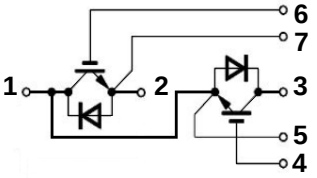
General Description

TRinno IGBT power module provides low conduction and switching losses as well as short circuit ruggedness. It is designed for applications such as Motor Driver, IH , Rectifier and Welder.

Features

- 1200V Field Stop Trench IGBT Technology
- Fast & Soft Recovery Diodes
- Positive Temperature Coefficient
- Short Circuit Withstanding Time : 10μs



Applications

Motor driver, IH(Induction heating), Rectifier, Welder

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	±20	V
Continuous Collector Current	T_C = 25 ℃	I_C	300	A
	T_C = 100 ℃		150	A
Pulsed Collector Current (Note 1)		I_{CM}	300	A
Diode Continuous Forward Current	T_C = 100 ℃	I_F	150	A
Power Dissipation	T_C = 25 ℃	P_D	543	W
	T_C = 100 ℃		217	W
Operating Junction Temperature		T_{vj}	-40 ~ 150	℃
Storage Temperature Range		T_{STG}	-40 ~ 150	℃

Notes :
(1) Repetitive rating : Pulse width limited by maximum junction temperature

Thermal Characteristics

Parameter	Symbol	Value	Unit
Maximum Thermal resistance, Junction-to-Case (Per ½ Module)	$R_{\theta JC}$ (IGBT)	0.23	K/W
Maximum Thermal resistance, Junction-to-Case (Per ½ Module)	$R_{\theta JC}$ (DIODE)	0.27	K/W

Electrical Characteristics of the IGBT T_{vj}=25℃, unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
OFF						
Collector – Emitter Breakdown Voltage	BV_{CES}	V_{GE} = 0V, I_C = 1mA	1200	--	--	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V	--	--	2	mA
Gate – Emitter Leakage Current	I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V	--	--	± 200	nA
ON						
Gate – Emitter Threshold Voltage	$V_{GE(TH)}$	V_{GE} = V_{CE}, I_C = 150mA	5.0	--	8.0	V
Collector – Emitter Saturation Voltage	$V_{CE(SAT)}$	V_{GE} = 15V, I_C = 150A, T_{vj} = 25 ℃	--	2.0	2.5	V
		V_{GE} = 15V, I_C = 150A, T_{vj} = 125 ℃	--	2.3		V
DYNAMIC						
Input Capacitance	C_{IES}	V_{CE} = 25V, V_{GE} = 0V f = 1MHz	--	16	--	nF
Output Capacitance	C_{OES}		--	370	--	pF
Reverse Transfer Capacitance	C_{RES}		--	626	--	pF
SWITCHING						
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 150A R_G = 2Ω, V_{GE} = ±15V Inductive Load, T_{vj} = 25 ℃	--	45	--	ns
Rise Time	t_r		--	166	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	211	--	ns
Fall Time	t_f		--	84	--	ns
Turn-On Switching Loss	E_{ON}		--	17.1	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	8.1	--	mJ
Total Switching Loss	E_{TS}		--	25.2	--	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 150A R_G = 2Ω, V_{GE} = ±15V Inductive Load, T_{vj} = 125 ℃	--	48	--	ns
Rise Time	t_r		--	178	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	231	--	ns
Fall Time	t_f		--	116	--	ns
Turn-On Switching Loss	E_{ON}		--	21.9	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	10.2	--	mJ
Total Switching Loss	E_{TS}		--	32.1	--	mJ
Total Gate Charge	Q_g	V_{CC} = 600V, I_C = 150A V_{GE} = 15V	--	1031	--	nC
Gate-Emitter Charge	Q_{ge}		--	99	--	nC
Gate-Collector Charge	Q_{gc}		--	559	--	nC
Short Circuit Withstanding Time	t_{SC}	V_{CC} = 600V, V_{GE} = 15V, T_{vj} = 125 ℃	10	--	--	μs

Electrical Characteristics of the DIODE T_{vj}=25℃, unless otherwise noted

Parameter	Symbol	Test condition		Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{FM}	I_F = 150A	T_{vj} = 25 ℃	--	2.3	2.8	V
			T_{vj} = 125 ℃	--	2.2	2.7	
Reverse Recovery Current	I_{rr}	V_{CC} = 600V, I_F = 150A R_G = 2Ω, V_{GE} = ±15V Inductive Load	T_{vj} = 25 ℃	--	92	--	A
			T_{vj} = 125 ℃	--	97	--	
Reverse Recovery Charge	Q_{rr}		T_{vj} = 25 ℃	--	8.1	--	μC
			T_{vj} = 125 ℃	--	12.3	--	
Reverse Recovery Time	t_{rr}		T_{vj} = 25 ℃	--	229	--	ns
			T_{vj} = 125 ℃	--	332	--	

Characteristics of the Module

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Isolation Voltage	V_{ISO}	RMS, f=50Hz, t=1 minutes	--	2.5	--	kV
Terminal mounting torque (M5)	--		2.5	--	5.0	N.m
Weight	--		--	155	--	g

IGBT Characteristics

Fig. 1 Output characteristics

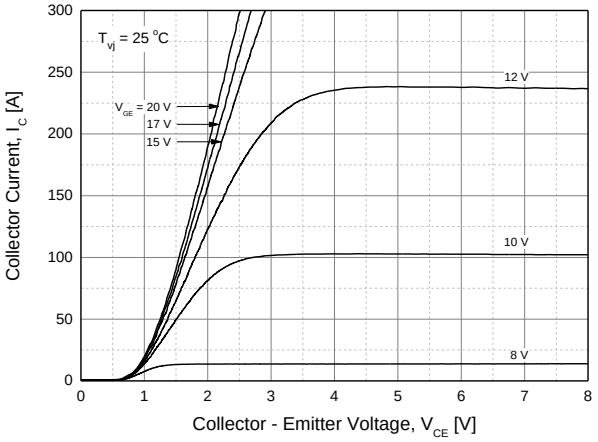


Fig. 2 Saturation voltage characteristics

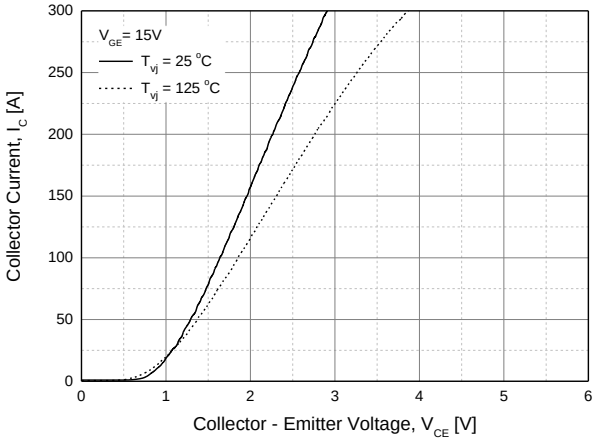


Fig. 3 Switching loss vs. gate resistor

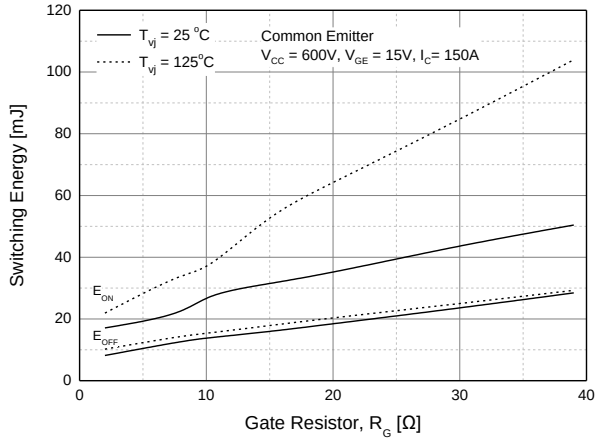


Fig. 4 Switching loss vs. collector current

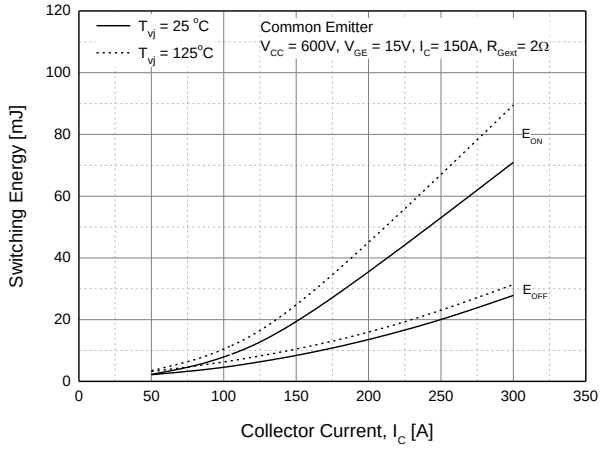


Fig. 5 Transient thermal impedance of IGBT

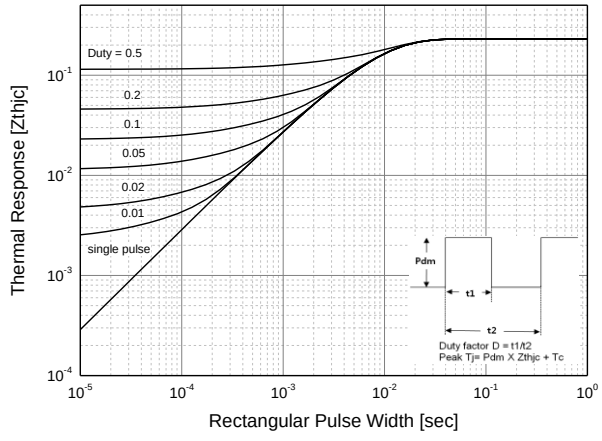
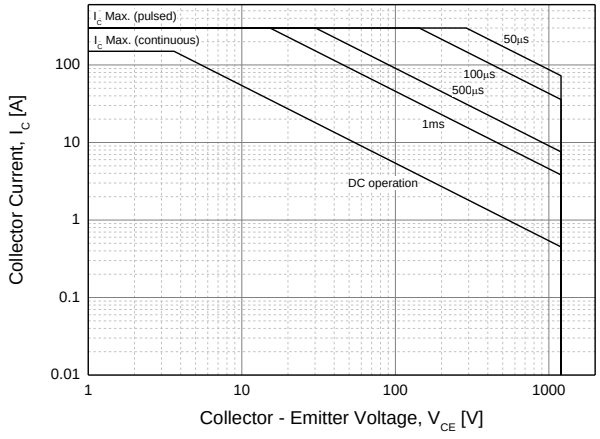


Fig. 6 SOA



IGBT Characteristics

Fig. 7 RBSOA

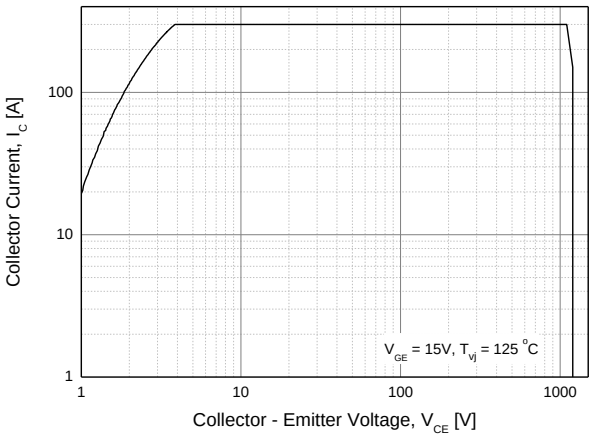


Fig. 8 Load current vs. frequency

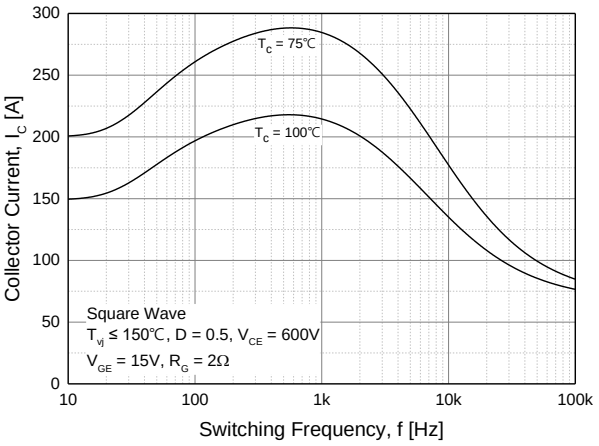
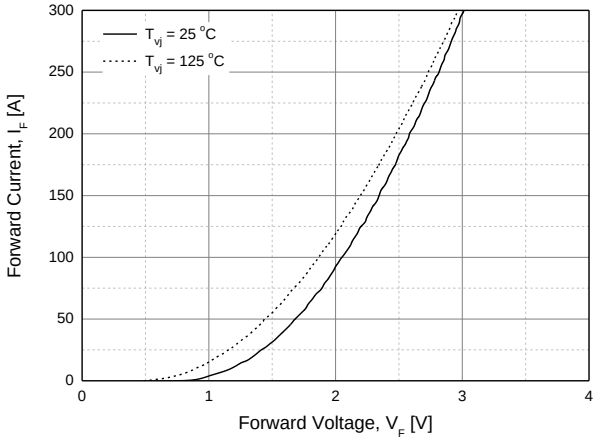
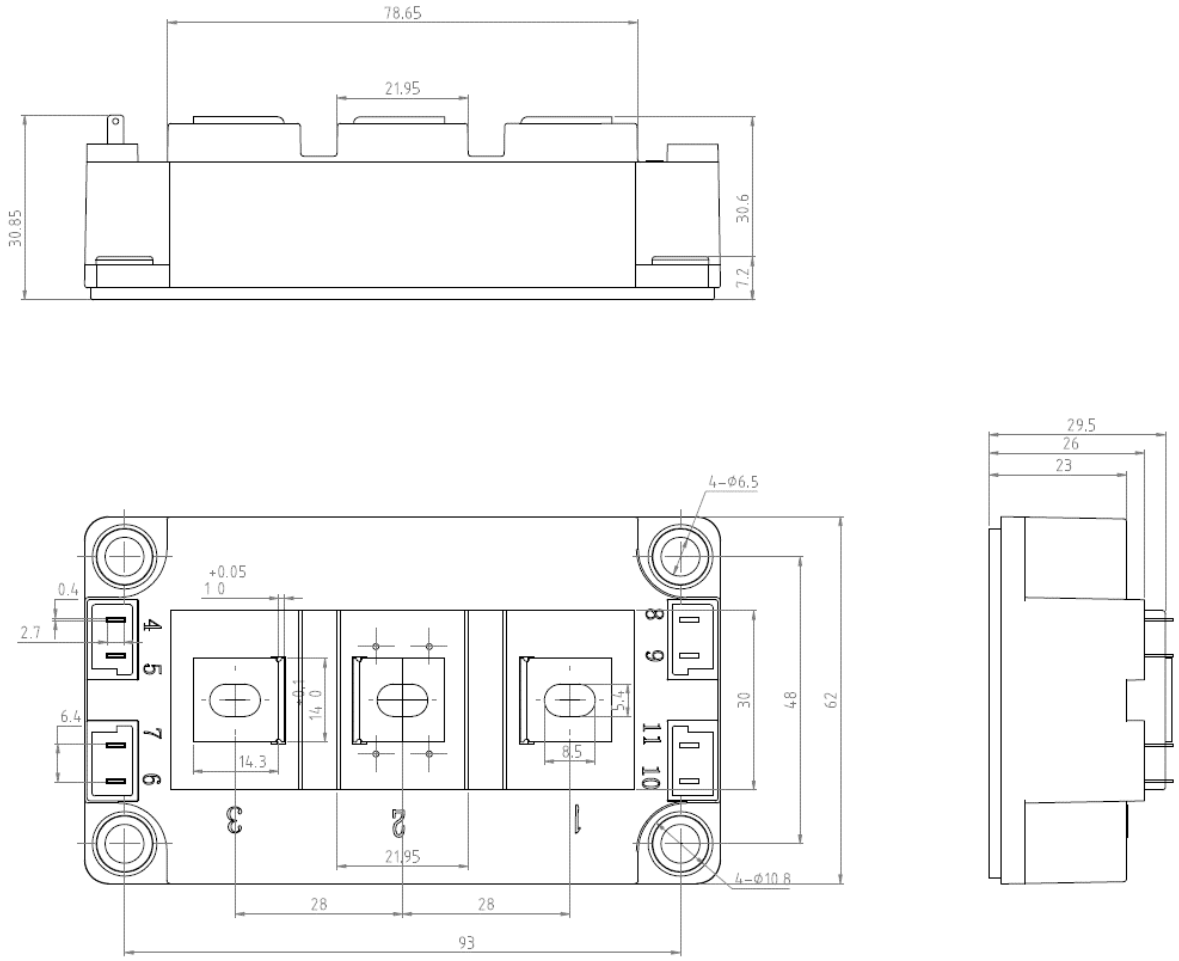


Fig. 9 Conduction characteristics of diode



Package Outline (Dimension in mm)



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