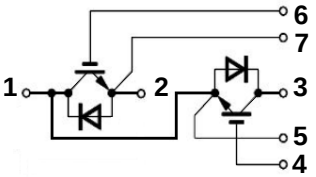
General Description

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 NPT 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	150	A
	T_C = 100 ℃		75	A
Pulsed Collector Current (Note 1)		I_{CM}	150	A
Diode Continuous Forward Current	T_C = 100 ℃	I_F	75	A
Power Dissipation	T_C = 25 ℃	P_D	417	W
	T_C = 100 ℃		166	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 ½ Module)	$R_{\theta JC}$ (IGBT)	0.3	K/W
Typical Thermal resistance, Junction-to-Case (Per ½ Module)	$R_{\theta JC}$ (DIODE)	1.0	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	--	--	1	mA
Gate – Emitter Leakage Current	I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V	--	--	± 100	nA
ON						
Gate – Emitter Threshold Voltage	$V_{GE(TH)}$	V_{GE} = V_{CE}, I_C = 250μA	4.0	--	7.5	V
		V_{GE} = V_{CE}, I_C = 75mA	5.0	--	8.5	V
Collector – Emitter Saturation Voltage	$V_{CE(SAT)}$	V_{GE} = 15V, I_C = 75A, T_{vj} = 25 ℃	--	2.3	2.8	V
		V_{GE} = 15V, I_C = 75A, T_{vj} = 125 ℃	--	2.5	3.0	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 = 75A R_G = 2.2Ω, V_{GE} = ±15V Inductive Load, T_{vj} = 25 ℃	--	48	--	ns
Rise Time	t_r		--	69	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	163	--	ns
Fall Time	t_f		--	47	--	ns
Turn-On Switching Loss	E_{ON}		--	5.7	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	2.4	--	mJ
Total Switching Loss	E_{TS}		--	8.1	--	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 75A R_G = 2.2Ω, V_{GE} = ±15V Inductive Load, T_{vj} = 125 ℃	--	53	--	ns
Rise Time	t_r		--	74	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	165	--	ns
Fall Time	t_f		--	56	--	ns
Turn-On Switching Loss	E_{ON}		--	8.2	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	4.1	--	mJ
Total Switching Loss	E_{TS}		--	12.3	--	mJ
Total Gate Charge	Q_g	V_{CC} = 600V, I_C = 75A V_{GE} = 15V	--	635	--	nC
Gate-Emitter Charge	Q_{ge}		--	110	--	nC
Gate-Collector Charge	Q_{gc}		--	285	--	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 = 75A	T_{vj} = 25 ℃	--	1.7	2.5	V
			T_{vj} = 125 ℃	--	1.8	2.6	
Reverse Recovery Current	I_{rr}	V_{CC} = 600V, I_F = 75A R_G = 2.2Ω, V_{GE} = ±15V Inductive Load	T_{vj} = 25 ℃	--	55	--	A
			T_{vj} = 125 ℃	--	70	--	
Reverse Recovery Charge	Q_{rr}		T_{vj} = 25 ℃	--	6.5	--	μC
			T_{vj} = 125 ℃	--	12.0	--	
Reverse Recovery Time	t_{rr}		T_{vj} = 25 ℃	--	110	--	ns
			T_{vj} = 125 ℃	--	120	--	

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)	--		--	3.0	--	N.m
Weight	--		--	170	--	g

IGBT Characteristics

Fig. 1 Output characteristics

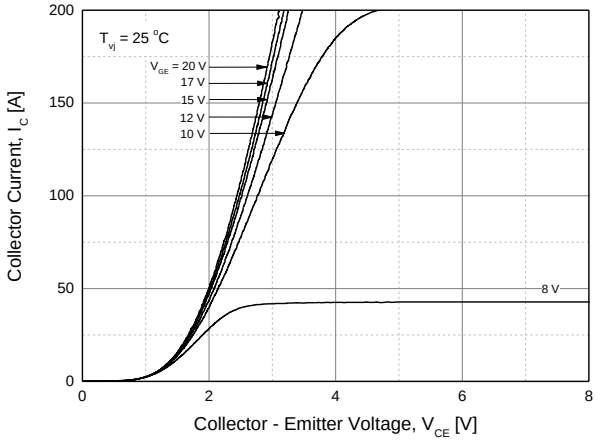


Fig. 2 Saturation voltage characteristics

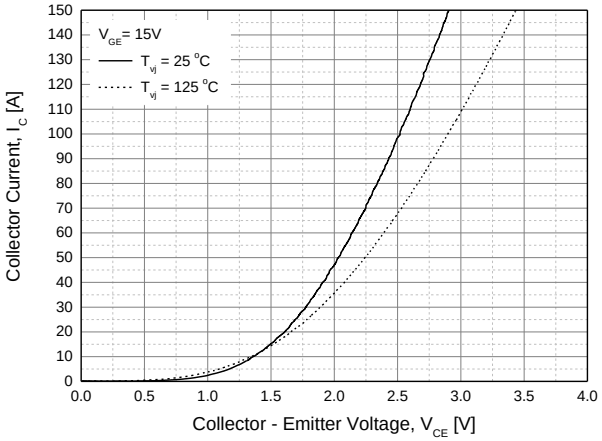


Fig. 3 Turn-on time vs. gate resistor

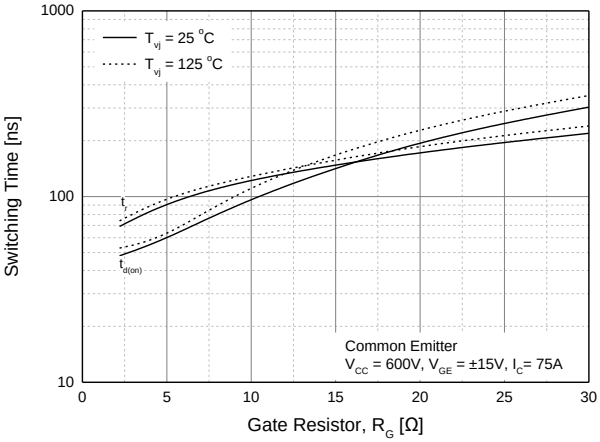


Fig. 4 Turn-off time vs. gate resistor

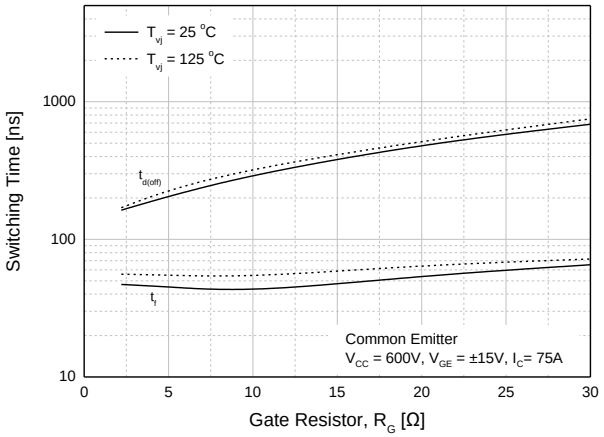


Fig. 5 Switching loss vs. gate resistor

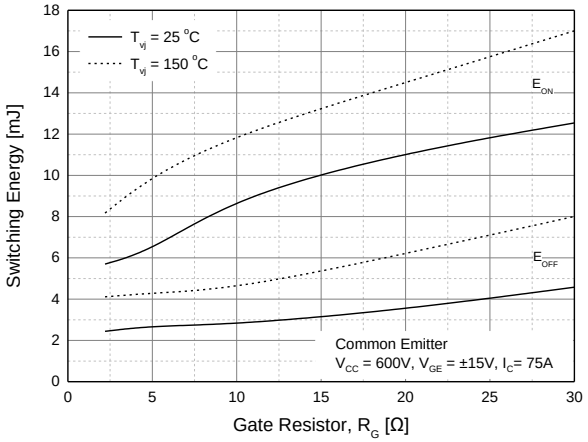
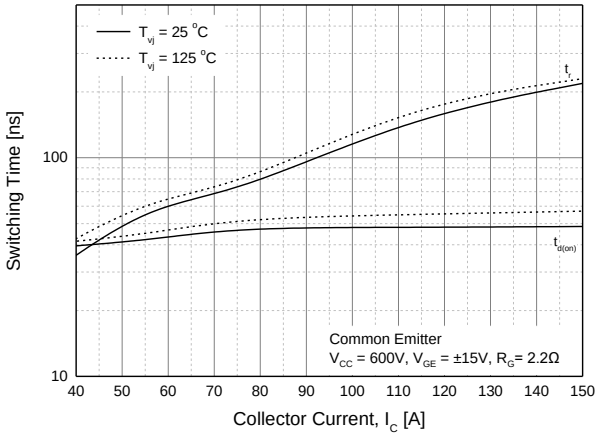


Fig. 6 Turn-on time vs. collector current



IGBT Characteristics

Fig. 7 Turn-off time vs. collector current

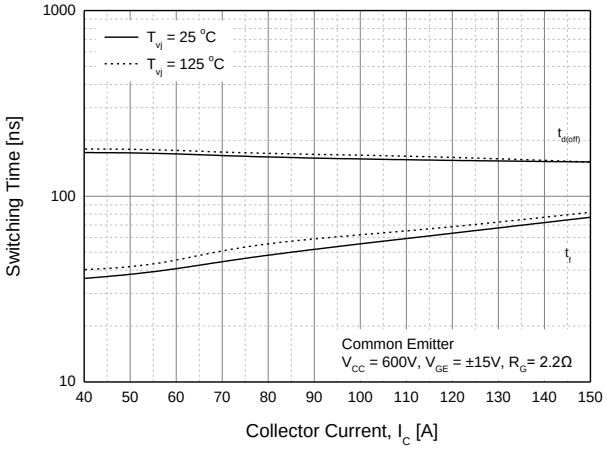


Fig. 8 Switching loss vs. collector current

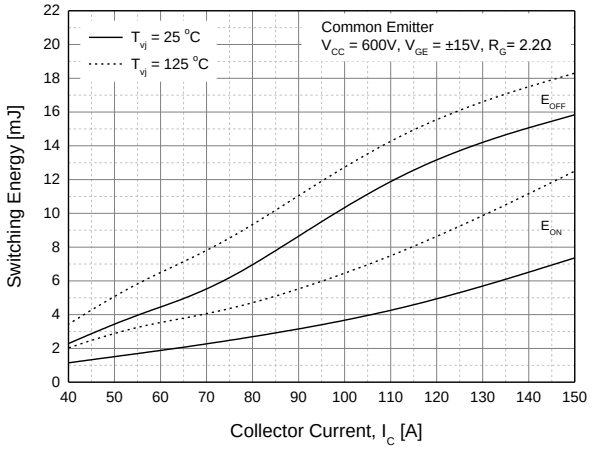


Fig. 9 Gate charge characteristics

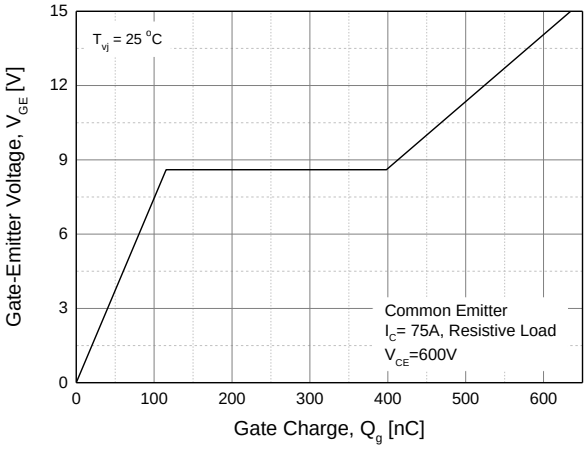


Fig. 10 Transient thermal impedance of IGBT

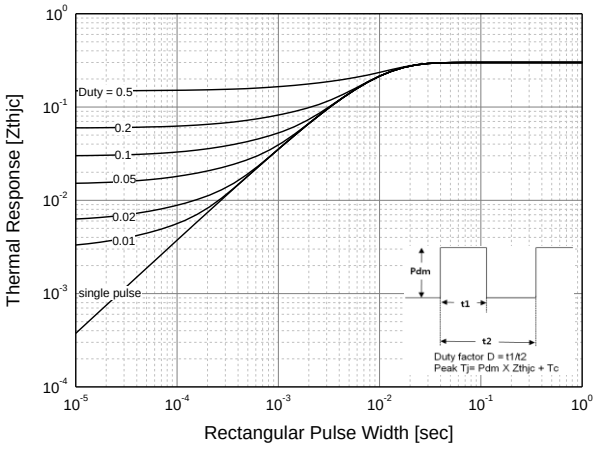


Fig. 11 SOA

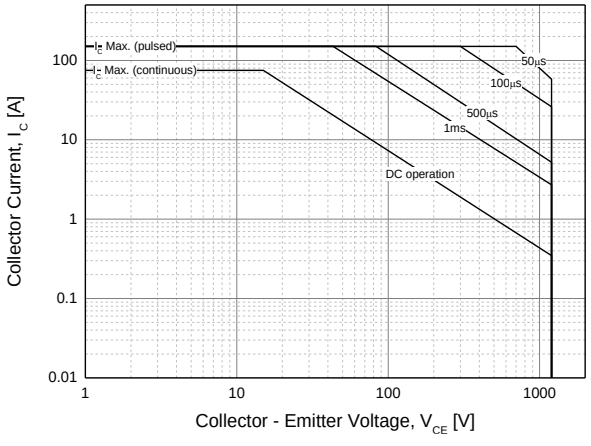
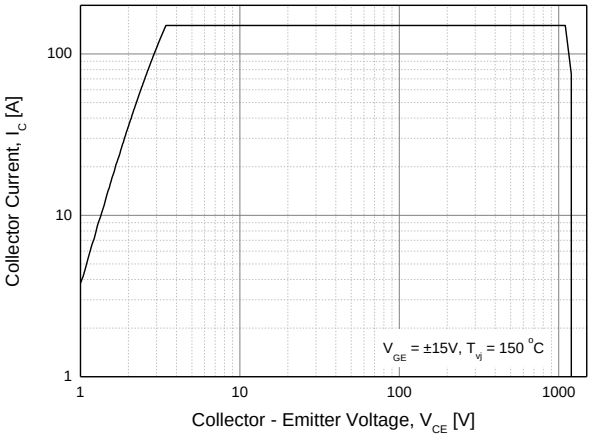
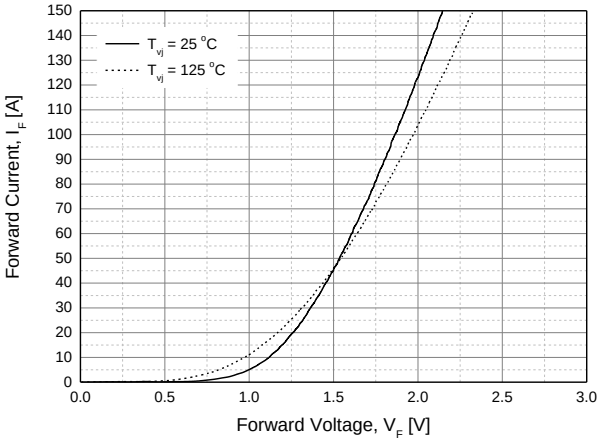


Fig. 12 RBSOA

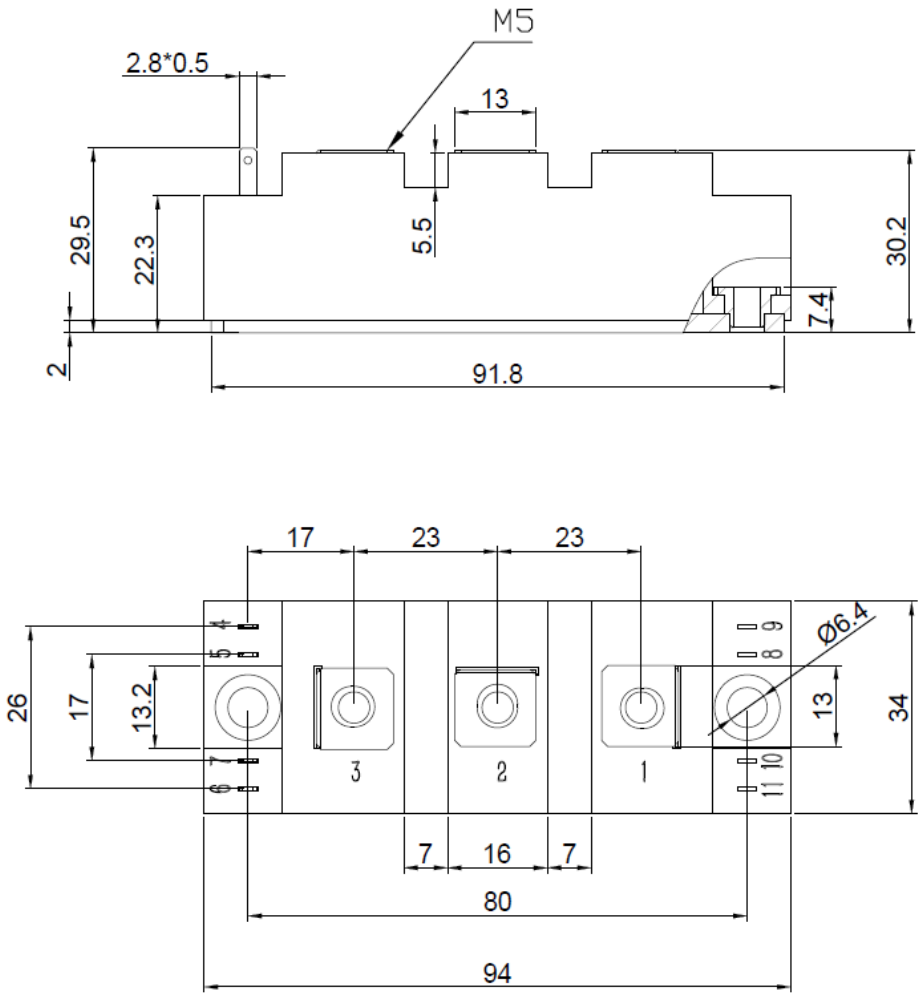


Diode Characteristics

Fig. 13 Conduction characteristics of Diode



Package Outline (Dimension in mm)



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