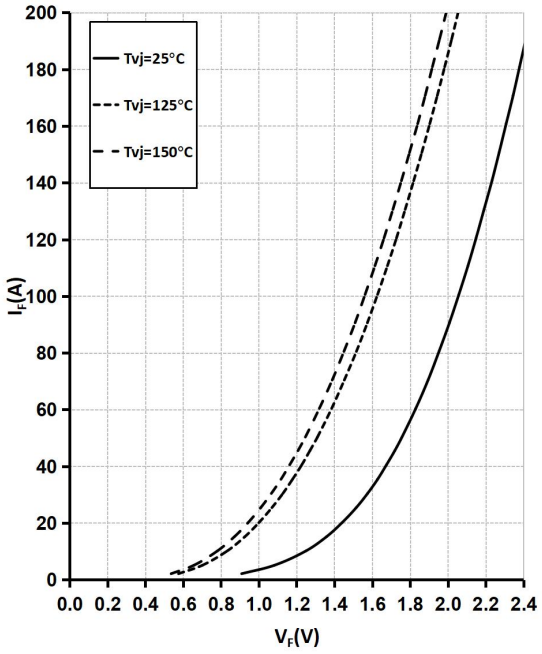
$E = f(R_G)$

V_{GE}= 15V, I_C= 100A, V_{CC}= 600V



Forward characteristic (typical), Diode, Inverter

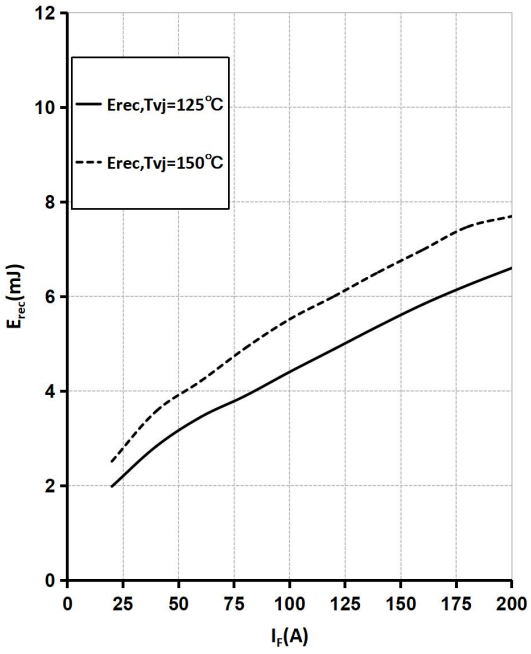
$I_F = f(V_f)$



Switching losses (typical), Diode, Inverter

$E_{rec} = f(I_F)$

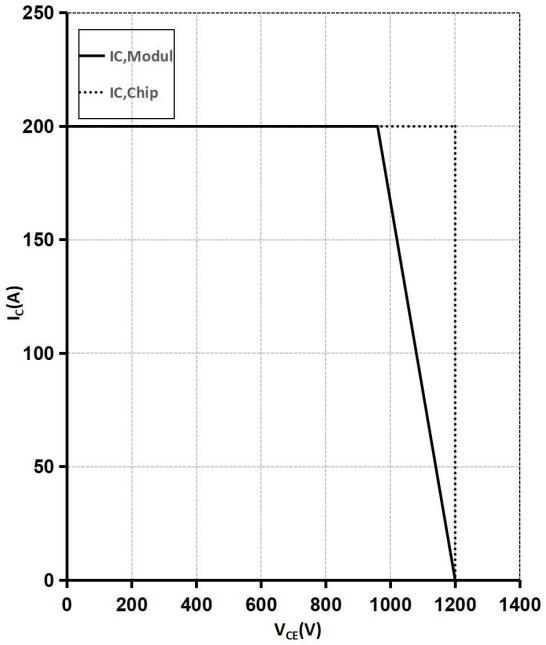
$R_{Gon} = 10\Omega, V_{CC} = 600V$



Reverse bias safe operating area (RBSOA), IGBT, Inverter

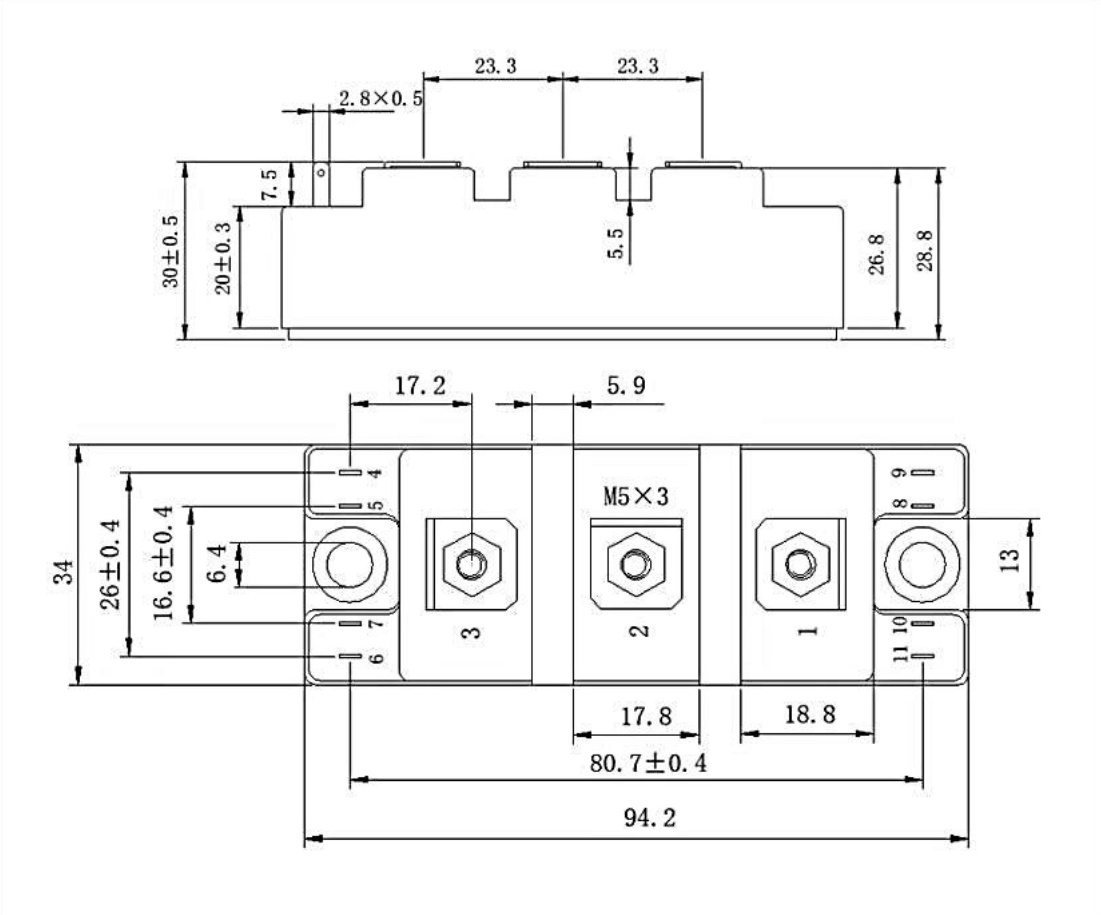
$I_C = f(V_{CE})$

$R_{Goff} = 10\Omega$, $V_{GE} = \pm 15V$, $T_{vj} = 150°C$

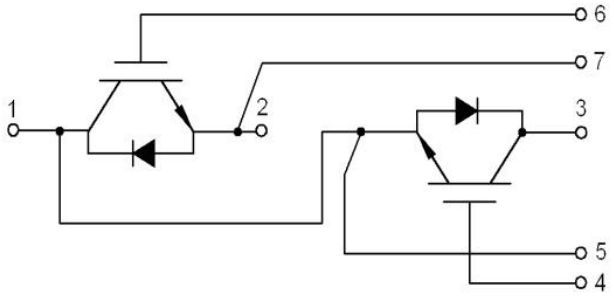


Package Dimension

Dimensions in Millimeters



Internal Circuit



Revision History

Revision	Date	Subjects (major changes since last revision)
0.1	2023-04-25	Preliminary version
1.0	2023-11-23	MP version

The information given herein shall be not regarded as a guarantee of conditions or characteristics . For any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Drvtek hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given herein is subject to customer's compliance with its obligations stated herein and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Drvtek in customer's applications.

The data contained herein is exclusively intended for technically trained staff. It is the responsibility of customer to evaluate the suitability of the product for the intended application and the completeness of the product information given herein for such application.

For further information on the product, technology, delivery, conditions and prices please contact Drvtek (www.Drvtek.com).

Warnings
Due to technical requirements products may contain dangerous substances. For information on the types in question please contact Drvtek.

Except as otherwise approved by Drvtek in a written document, Drvtek products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.