TAVAKOL ELECTRONIC
توکل الکترونیک
مرجع تخصصی تأمین قطعات الکترونیکی اورجینال
این دیتاشیت توسط توکل الکترونیک تهیه و ارائه شده است.
جهت مشاهده قیمت، موجودی و ثبت سفارش این قطعه به وب‌سایت توکل الکترونیک مراجعه فرمایید.
مشاهده قیمت و خرید
برای خرید و مشاهده سایر محصولات کلیک کنید

STARPOWER

SEMICONDUCTOR **IGBT**

GD300MLX65B3ST

650V/300A 3-level in one-package

General Description

STARPOWER IGBT Power Module provides ultra low conduction loss as well as short circuit ruggedness. They are designed for the applications such as 3-level-applications.

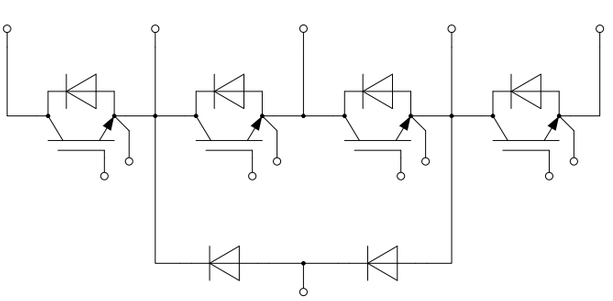
Features

- Low $V_{CE(sat)}$ trench IGBT technology
- 6μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175°C
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology

Typical Applications

- Solar power
- UPS
- 3-level-applications

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25°C unless otherwise noted

T1-T4 IGBT

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=60°C	354 300	A
I_{CM}	Pulsed Collector Current t_p=1ms	600	A
P_D	Maximum Power Dissipation @ T_j=175°C	857	W

D1-D4 Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	650	V
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	400	A

D5,D6 Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	650	V
I_F	Diode Continuous Forward Current	300	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	600	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	175	°C
T_{jop}	Operating Junction Temperature	-40 to +150	°C
T_{STG}	Storage Temperature Range	-40 to +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500	V

T1-T4 IGBT Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=300A,V_{GE}=15V, T_j=25°C		1.45	1.80	V
		I_C=300A,V_{GE}=15V, T_j=125°C		1.60		
		I_C=300A,V_{GE}=15V, T_j=150°C		1.70		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=4.80mA,V_{CE}=V_{GE}, T_j=25°C	5.1	5.8	6.5	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25°C			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25°C			400	nA
R_{Gint}	Internal Gate Resistance			1.0		Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=1MHz, V_{GE}=0V		34.8		nF
C_{res}	Reverse Transfer Capacitance			0.69		nF
Q_G	Gate Charge	V_{GE}=-15…+15V		2.08		μC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=300A, R_G=2.4Ω,V_{GE}=±15V, T_j=25°C		110		ns
t_r	Rise Time			50		ns
$t_{d(off)}$	Turn-Off Delay Time			392		ns
t_f	Fall Time			40		ns
E_{on}	Turn-On Switching Loss			1.96		mJ
E_{off}	Turn-Off Switching Loss			6.40		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=300A, R_G=2.4Ω,V_{GE}=±15V, T_j=125°C		120		ns
t_r	Rise Time			60		ns
$t_{d(off)}$	Turn-Off Delay Time			416		ns
t_f	Fall Time			56		ns
E_{on}	Turn-On Switching Loss			3.10		mJ
E_{off}	Turn-Off Switching Loss			9.60		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=300A, R_G=2.4Ω,V_{GE}=±15V, T_j=150°C		130		ns
t_r	Rise Time			60		ns
$t_{d(off)}$	Turn-Off Delay Time			424		ns
t_f	Fall Time			56		ns
E_{on}	Turn-On Switching Loss			3.30		mJ
E_{off}	Turn-Off Switching Loss			10.0		mJ
I_{SC}	SC Data	t_P≤6μs,V_{GE}=15V, T_j=150°C,V_{CC}=360V, V_{CEM}≤650V		1500		A

D1-D4 Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=200A,V_{GE}=0V,T_j=25°C		1.55	2.00	V
		I_F=200A,V_{GE}=0V,T_j=125°C		1.50		
		I_F=200A,V_{GE}=0V,T_j=150°C		1.45		
Q_r	Recovered Charge	V_R=300V,I_F=200A, -di/dt=5700A/μs,V_{GE}=-15V T_j=25°C		10.0		μC
I_{RM}	Peak Reverse Recovery Current			160		A
E_{rec}	Reverse Recovery Energy			3.00		mJ
Q_r	Recovered Charge	V_R=300V,I_F=200A, -di/dt=5700A/μs,V_{GE}=-15V T_j=125°C		17.0		μC
I_{RM}	Peak Reverse Recovery Current			230		A
E_{rec}	Reverse Recovery Energy			5.20		mJ
Q_r	Recovered Charge	V_R=300V,I_F=200A, -di/dt=5700A/μs,V_{GE}=-15V T_j=150°C		20.0		μC
I_{RM}	Peak Reverse Recovery Current			240		A
E_{rec}	Reverse Recovery Energy			5.80		mJ

D5,D6 Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=300A,V_{GE}=0V,T_j=25°C		1.55	2.00	V
		I_F=300A,V_{GE}=0V,T_j=125°C		1.50		
		I_F=300A,V_{GE}=0V,T_j=150°C		1.45		
Q_r	Recovered Charge	V_R=300V,I_F=300A, -di/dt=7150A/μs,V_{GE}=-15V T_j=25°C		14.3		μC
I_{RM}	Peak Reverse Recovery Current			209		A
E_{rec}	Reverse Recovery Energy			3.74		mJ
Q_r	Recovered Charge	V_R=300V,I_F=300A, -di/dt=7150A/μs,V_{GE}=-15V T_j=125°C		26.4		μC
I_{RM}	Peak Reverse Recovery Current			259		A
E_{rec}	Reverse Recovery Energy			6.82		mJ
Q_r	Recovered Charge	V_R=300V,I_F=300A, -di/dt=7150A/μs,V_{GE}=-15V T_j=150°C		30.8		μC
I_{RM}	Peak Reverse Recovery Current			275		A
E_{rec}	Reverse Recovery Energy			7.70		mJ

Module Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per T1-T4 IGBT) Junction-to-Case (per D1-D4 Diode) Junction-to-Case (per D5,D6 Diode)			0.175 0.367 0.299	K/W
R_{thCH}	Case-to-Heatsink (per T1-T4 IGBT) Case-to-Heatsink (per D1-D4 Diode) Case-to-Heatsink (per D5,D6 Diode) Case-to-Heatsink (per Module)		0.248 0.520 0.423 0.035		K/W
M	Terminal Connection Torque, Screw M6 Mounting Torque, Screw M6	2.5 3.0		5.0 5.0	N.m
G	Weight of Module		340		g

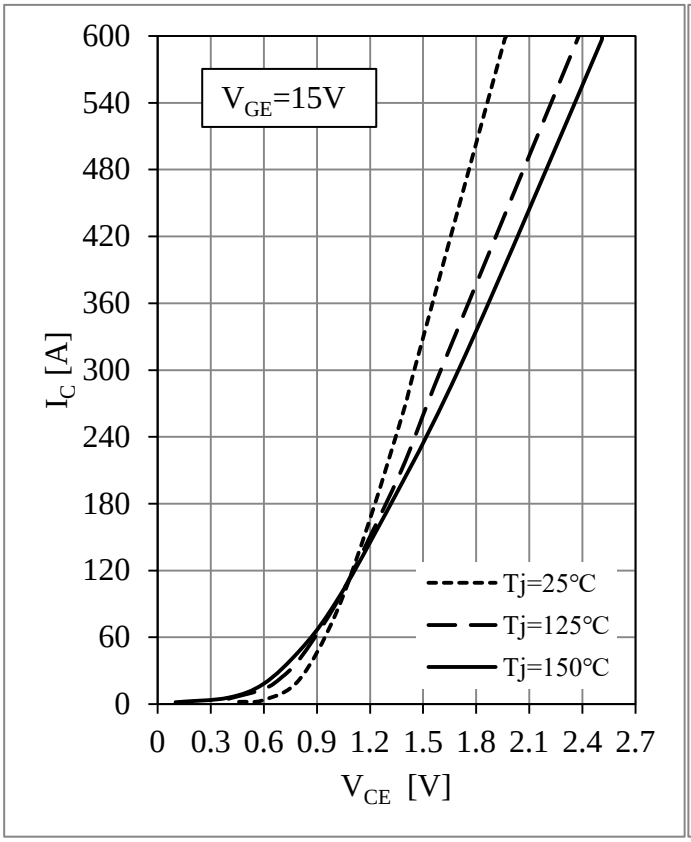


Fig 1. T1-T4 IGBT Output Characteristics

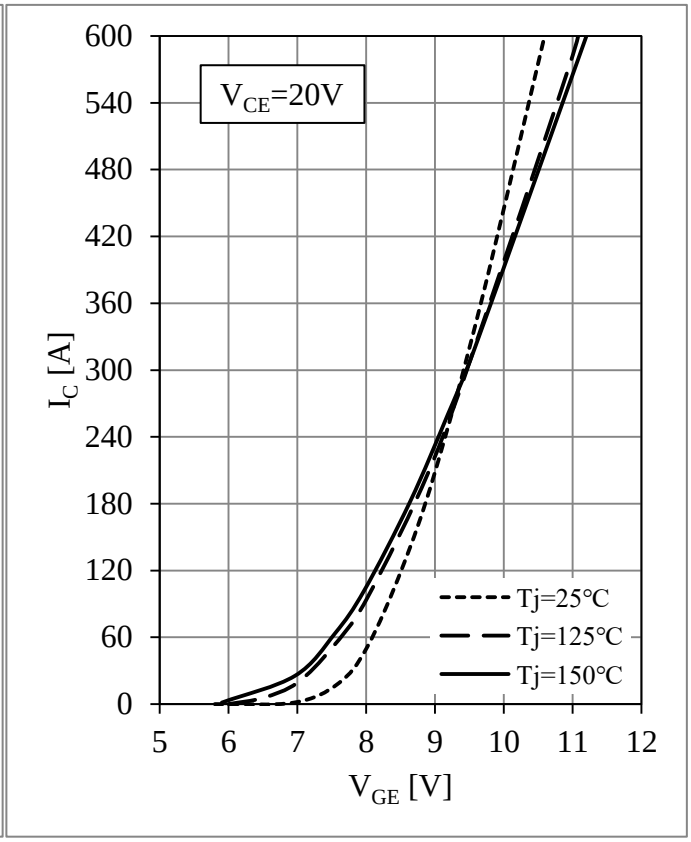


Fig 2. T1-T4 IGBT Transfer Characteristics

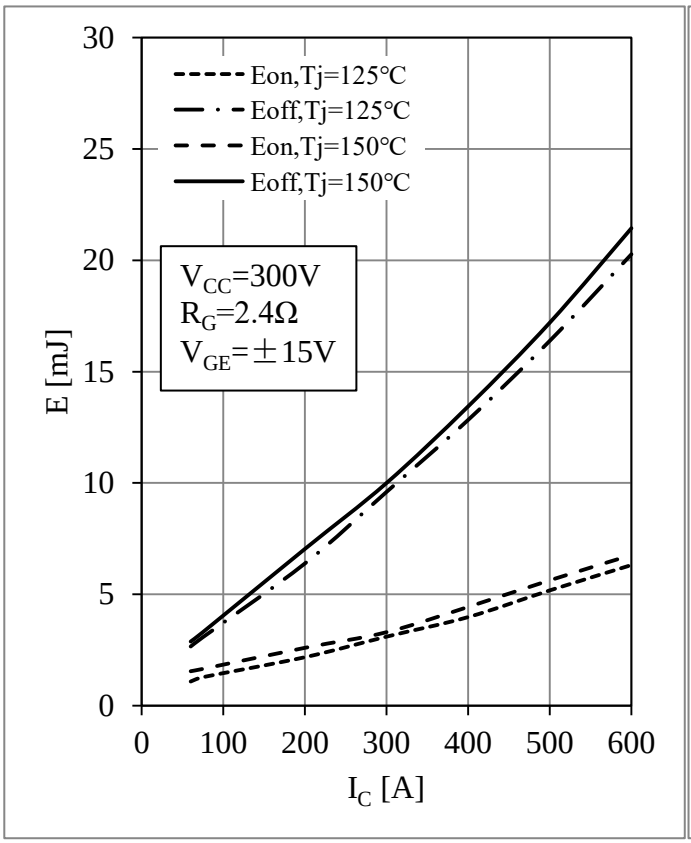


Fig 3. T1-T4 IGBT Switching Loss vs. I_C

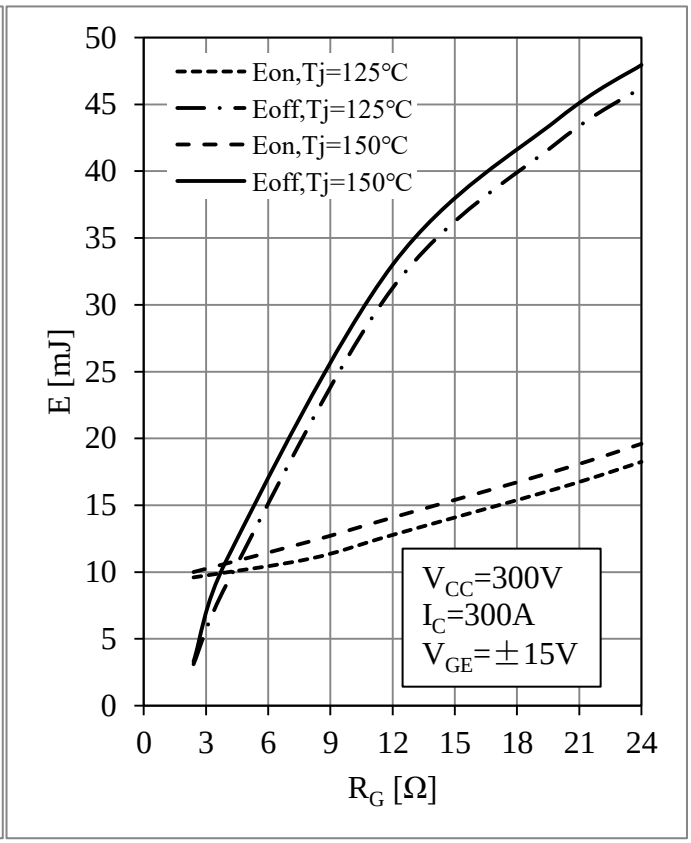


Fig 4. T1-T4 IGBT Switching Loss vs. R_G

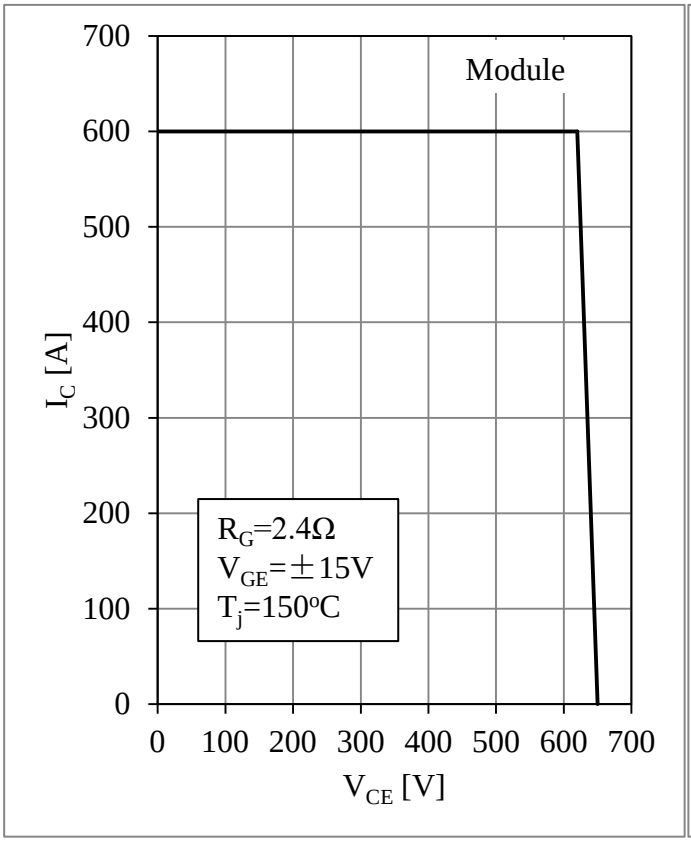


Fig 5. T1-T4 RBSOA

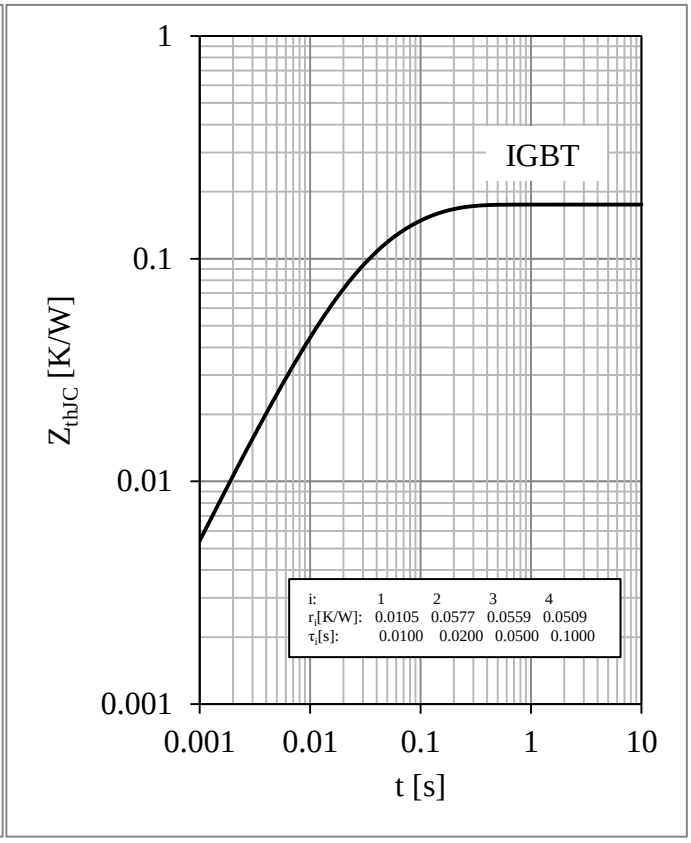


Fig 6. T1-T4 IGBT Transient Thermal Impedance

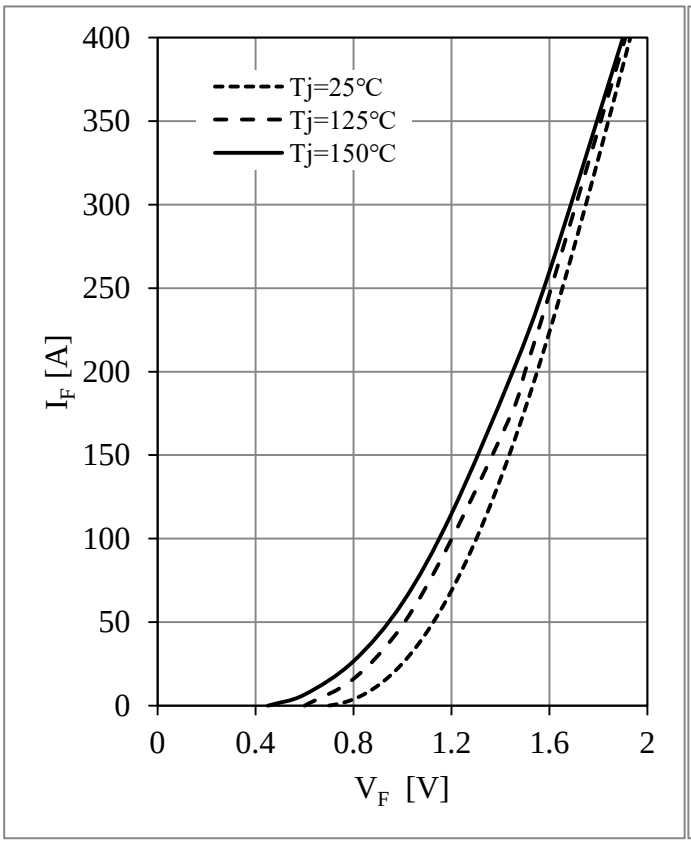


Fig 7. D1-D4 Diode Forward Characteristics

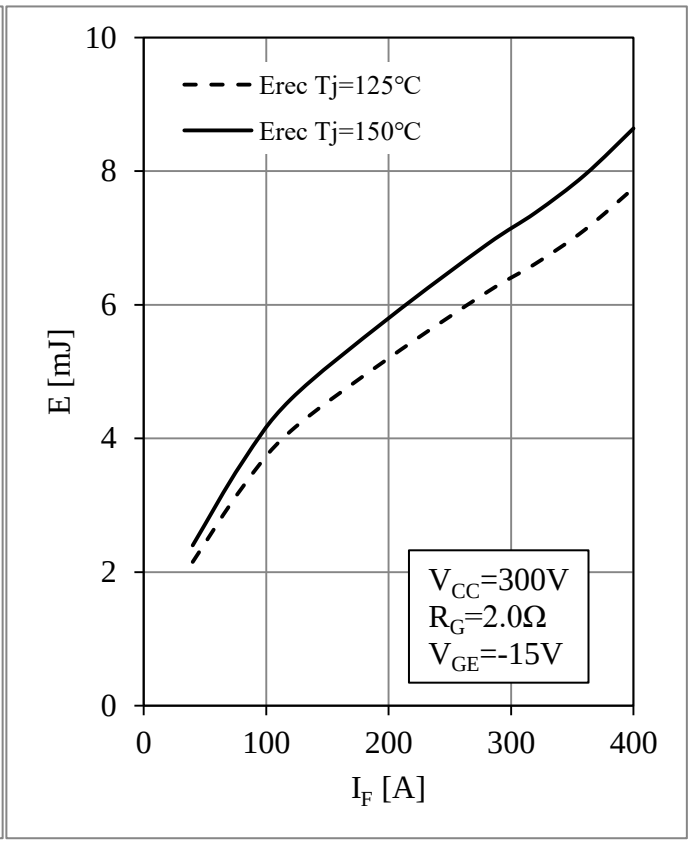


Fig 8. D1-D4 Diode Switching Loss vs. I_F

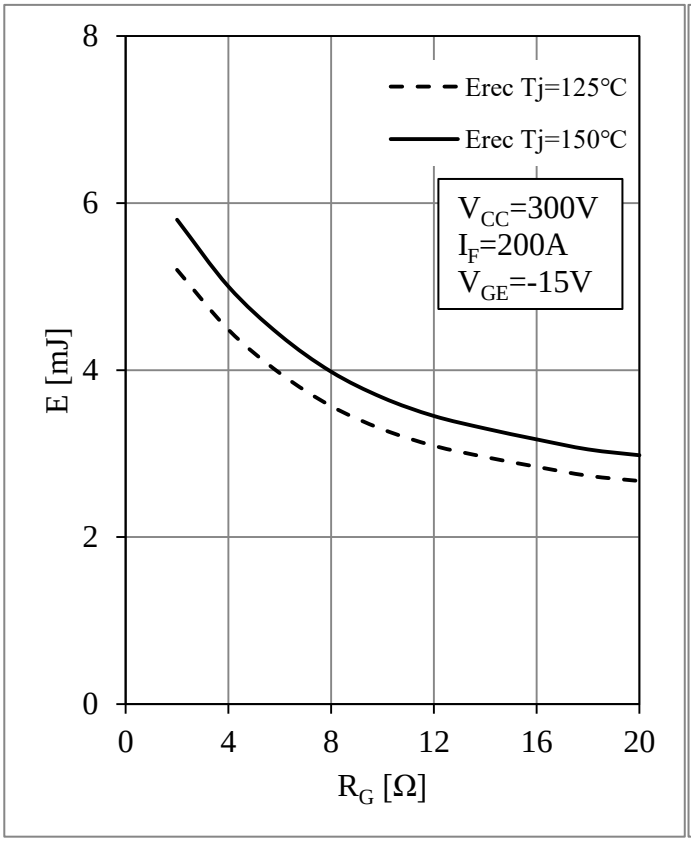


Fig 9. D1-D4 Diode Switching Loss vs. R_G

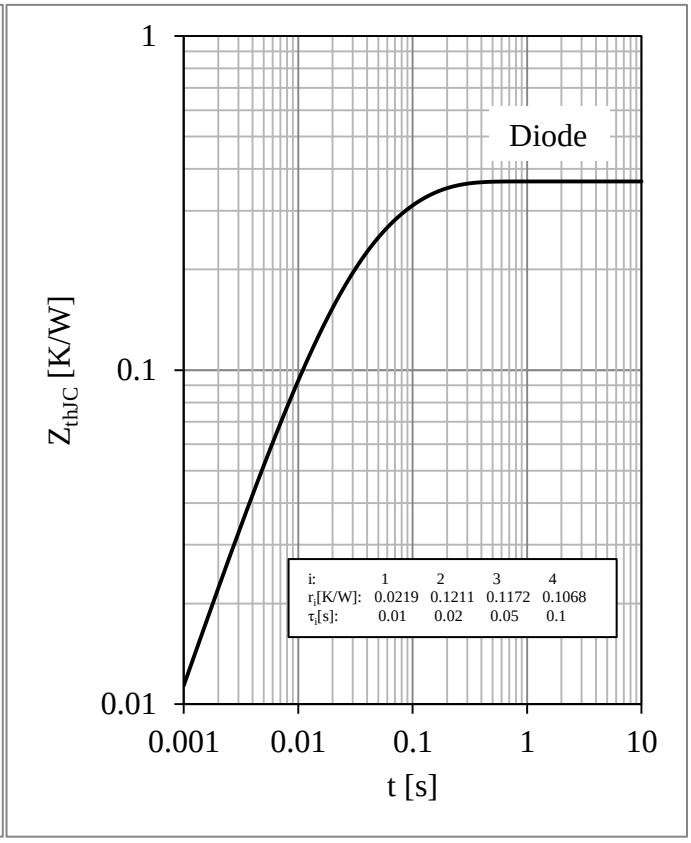


Fig 10. D1-D4 Diode Transient Thermal Impedance

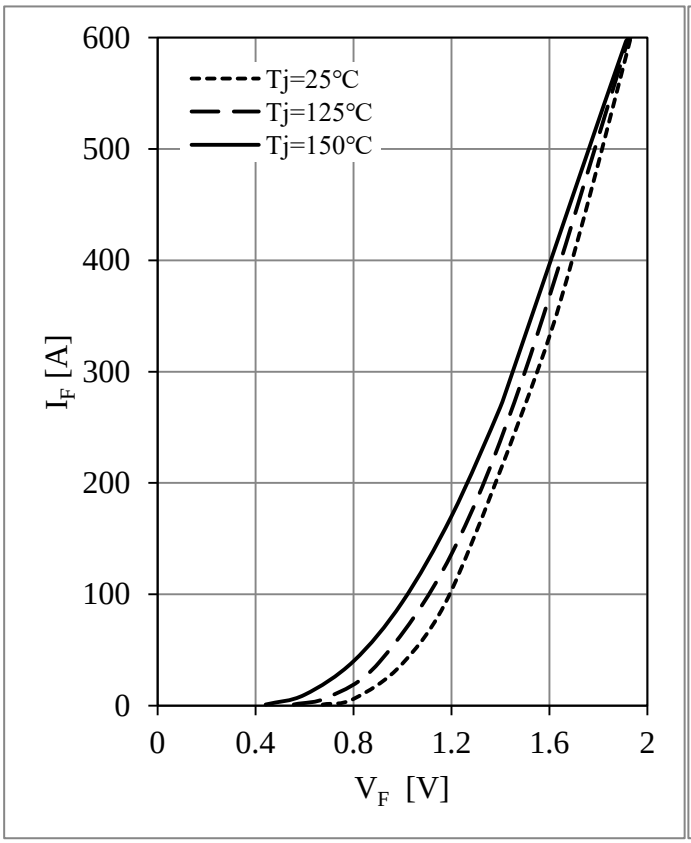


Fig 11. D5,D6 Diode Forward Characteristics

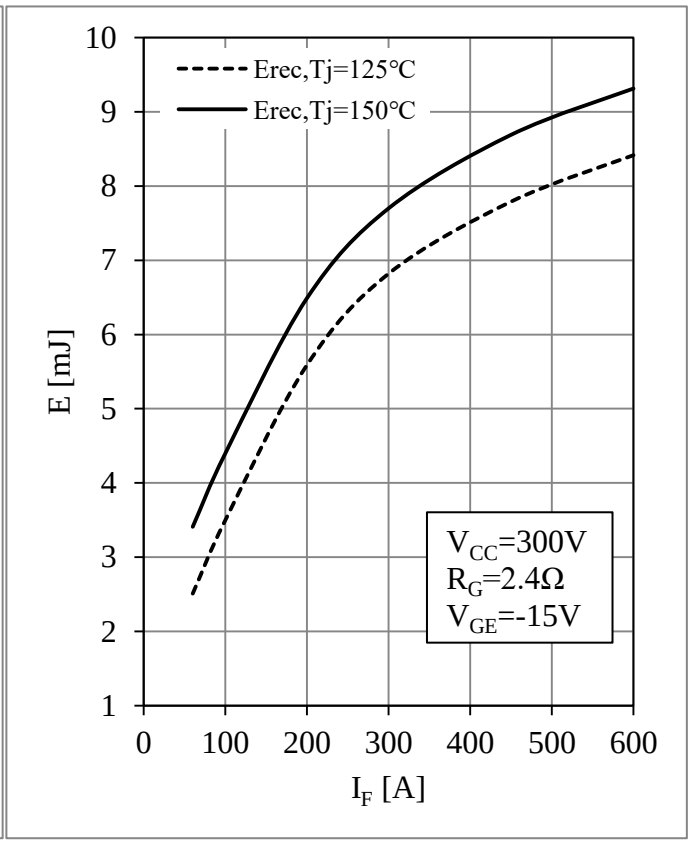


Fig 12. D5,D6 Diode Switching Loss vs. I_F

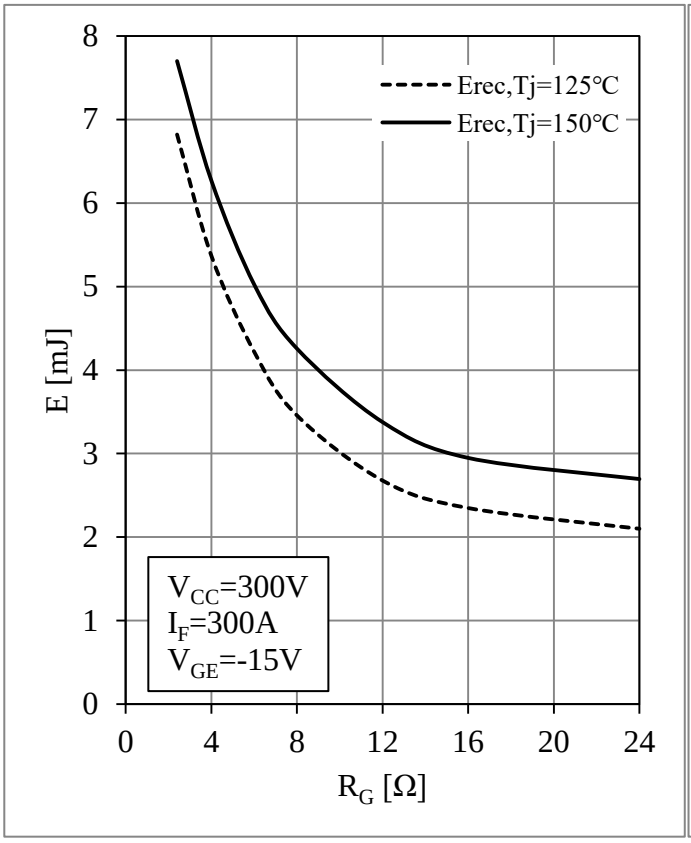


Fig 13. D5,D6 Diode Switching Loss vs. R_G

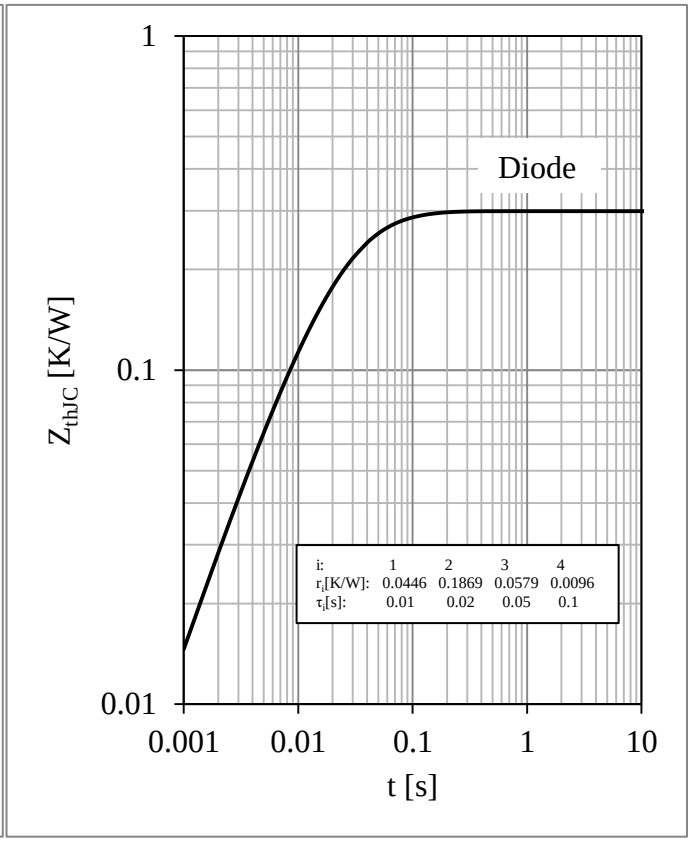
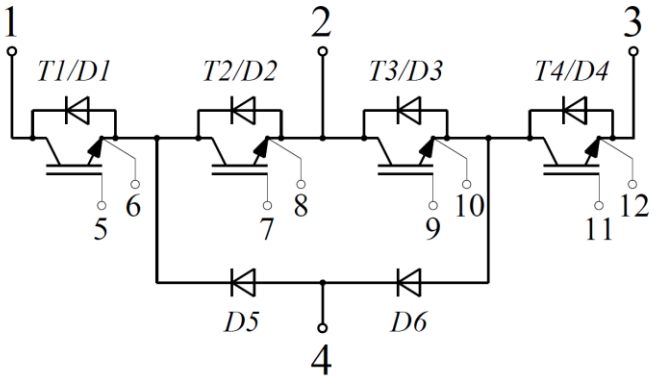


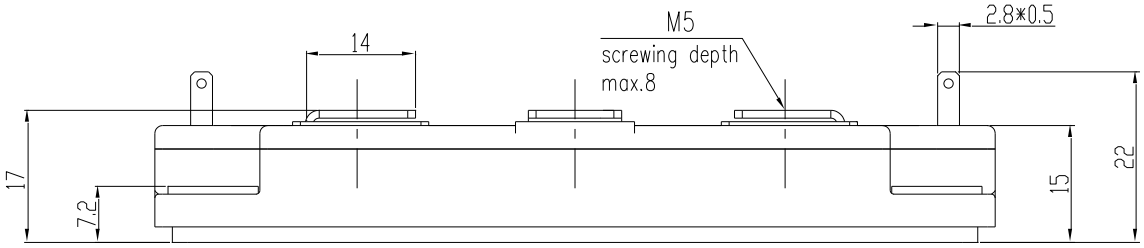
Fig 14. D5,D6 Diode Transient Thermal Impedance

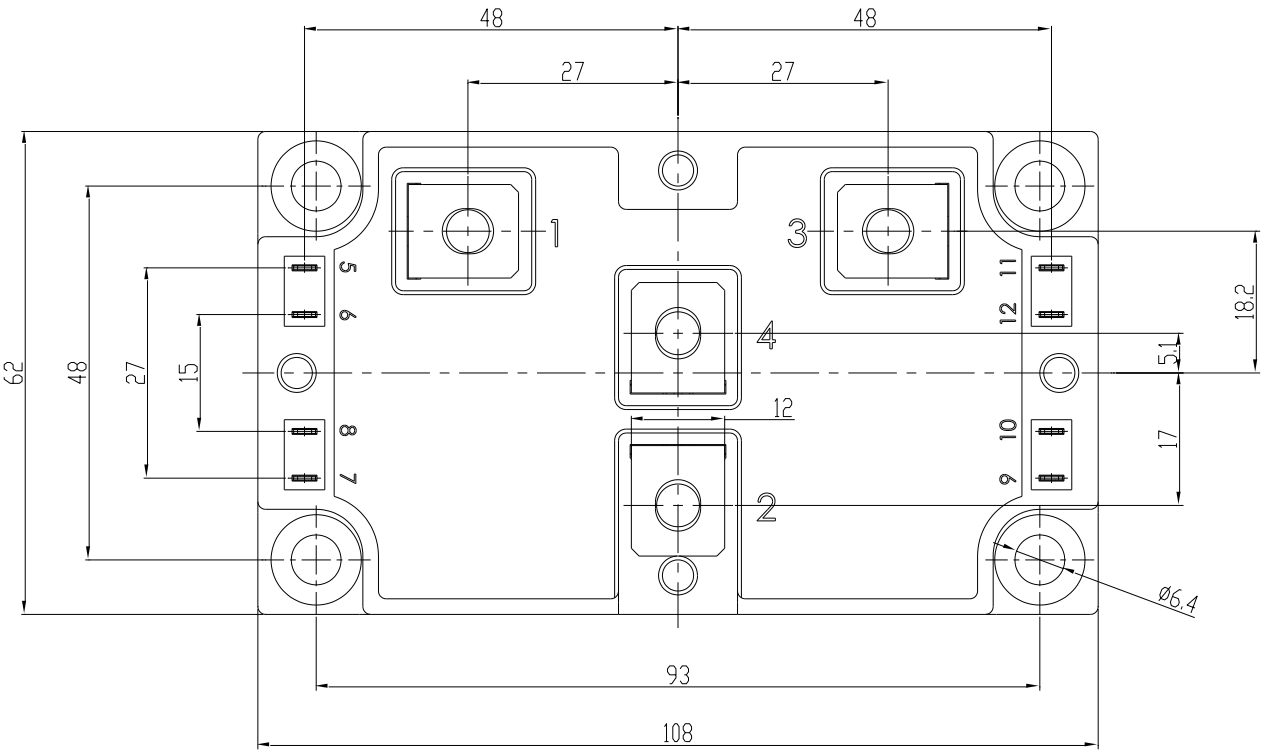
Circuit Schematic



Package Dimensions

Dimensions in Millimeters





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