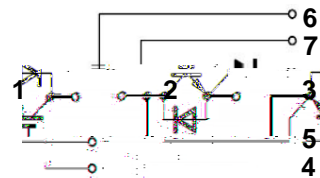


General Description

TRinno IGBT power module provides low conduction Loss, low switching loss and 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 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	$T_C = 25$	900	A
		$T_C = 100$	450	A
Pulsed Collector Current (Note 1)	I_{CM}	900	A	
Diode Continuous Forward Current	I_F	450	A	
Power Dissipation	P_D	$T_C = 25$	2083	W
		$T_C = 100$	833	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
Typical Thermal resistance, Junction-to-Case (Per Module)		0.06	K/W
Typical Thermal resistance, Junction-to-Case (Per ½ Module)		0.11	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}	$V_{CE} = 1200V, V_{GE} = 0V$	--	--	3	mA
Gate Emitter Leakage Current	I_{GES}	$V_{CE} = 0V, V_{GE} = 20V$	--	--	300	nA
ON						
Gate Emitter Threshold Voltage	$V_{GE(TH)}$	$V_{GE} = V_{CE}, I_C = 250 A$	3.5	--	7.0	V
		$V_{GE} = V_{CE}, I_C = 450mA$	5.0	--	8.5	V
Collector Emitter Saturation Voltage	$V_{CE(SAT)}$	$V_{GE} = 15V, I_C = 450A, T_{vj} = 25$	--	1.8	2.2	V
		$V_{GE} = 15V, I_C = 450A, T_{vj} = 125$	--	2.0	2.4	V
DYNAMIC						
Internal Gate Resistor	R_{Gint}	$T_{vj} = 25$	--	3.3	--	
Input Capacitance	C_{IES}	$V_{CE} = 25V,$ $V_{GE} = 0V$ $f = 1MHz$	--	60	--	nF
Output Capacitance	C_{OES}		--	3000	--	pF
Reverse Transfer Capacitance	C_{RES}		--	1500	--	pF
SWITCHING						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 450A$ $R_{Gext} = 2, V_{GE} = 15V$ Inductive Load, $T_{vj} = 25$	--	400	--	ns
Rise Time	t_r		--	160	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	960	--	ns
Fall Time	t_f		--	130	--	ns
Turn-On Switching Loss	E_{ON}		--	23.9	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	51.7	--	mJ
Total Switching Loss	E_{TS}		--	75.6	--	mJ
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 450A$ $R_{Gext} = 2, V_{GE} = 15V$ Inductive Load, $T_{vj} = 125$	--	360	--	ns
Rise Time	t_r		--	180	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	1050	--	ns
Fall Time	t_f		--	95	--	ns
Turn-On Switching Loss	E_{ON}		--	48.7	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	56.4	--	mJ
Total Switching Loss	E_{TS}		--	105.1	--	mJ
Total Gate Charge	Q_g	$V_{CC} = 600V, I_C = 450A$ $V_{GE} = 15V$	--	4250	--	nC
Gate-Emitter Charge	Q_{ge}		--	650	--	nC
Gate-Collector Charge	Q_{gc}		--	2100	--	nC
Short Circuit Withstanding Time	t_{sc}	$V_{CC} = 600V, V_{GE} = 15V, T_{vj} = 125$	10	--	--	s

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

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit	
Diode Forward Voltage	V_{FM}	$I_F = 450A$	$T_{vj}=25$	--	1.75	2.55	V
			$T_{vj}=125$	--	1.85	2.65	
Reverse Recovery Current	I_{rr}	$V_{CC} = 600V, I_F = 450A$ $R_{Gext} = 2$, $V_{GE} = 15V$ Inductive Load	$T_{vj}=25$	--	260	--	A
			$T_{vj}=125$	--	278	--	
Reverse Recovery Charge	Q_{rr}	$V_{CC} = 600V, I_F = 450A$ $R_{Gext} = 2$, $V_{GE} = 15V$ Inductive Load	$T_{vj}=25$	--	38.0	--	C
			$T_{vj}=125$	--	46.0	--	
Reverse Recovery Time	t_{rr}	$V_{CC} = 600V, I_F = 450A$ $R_{Gext} = 2$, $V_{GE} = 15V$ Inductive Load	$T_{vj}=25$	--	290	--	ns
			$T_{vj}=125$	--	330	--	

Characteristics of the Module

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Isolation Voltage	V_{ISO}	RMS, f=50 Hz, t=1 min	--	2.5	--	kV
Terminal mounting torque (M5)	--		--	3.5	--	N.m
Weight	--		--	290	--	g

IGBT Characteristics

Fig. 1 Output characteristics



Fig. 2 Saturation voltage characteristics

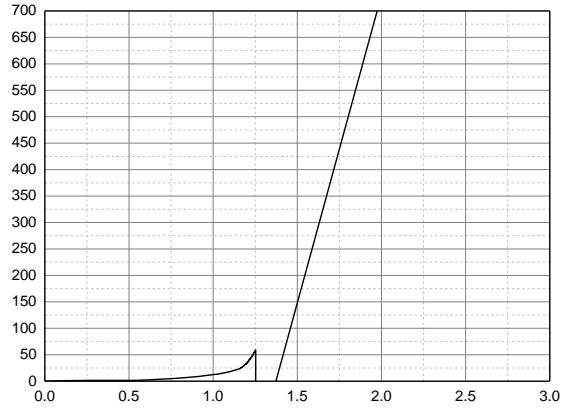


Fig. 3 Turn-on time vs. gate resistor

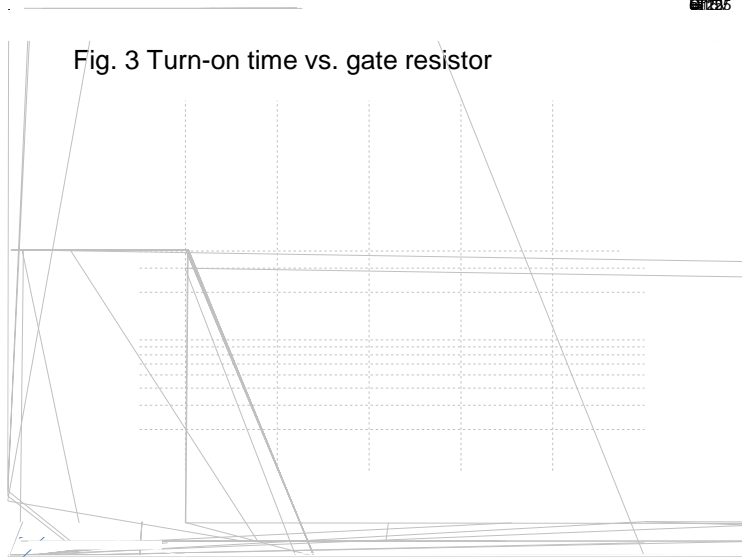


Fig. 5 Switching loss vs. gate resistor

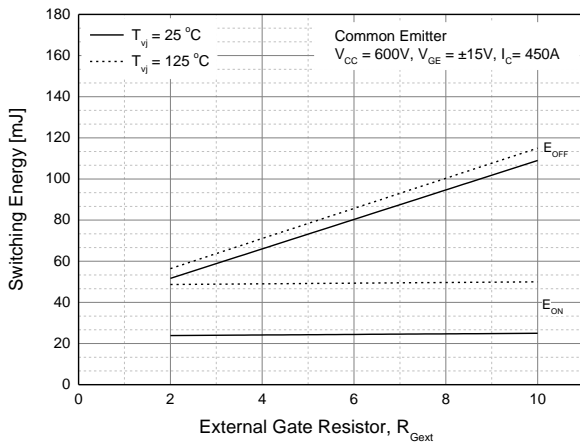
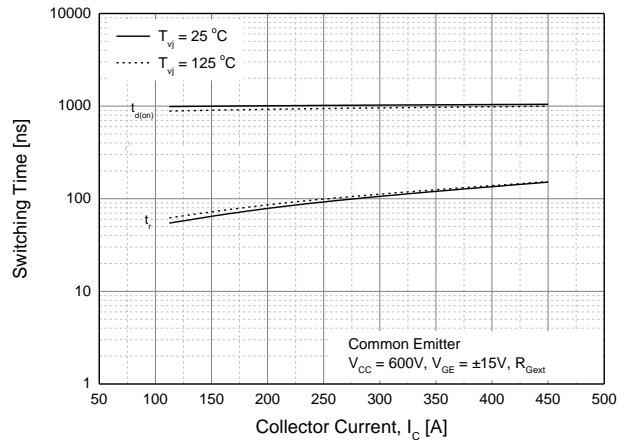


Fig. 6 Turn-on time vs. collector current



IGBT Characteristics

Fig. 7 Turn-off time vs. collector current

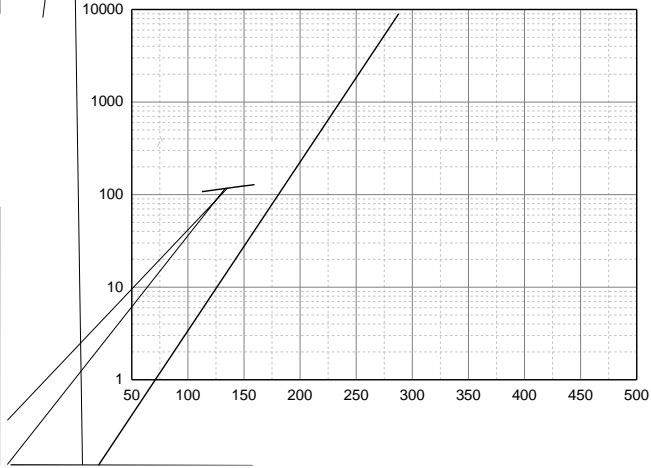


Fig. 8 Switching loss vs. collector current

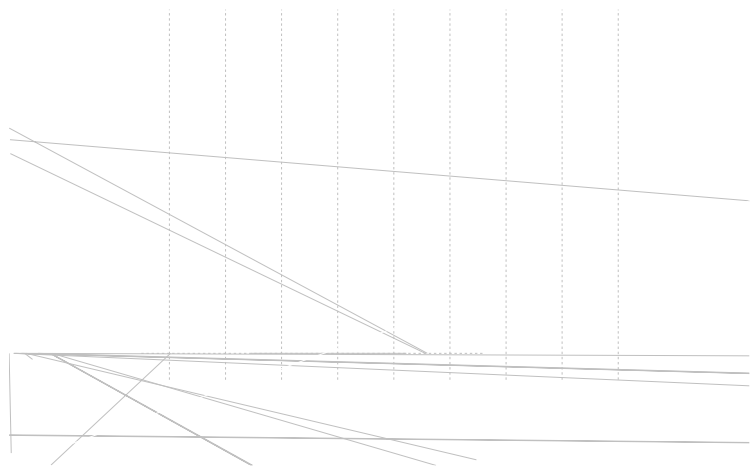


Fig. 9 Gate charge characteristics

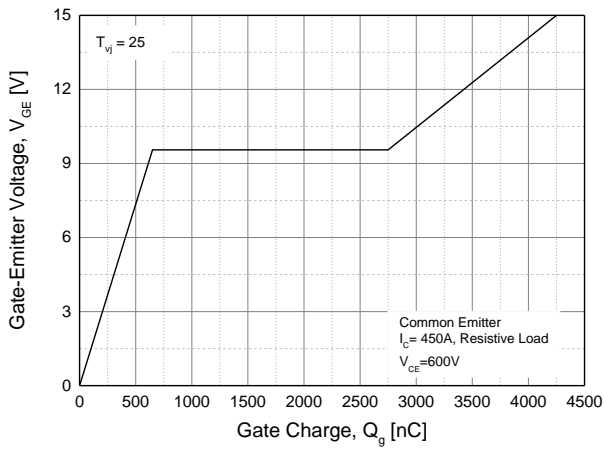


Fig. 10 Transient thermal impedance of IGBT

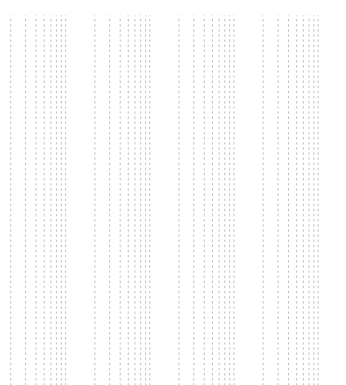


Fig. 11 SOA

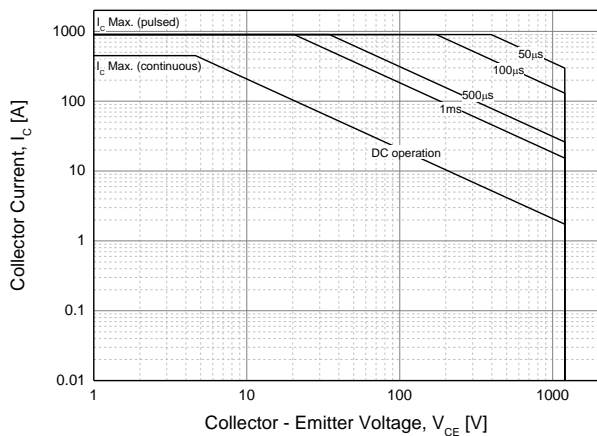
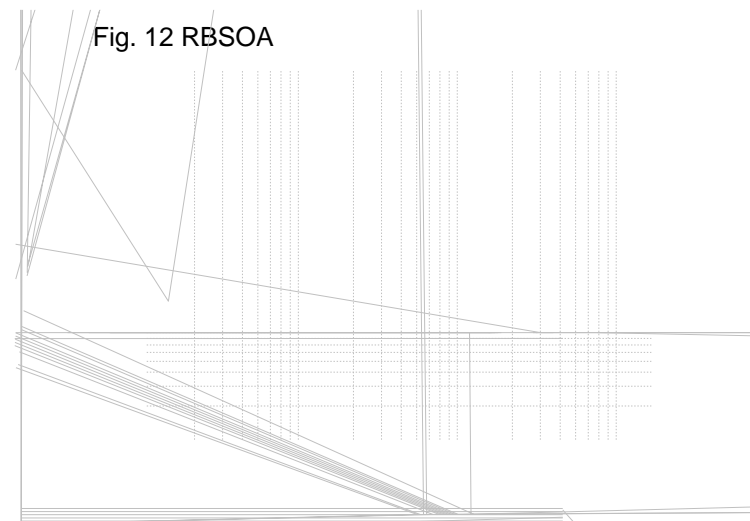
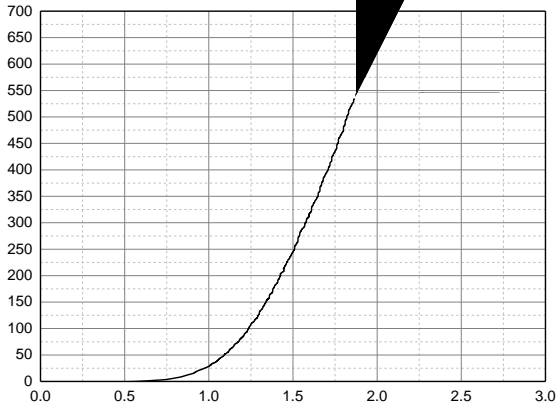


Fig. 12 RBSOA

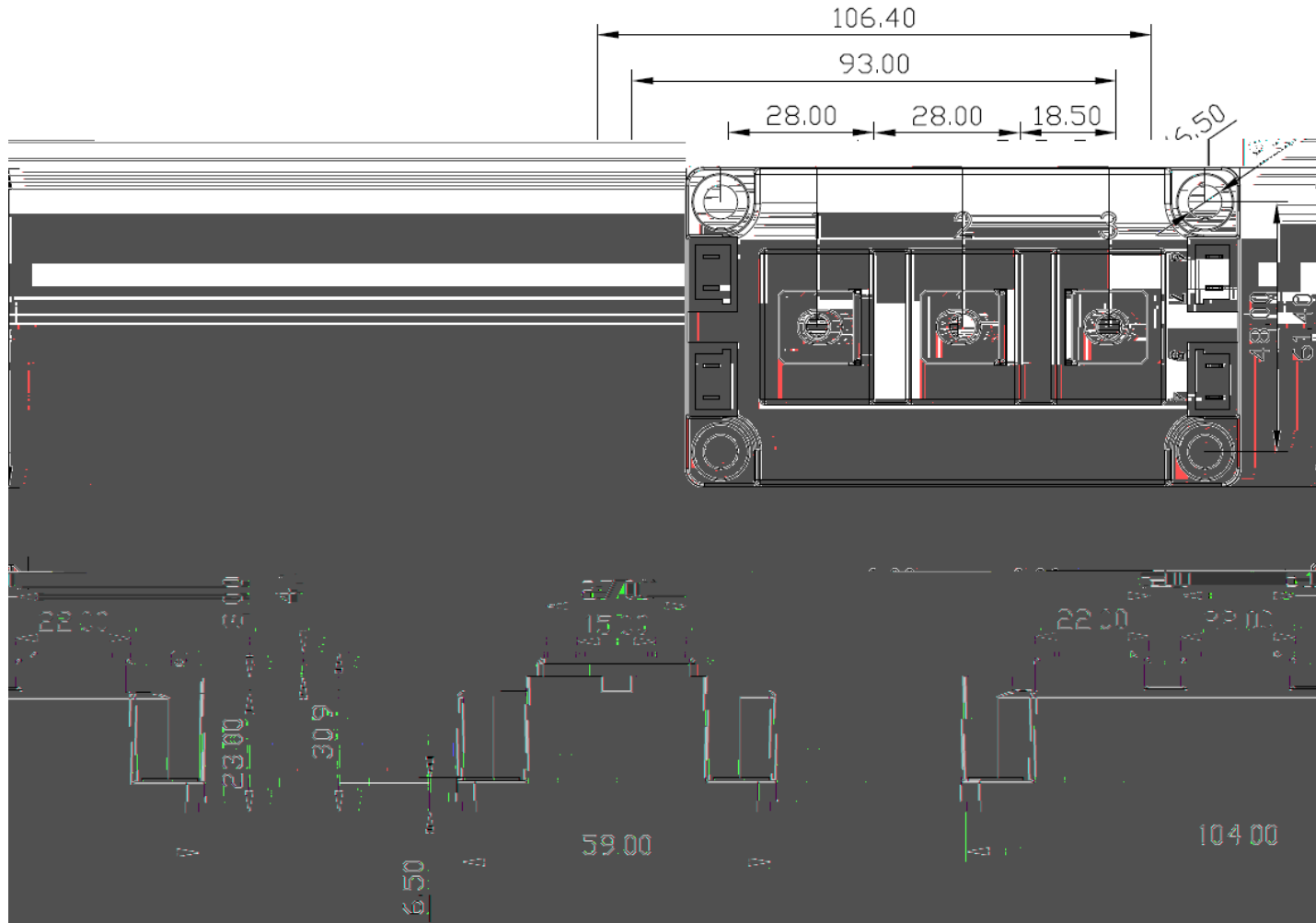


Diode Characteristics

Fig. 13 Conduction characteristic of Diode



Package Outline (Dimension in mm)



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