DOSEMI

IGBT

DG340A08T6B

750V/340A IGBT with Diode

General Description

DOSEMI IGBT Power Discrete provides ultra low conduction loss as well as low switching loss. They are designed for the applications such as general inverters and UPS.

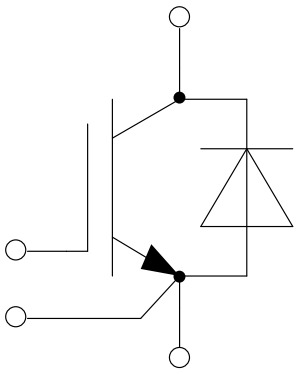
Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- Low switching loss
- Maximum junction temperature 175°C
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FWD
- Isolated heatsink using Si_3N_4 AMB technology
- ROHS

Typical Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25°C unless otherwise noted

IGBT

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	750	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=100°C	609 340	A
I_{CM}	Pulsed Collector Current t_p limited by T_{vjmax}	680	A
P_D	Maximum Power Dissipation @ T_{vj}=175°C	1704	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	750	V
I_F	Diode Continuous Forward Current	340	A
I_{FM}	Diode Maximum Forward Current t_p limited by T_{vjmax}	680	A

Discrete

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

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_{vj}=25°C		1.40	1.85	V
		I_C=300A,V_{GE}=15V, T_{vj}=150°C		1.60		
		I_C=300A,V_{GE}=15V, T_{vj}=175°C		1.65		
		I_C=340A,V_{GE}=15V, T_{vj}=150°C		1.70		
		I_C=340A,V_{GE}=15V, T_{vj}=175°C		1.75		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=3.20mA,V_{CE}=V_{GE}, T_{vj}=25°C	5.0	5.7	7.0	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_{vj}=25°C			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_{vj}=25°C			400	nA
R_{Gint}	Internal Gate Resistance			5.0		Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=100kHz, V_{GE}=0V		23.7		nF
C_{oes}	Output Capacitance			0.84		nF
C_{res}	Reverse Transfer Capacitance			0.16		nF
Q_G	Gate Charge	V_{GE}=-8…+15V		1.20		μC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=300A, R_G=3.9Ω, V_{GE}=-8/+15V, L_S=60nH,T_{vj}=25°C		343		ns
t_r	Rise Time			91		ns
$t_{d(off)}$	Turn-Off Delay Time			560		ns
t_f	Fall Time			60		ns
E_{on}	Turn-On Switching Loss			12.6		mJ
E_{off}	Turn-Off Switching Loss			13.5		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=300A, R_G=3.9Ω, V_{GE}=-8/+15V, L_S=60nH,T_{vj}=150°C		353		ns
t_r	Rise Time			110		ns
$t_{d(off)}$	Turn-Off Delay Time			641		ns
t_f	Fall Time			82		ns
E_{on}	Turn-On Switching Loss			19.0		mJ
E_{off}	Turn-Off Switching Loss			16.6		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=300A, R_G=3.9Ω, V_{GE}=-8/+15V, L_S=60nH,T_{vj}=175°C		354		ns
t_r	Rise Time			118		ns
$t_{d(off)}$	Turn-Off Delay Time			663		ns
t_f	Fall Time			87		ns
E_{on}	Turn-On Switching Loss			21.0		mJ
E_{off}	Turn-Off Switching Loss			17.3		mJ
I_{SC}	SC Data	t_P≤3μs,V_{GE}=15V, T_{vj}=150°C,V_{CC}=400V, V_{CEM}≤750V		1300		A

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_{vj}=25°C		1.85	2.30	V
		I_F=300A,V_{GE}=0V,T_{vj}=150°C		1.90		
		I_F=300A,V_{GE}=0V,T_{vj}=175°C		1.90		
		I_F=340A,V_{GE}=0V,T_{vj}=150°C		2.00		
		I_F=340A,V_{GE}=0V,T_{vj}=175°C		2.00		
t_{rr}	Reverse Recovery Time	V_R=400V,I_F=300A, -di/dt=2500A/μs,V_{GE}=-8V L_S=60nH,T_{vj}=25°C		222		ns
Q_r	Recovered Charge			9.47		μC
I_{RM}	Peak Reverse Recovery Current			91		A
E_{rec}	Reverse Recovery Energy			1.93		mJ
t_{rr}	Reverse Recovery Time	V_R=400V,I_F=300A, -di/dt=2000A/μs,V_{GE}=-8V L_S=60nH,T_{vj}=150°C		266		ns
Q_r	Recovered Charge			15.1		μC
I_{RM}	Peak Reverse Recovery Current			110		A
E_{rec}	Reverse Recovery Energy			3.11		mJ
t_{rr}	Reverse Recovery Time	V_R=400V,I_F=300A, -di/dt=2000A/μs,V_{GE}=-8V L_S=60nH,T_{vj}=175°C		281		ns
Q_r	Recovered Charge			15.8		μC
I_{RM}	Peak Reverse Recovery Current			111		A
E_{rec}	Reverse Recovery Energy			3.15		mJ

Discrete Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)		0.088 0.159	0.101 0.183	K/W

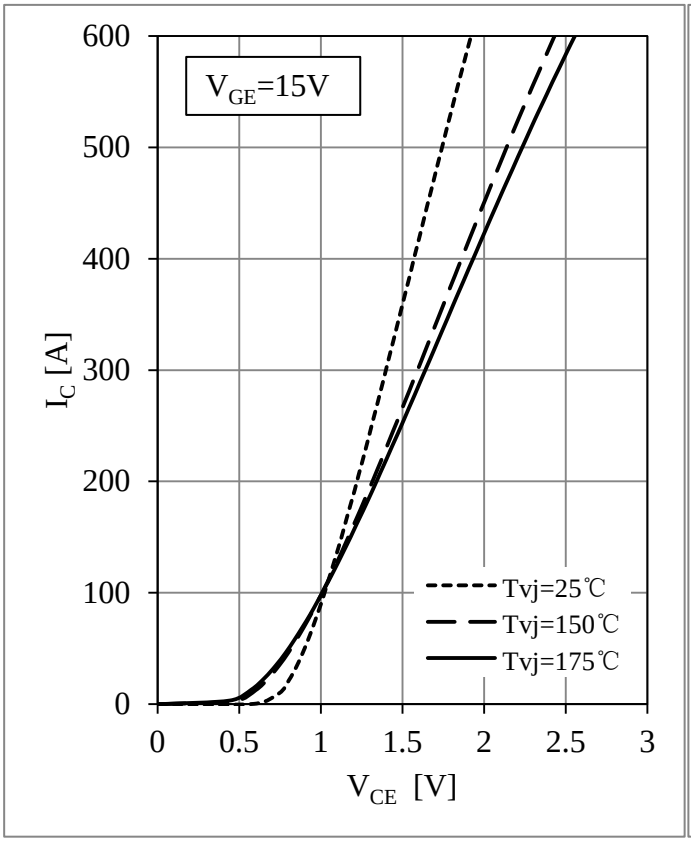


Fig 1. IGBT Output Characteristics

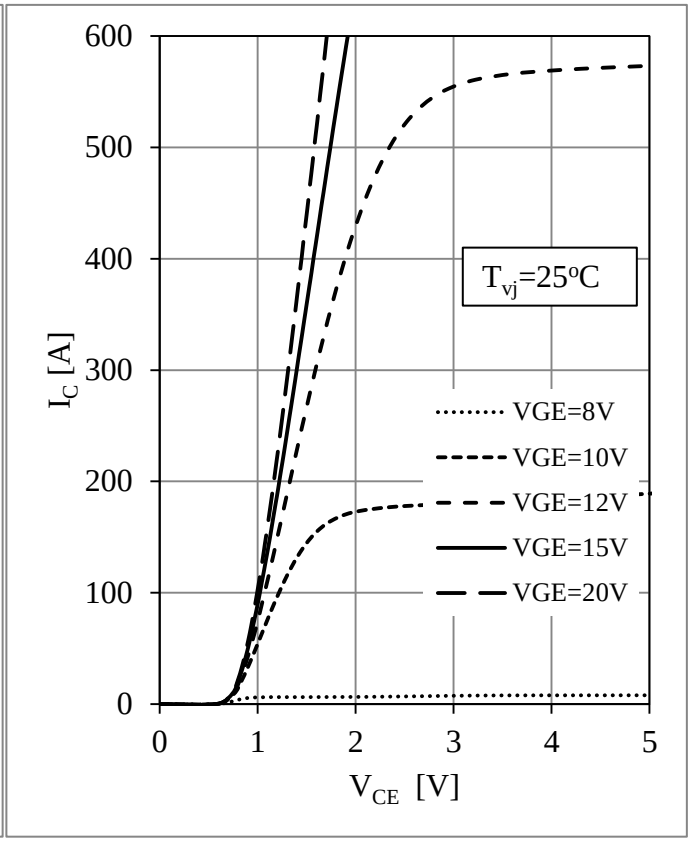


Fig 2. IGBT Output Characteristics

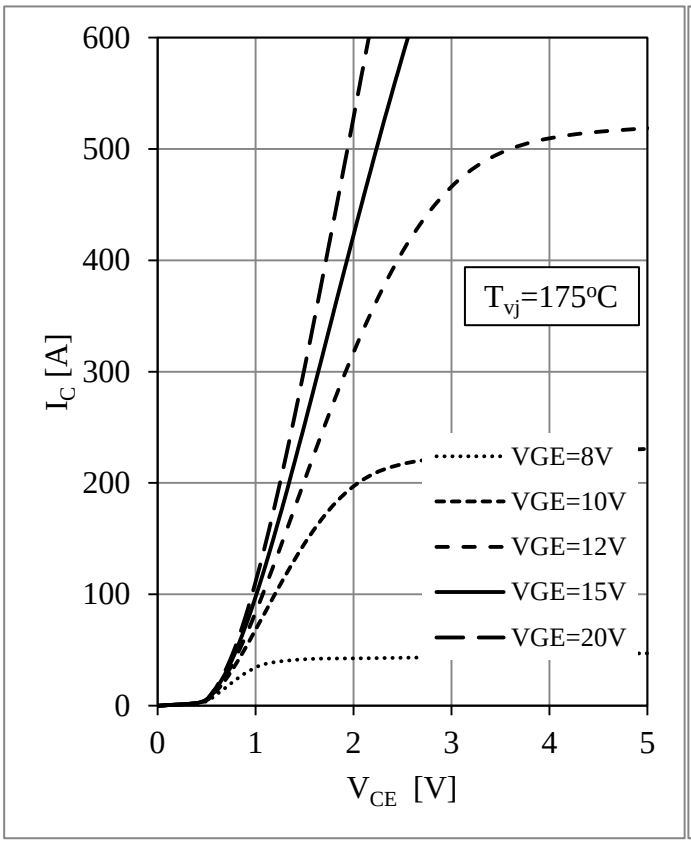


Fig 3. IGBT Output Characteristics

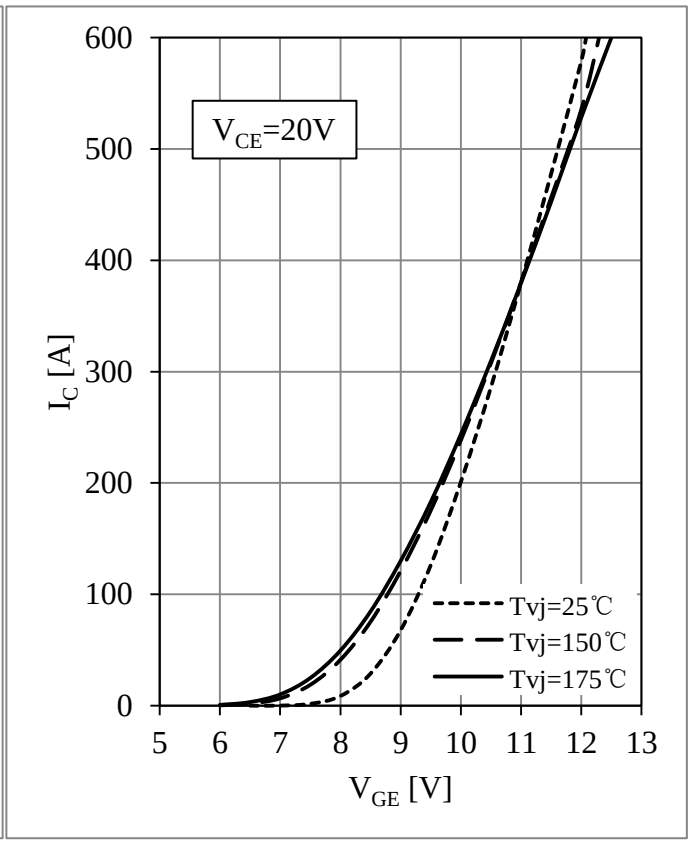


Fig 4. IGBT Transfer Characteristics

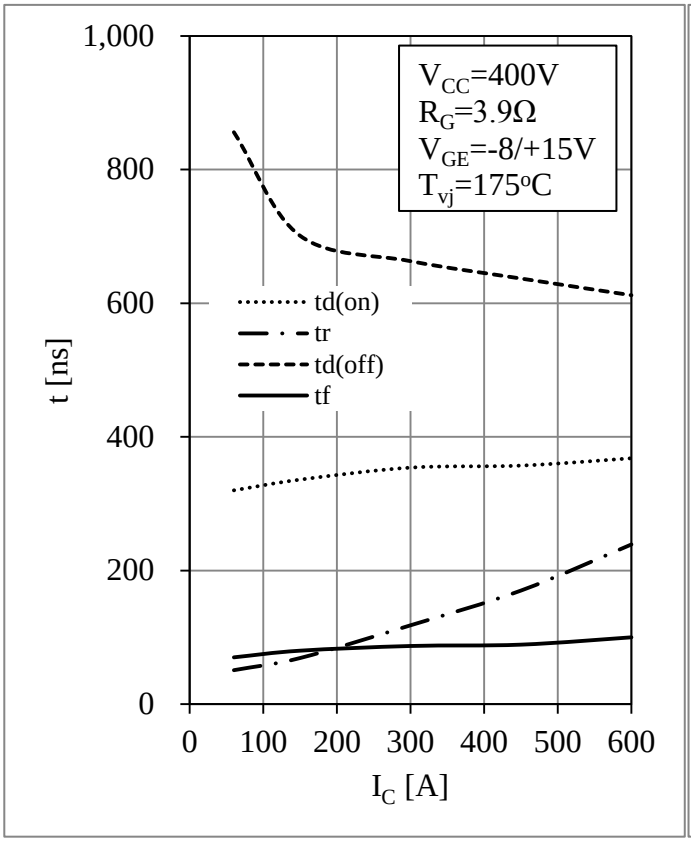


Fig 5. IGBT Switching Times as.I_C

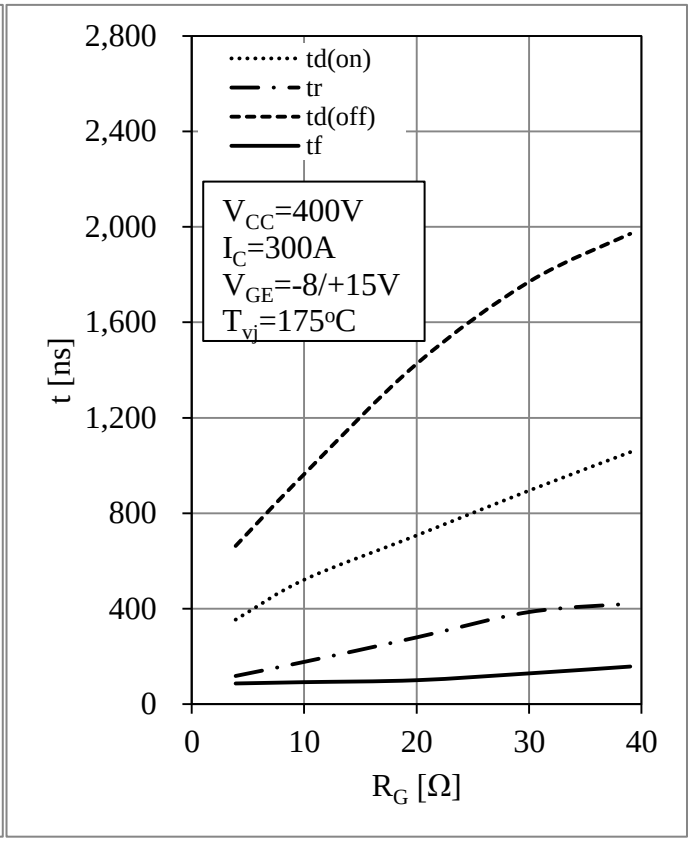


Fig 6. IGBT Switching Times as. R_G

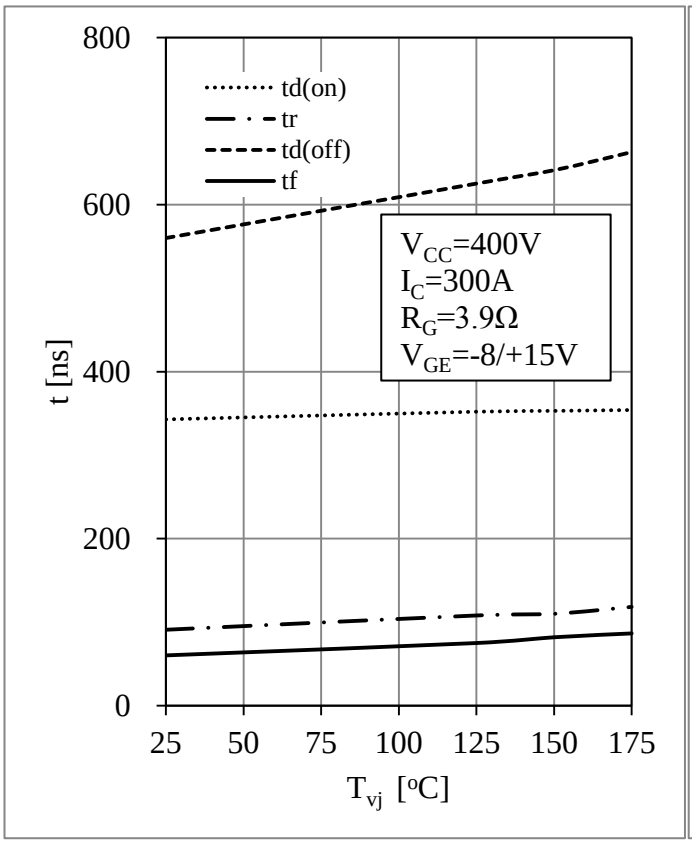


Fig 7. IGBT Switching Times vs. T_j

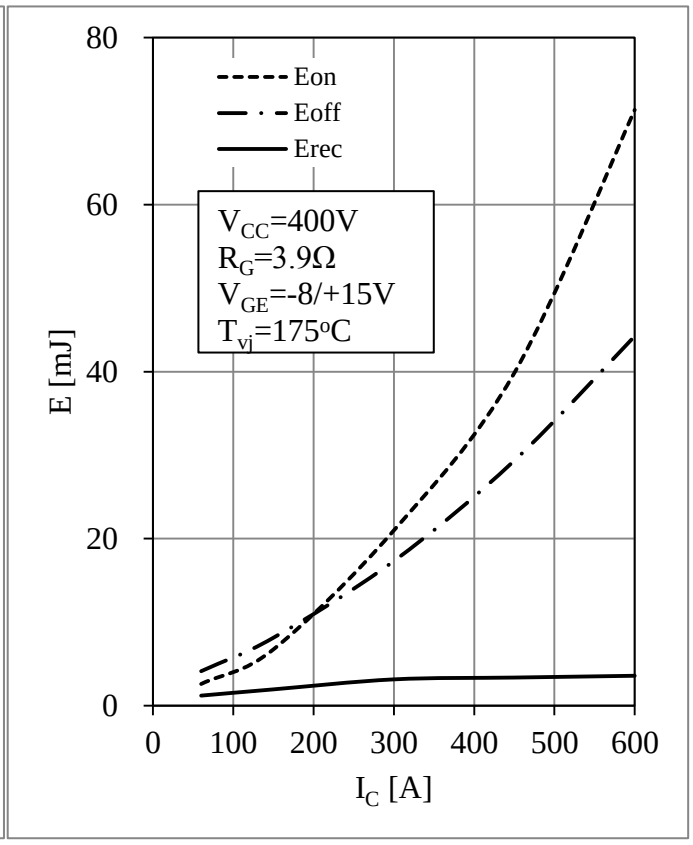


Fig 8. Switching Energy Loss vs. I_C

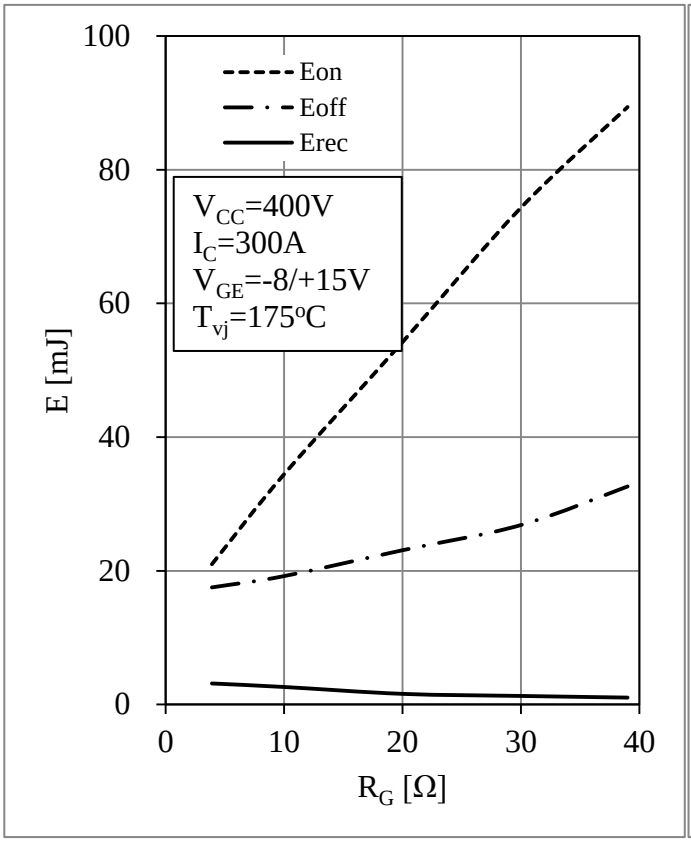


Fig 9. Switching Energy Loss vs. R_G

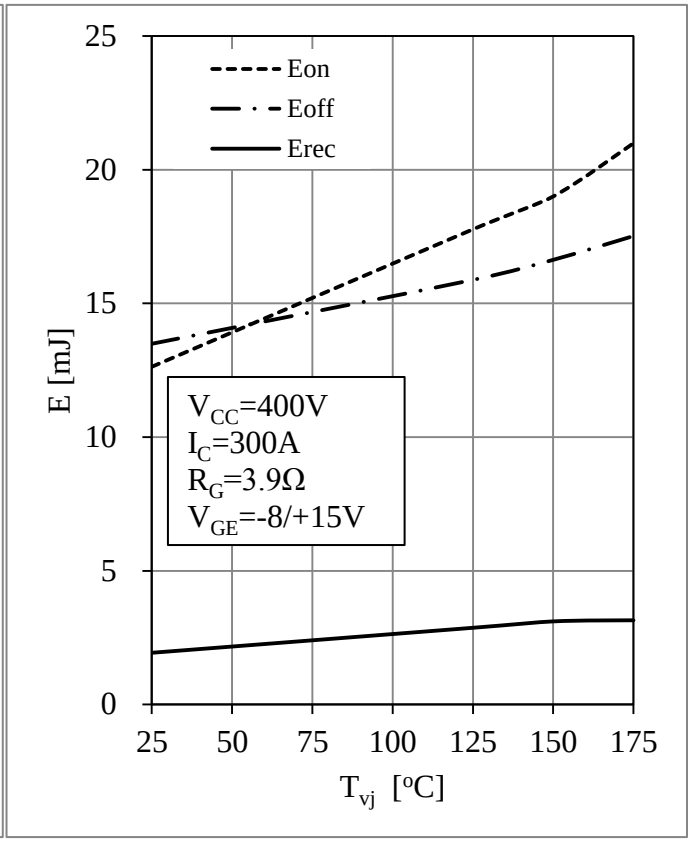


Fig 10. Switching Energy Loss vs. T_j

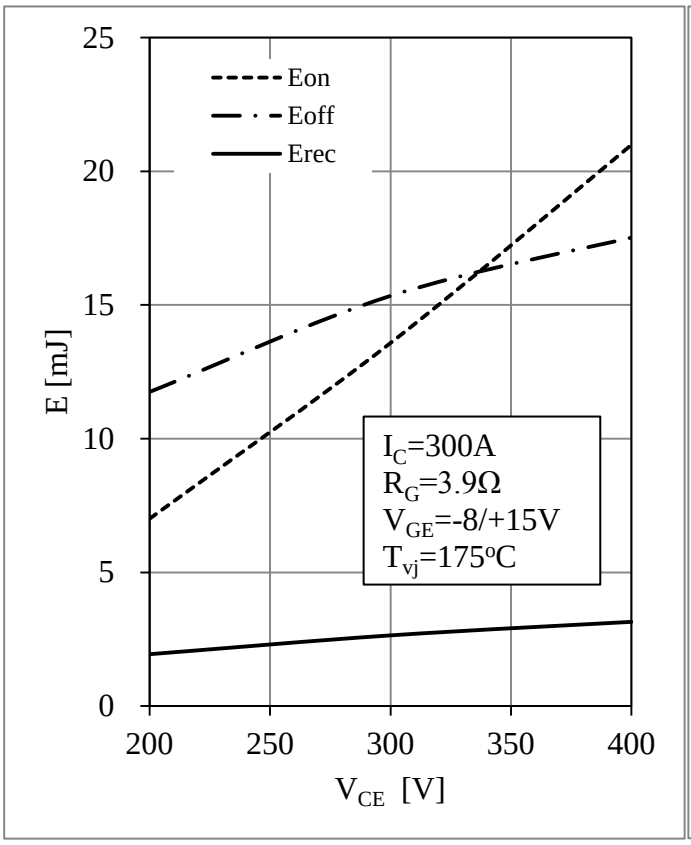


Fig 11. Switching Energy Loss vs.V_{CE}

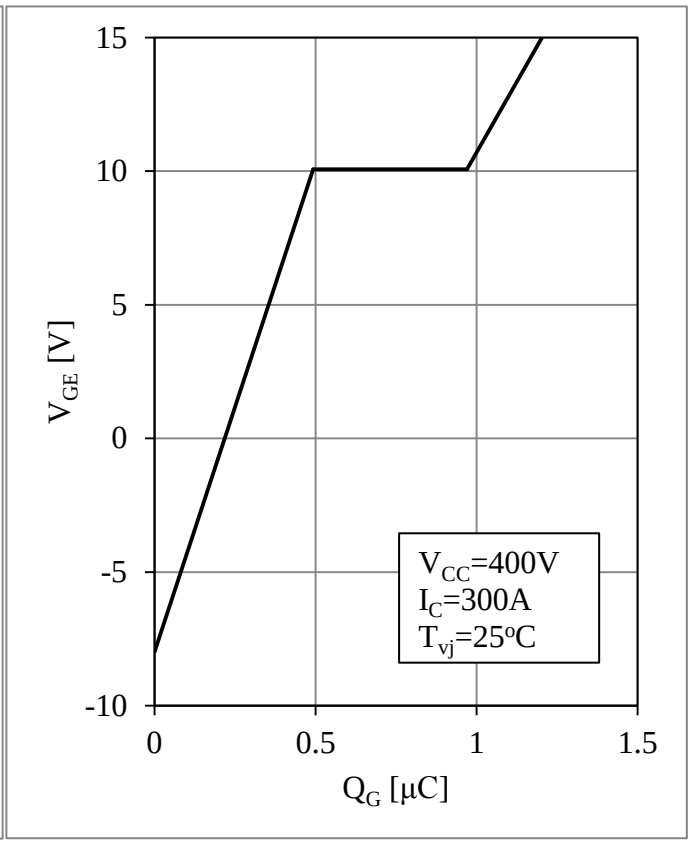


Fig 12. IGBT Gate Charge Characteristic

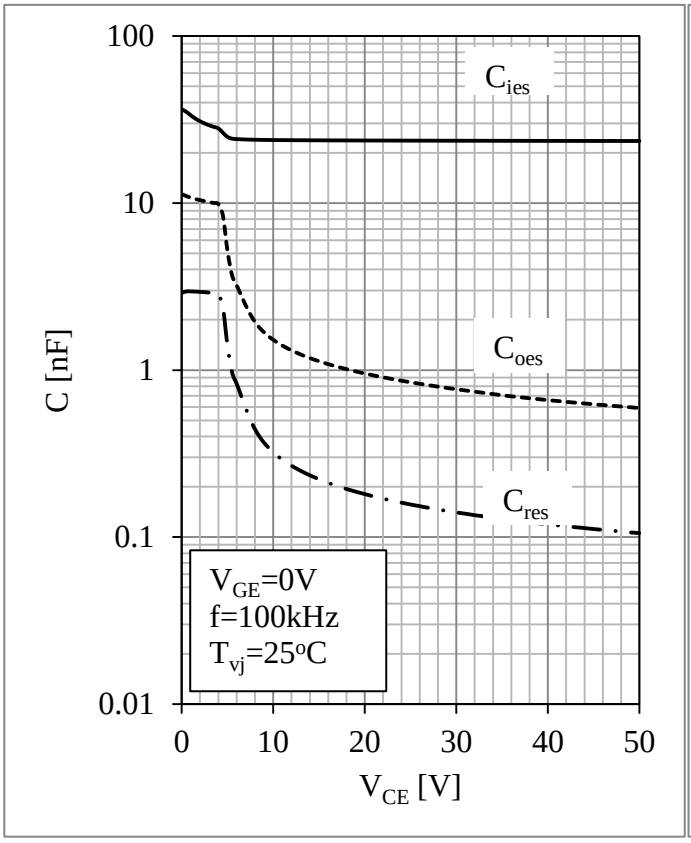


Fig 13. IGBT Capacity Charcteristic

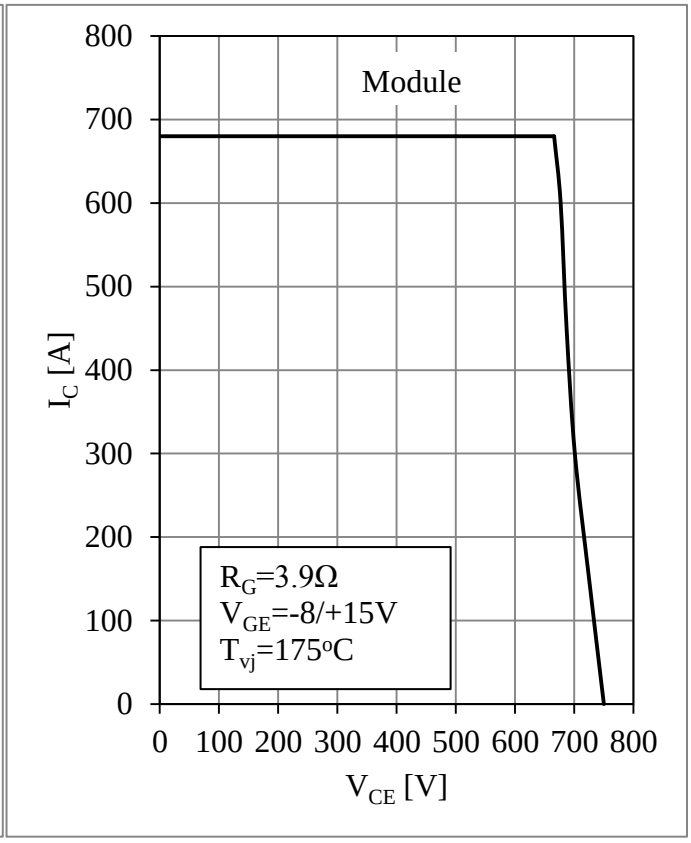


Fig 14. RBSOA

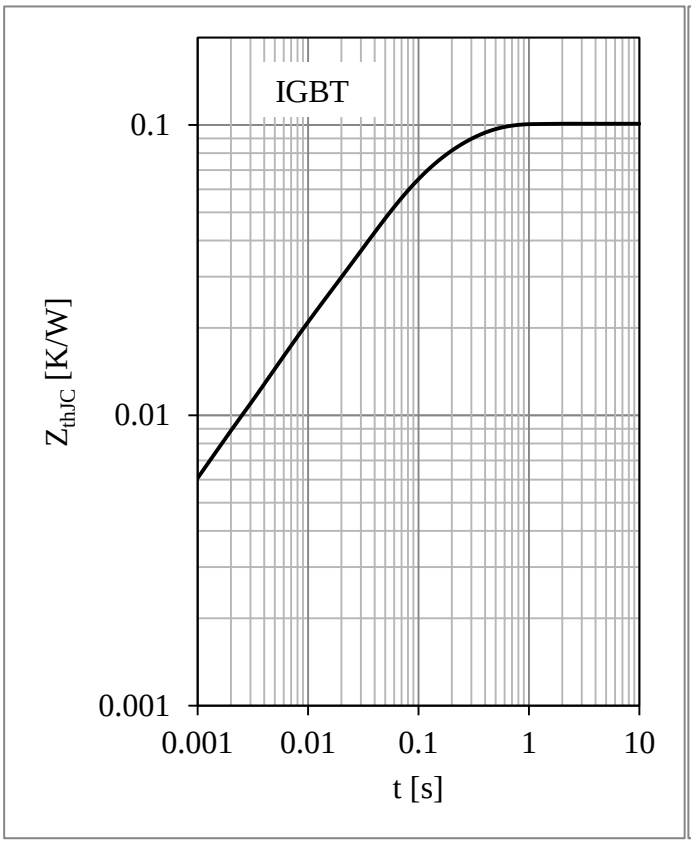


Fig 15. IGBT Transient Thermal Impedance

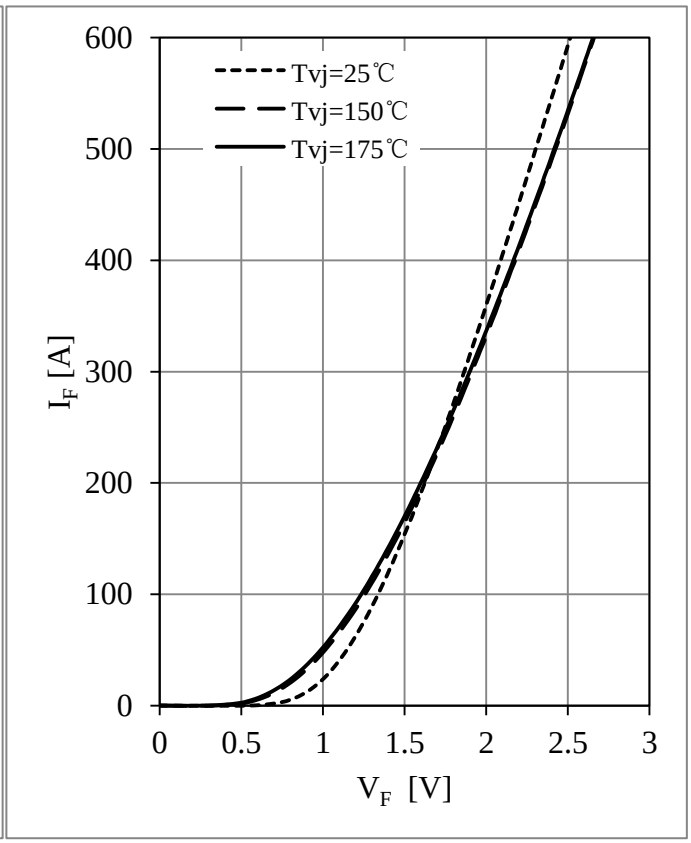


Fig 16. Diode Forward Characteristics

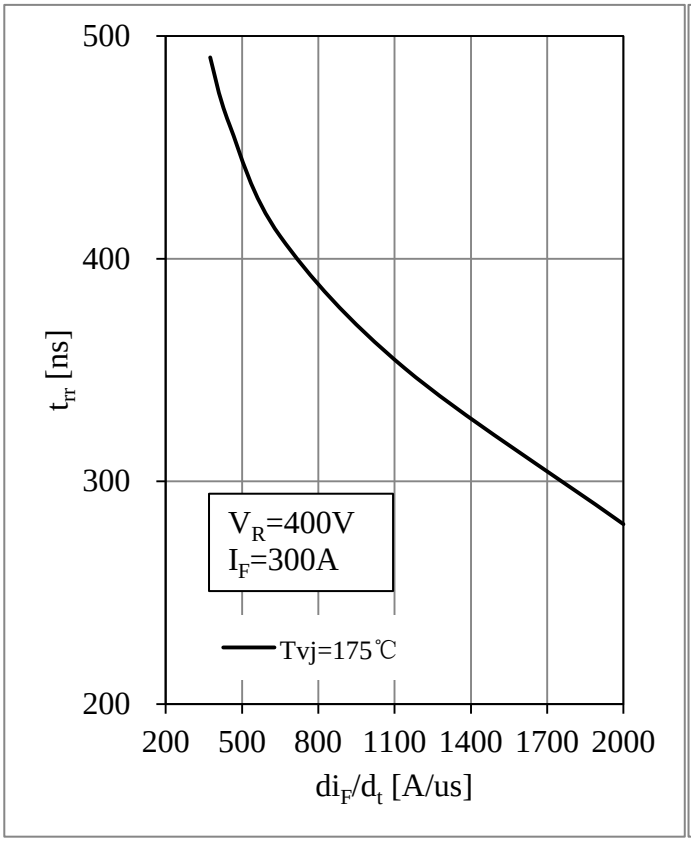


Fig 17. Reverse Recovery Time vs. di_F/d_t

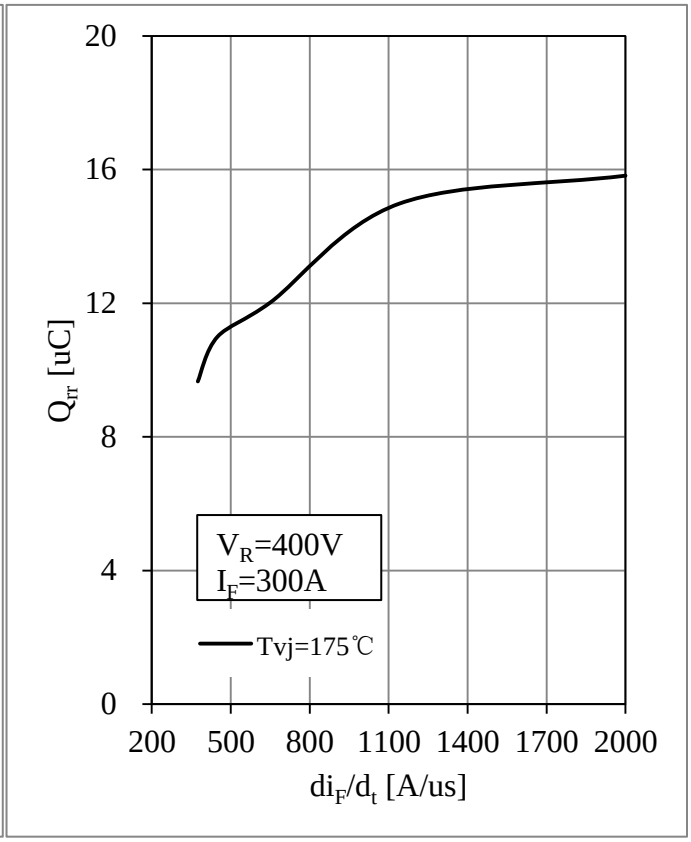


Fig 18. Reverse Recovery Charge vs. di_F/d_t

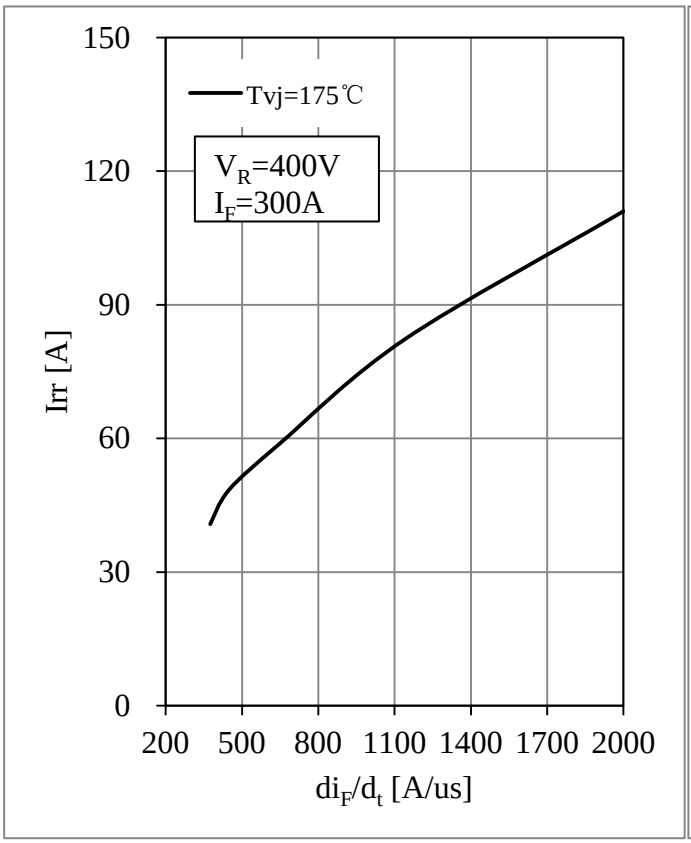


Fig 19. Reverse Recovery Current vs. di_F/d_t

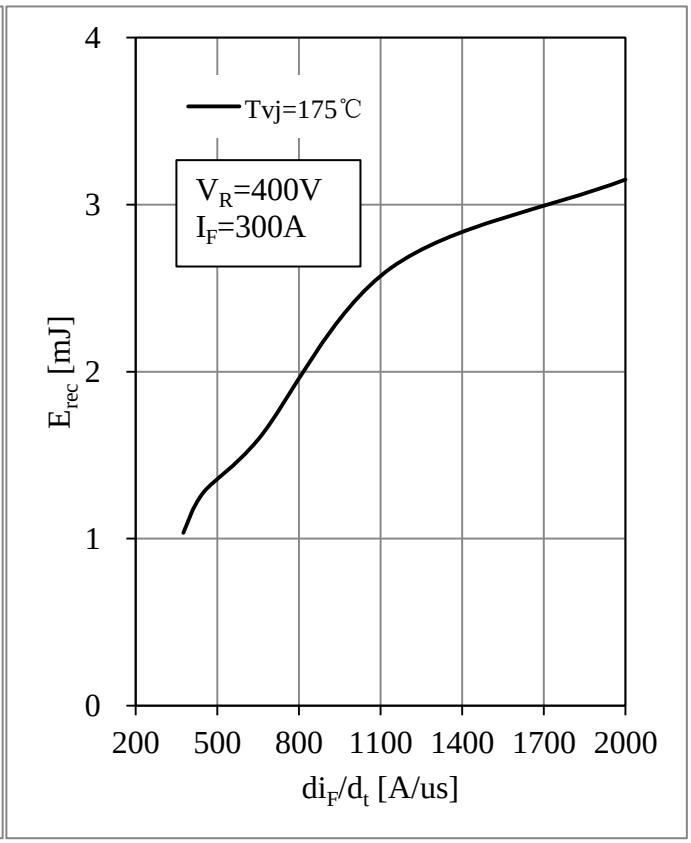


Fig 20. Reverse Energy Losses vs. di_F/d_t

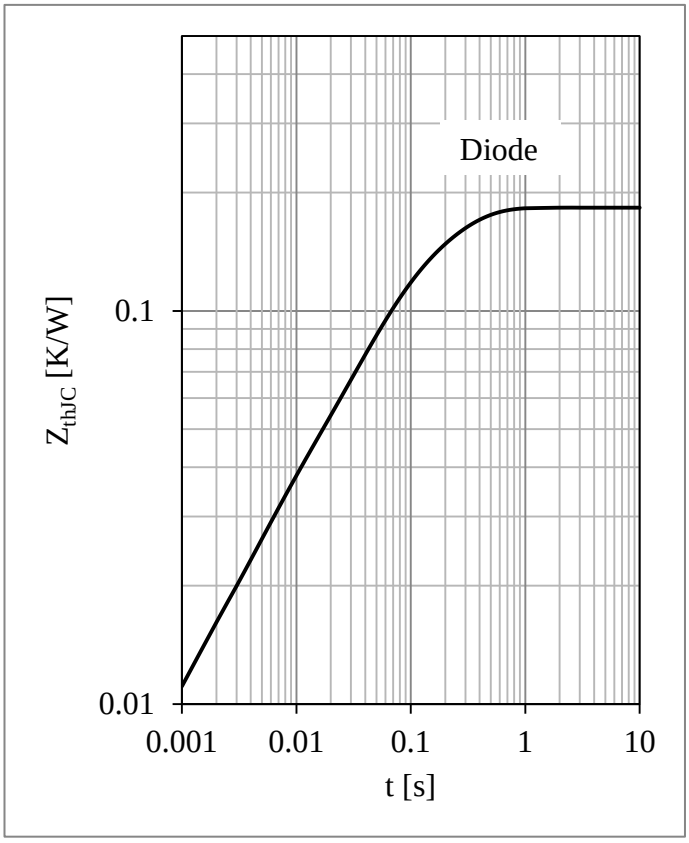
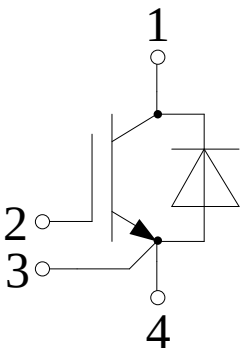


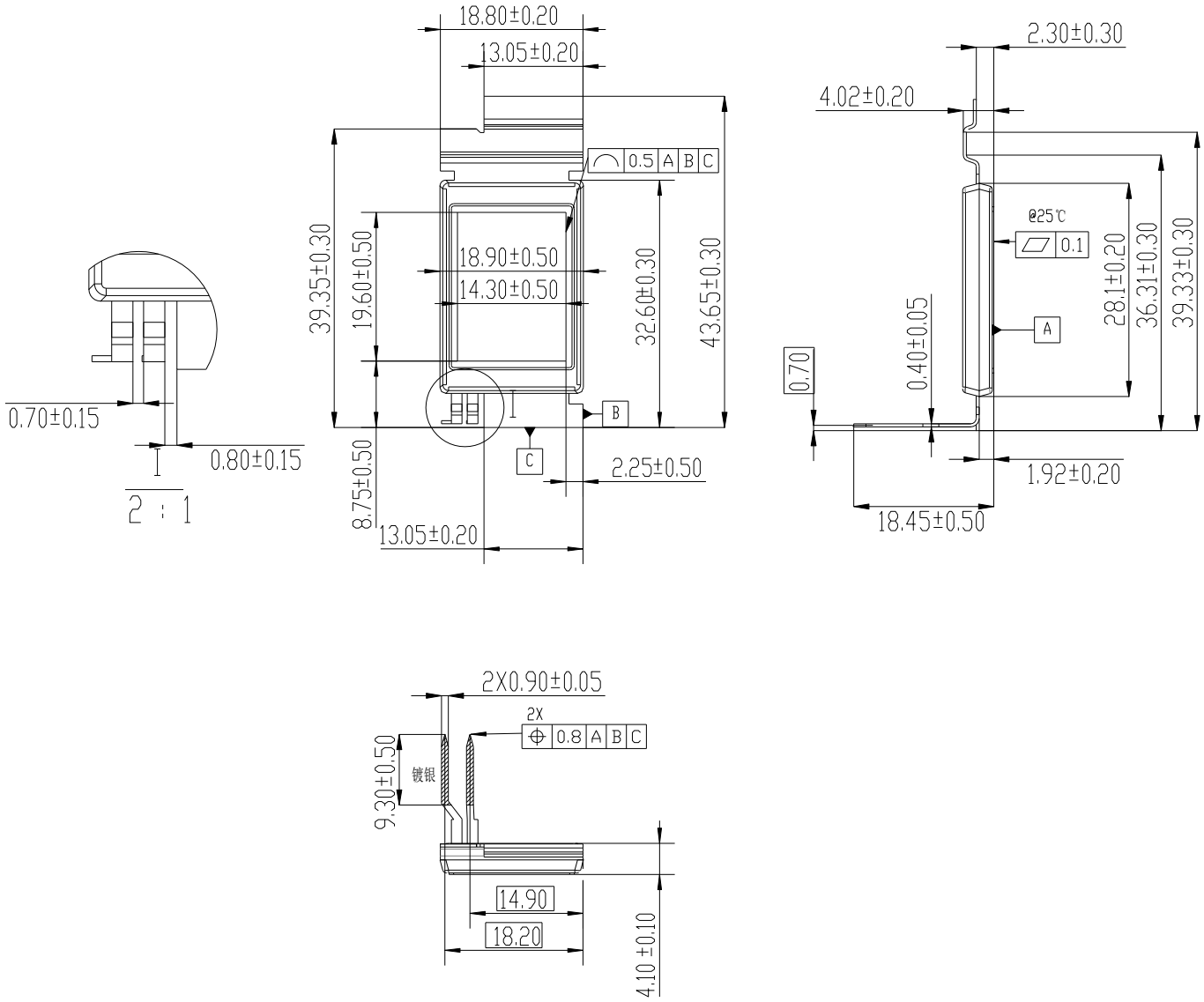
Fig 21. Diode Transient Thermal Impedance

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



Terms and Conditions of Usage

The data contained in this product datasheet is exclusively intended for technically trained staff. you and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

This product data sheet is describing the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively pursuant the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its characteristics.

Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of our product, please contact the sales office, which is responsible for you (see www.powersemi.cc), For those that are specifically interested we may provide application notes.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the Product in aviation applications, in health or live endangering or life support applications, please notify.

If and to the extent necessary, please forward equivalent notices to your customers.
Changes of this product data sheet are reserved.