

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.

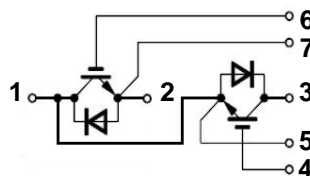
Features

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



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	I_C	$T_C = 25\text{ }^\circ\text{C}$	200
		$T_C = 100\text{ }^\circ\text{C}$	100
Pulsed Collector Current (Note 1)	I_{CM}	200	A
Diode Continuous Forward Current	I_F	100	A
Power Dissipation	P_D	$T_C = 25\text{ }^\circ\text{C}$	658
		$T_C = 100\text{ }^\circ\text{C}$	263
Operating Junction Temperature	T_{vj}	-40 ~ 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-40 ~ 150	$^\circ\text{C}$

Notes :

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

Thermal Characteristics

Parameter	Symbol	Value	Unit
Maximum Thermal resistance, Junction-to-Case (Per 1/2 Module)	$R_{\theta JC}$ (IGBT)	0.19	K/W
Maximum Thermal resistance, Junction-to-Case (Per 1/2 Module)	$R_{\theta JC}$ (DIODE)	0.75	K/W

Electrical Characteristics of the IGBT $T_{vj}=25^{\circ}\text{C}$, 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}	$V_{CE} = 1200V, V_{GE} = 0V$	--	--	1	mA
Gate – Emitter Leakage Current	I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$	--	--	± 100	nA
ON						
Gate – Emitter Threshold Voltage	$V_{GE(TH)}$	$V_{GE} = V_{CE}, I_C = 100mA$	5.0	--	8.0	V
Collector – Emitter Saturation Voltage	$V_{CE(SAT)}$	$V_{GE} = 15V, I_C = 100A, T_{vj} = 25^{\circ}\text{C}$	--	2.0	2.5	V
		$V_{GE} = 15V, I_C = 100A, T_{vj} = 125^{\circ}\text{C}$	--	2.3		V
DYNAMIC						
Input Capacitance	C_{IES}	$V_{CE} = 25V,$ $V_{GE} = 0V$ $f = 1MHz$	--	9.5	--	nF
Output Capacitance	C_{OES}		--	530	--	pF
Reverse Transfer Capacitance	C_{RES}		--	70	--	pF
SWITCHING						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 100A$ $R_G = 5\Omega, V_{GE} = \pm 15V$ Inductive Load, $T_{vj} = 25^{\circ}\text{C}$	--	70	--	ns
Rise Time	t_r		--	77	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	195	--	ns
Fall Time	t_f		--	58	--	ns
Turn-On Switching Loss	E_{ON}		--	7.0	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	3.7	--	mJ
Total Switching Loss	E_{TS}		--	10.7	--	mJ
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 100A$ $R_G = 5\Omega, V_{GE} = \pm 15V$ Inductive Load, $T_{vj} = 125^{\circ}\text{C}$	--	60	--	ns
Rise Time	t_r		--	66	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	190	--	ns
Fall Time	t_f		--	68	--	ns
Turn-On Switching Loss	E_{ON}		--	10.7	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	5.5	--	mJ
Total Switching Loss	E_{TS}		--	16.2	--	mJ
Total Gate Charge	Q_g	$V_{CC} = 600V, I_C = 50A$ $V_{GE} = 15V$	--	725	--	nC
Gate-Emitter Charge	Q_{ge}		--	128	--	nC
Gate-Collector Charge	Q_{gc}		--	330	--	nC
Short Circuit Withstanding Time	t_{SC}	$V_{CC} = 600V, V_{GE} = 15V, T_{vj} = 125^{\circ}\text{C}$	10	--	--	μs

Electrical Characteristics of the DIODE $T_{vj}=25^{\circ}\text{C}$, unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit	
Diode Forward Voltage	V_{FM}	$I_F = 100\text{A}$	$T_{vj} = 25^{\circ}\text{C}$	--	2.3	2.8	V
			$T_{vj} = 125^{\circ}\text{C}$	--	2.2	2.7	
Reverse Recovery Current	I_{rr}	$V_{CC} = 600\text{V}, I_F = 100\text{A}$ $R_G = 5\Omega, V_{GE} = \pm 15\text{V}$ Inductive Load	$T_{vj} = 25^{\circ}\text{C}$	--	61	--	A
			$T_{vj} = 125^{\circ}\text{C}$	--	74	--	
Reverse Recovery Charge	Q_{rr}		$T_{vj} = 25^{\circ}\text{C}$	--	4.7	--	μC
			$T_{vj} = 125^{\circ}\text{C}$	--	9.8	--	
Reverse Recovery Time	t_{rr}		$T_{vj} = 25^{\circ}\text{C}$	--	130	--	ns
			$T_{vj} = 125^{\circ}\text{C}$	--	175	--	

Characteristics of the Module

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

IGBT Characteristics

Fig. 1 Output characteristics

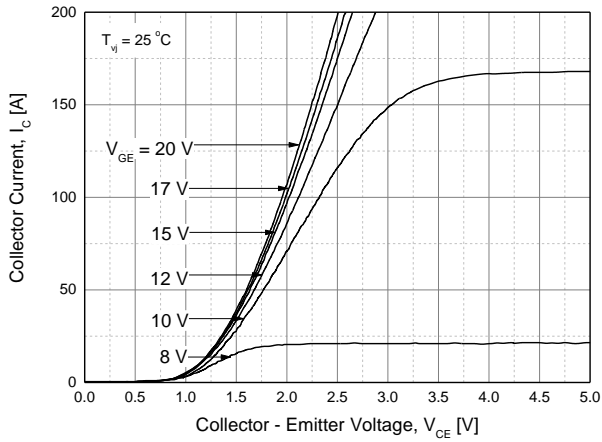


Fig. 2 Saturation voltage characteristics

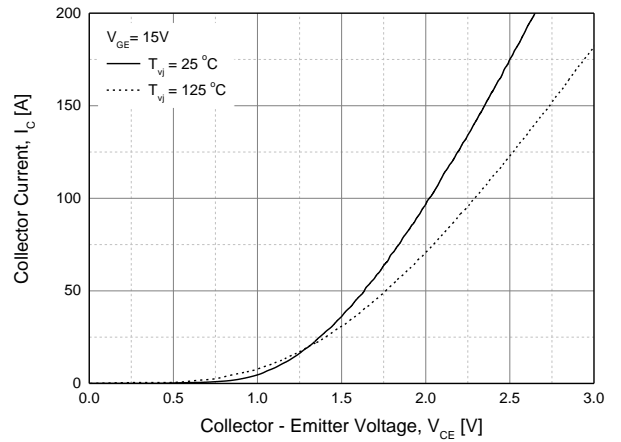


Fig. 3 Switching loss vs. gate resistor

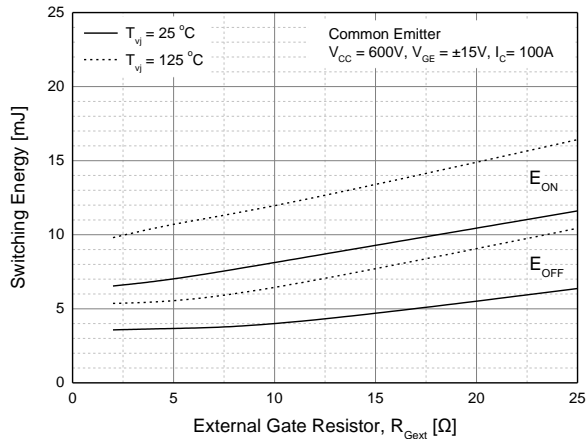


Fig. 4 Switching loss vs. collector current

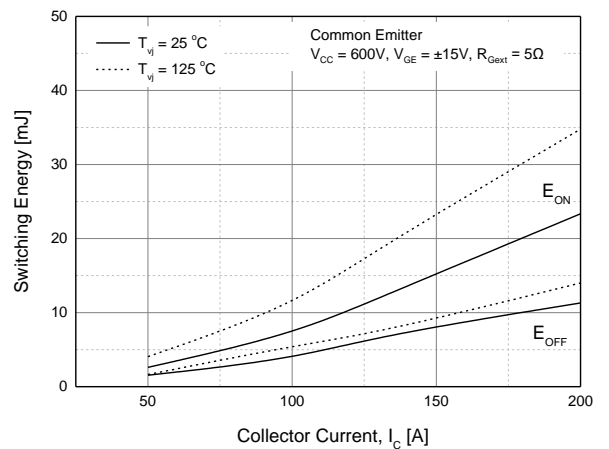


Fig. 5 Transient thermal impedance of IGBT

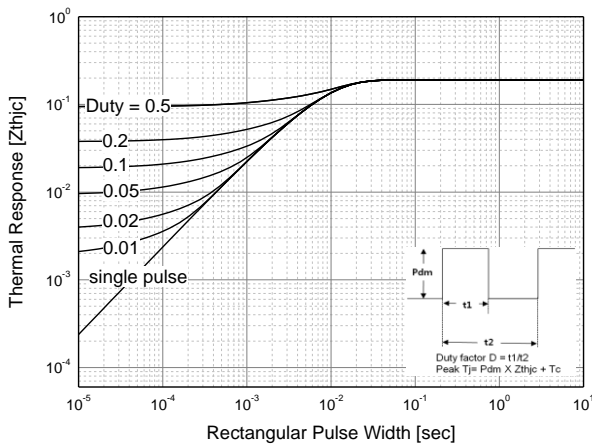
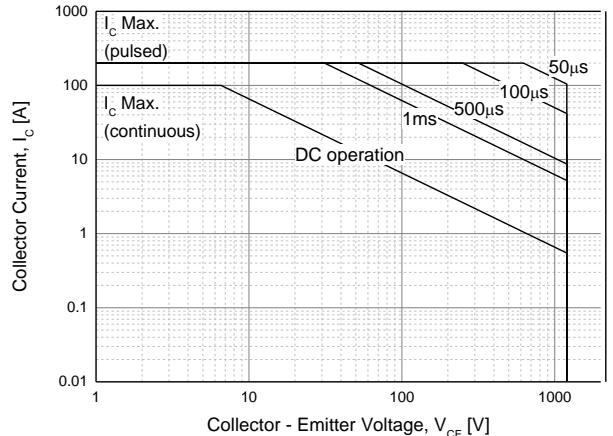


Fig. 6 SOA



IGBT Characteristics

Fig. 7 RBSOA

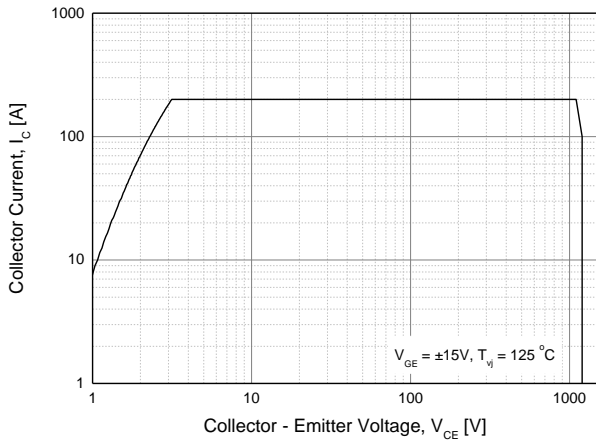


Fig. 8 Load current vs. frequency

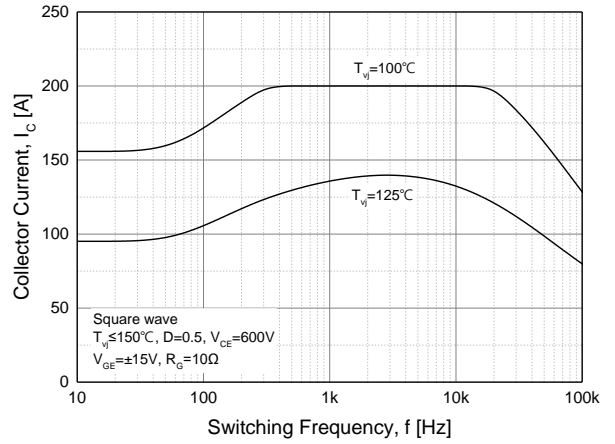
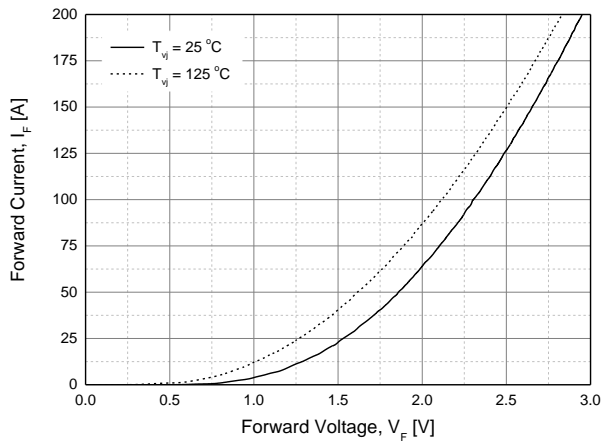
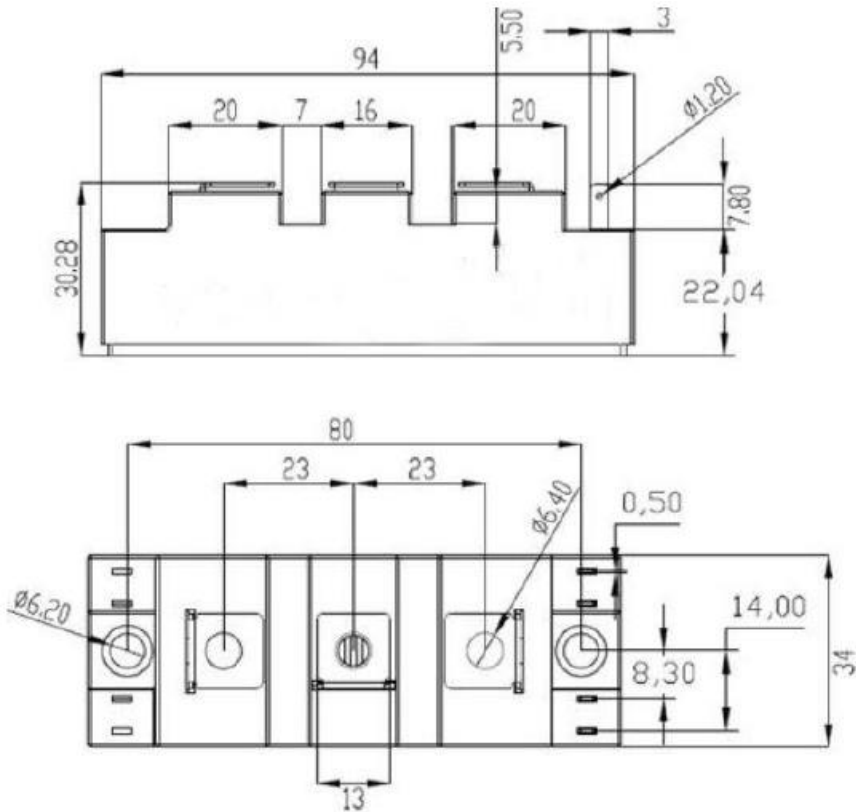


Fig. 9 Conduction characteristics of diode



Package Outline (Dimension in mm)



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