

DOSEMI

IGBT

DG340X08T6B

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.

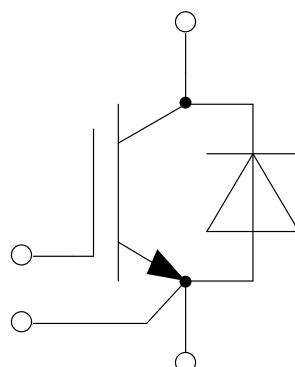
Features

- 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 $T_C=25^{\circ}\text{C}$ 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 @ $T_C=25^{\circ}\text{C}$ @ $T_C=100^{\circ}\text{C}$	523 340	A
I_{CM}	Pulsed Collector Current t_p limited by T_{vjmax}	680	A
P_D	Maximum Power Dissipation @ $T_{vj}=175^{\circ}\text{C}$	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	$^{\circ}\text{C}$
T_{jop}	Operating Junction Temperature	-40 to +150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}$, $t=1\text{min}$	2500	V

IGBT Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=300\text{A}, V_{GE}=15\text{V}, T_{vj}=25^{\circ}\text{C}$		1.65	2.10	V
		$I_C=300\text{A}, V_{GE}=15\text{V}, T_{vj}=150^{\circ}\text{C}$		1.95		
		$I_C=300\text{A}, V_{GE}=15\text{V}, T_{vj}=175^{\circ}\text{C}$		2.05		
		$I_C=340\text{A}, V_{GE}=15\text{V}, T_{vj}=150^{\circ}\text{C}$		2.10		
		$I_C=340\text{A}, V_{GE}=15\text{V}, T_{vj}=175^{\circ}\text{C}$		2.20		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=3.20\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^{\circ}\text{C}$	5.0	5.7	7.0	V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$			400	nA
R_{Gint}	Internal Gate Resistance			2.0		Ω
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, f=100\text{kHz}, V_{GE}=0\text{V}$		13.7		nF
C_{oes}	Output Capacitance			0.95		nF
C_{res}	Reverse Transfer Capacitance			0.54		nF
Q_G	Gate Charge	$V_{GE}=-8\dots+15\text{V}$		1.04		μC
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=400\text{V}, I_C=300\text{A}, R_G=3.9\Omega, V_{GE}=-8/+15\text{V}, L_S=60\text{nH}, T_{vj}=25^{\circ}\text{C}$		137		ns
t_r	Rise Time			95		ns
$t_{d(off)}$	Turn-Off Delay Time			419		ns
t_f	Fall Time			65		ns
E_{on}	Turn-On Switching Loss			13.8		mJ
E_{off}	Turn-Off Switching Loss			14.3		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=400\text{V}, I_C=300\text{A}, R_G=3.9\Omega, V_{GE}=-8/+15\text{V}, L_S=60\text{nH}, T_{vj}=150^{\circ}\text{C}$		144		ns
t_r	Rise Time			105		ns
$t_{d(off)}$	Turn-Off Delay Time			468		ns
t_f	Fall Time			73		ns
E_{on}	Turn-On Switching Loss			18.5		mJ
E_{off}	Turn-Off Switching Loss			16.7		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=400\text{V}, I_C=300\text{A}, R_G=3.9\Omega, V_{GE}=-8/+15\text{V}, L_S=60\text{nH}, T_{vj}=175^{\circ}\text{C}$		156		ns
t_r	Rise Time			111		ns
$t_{d(off)}$	Turn-Off Delay Time			488		ns
t_f	Fall Time			75		ns
E_{on}	Turn-On Switching Loss			20.0		mJ
E_{off}	Turn-Off Switching Loss			16.9		mJ
I_{SC}	SC Data	$t_p \leq 3\mu\text{s}, V_{GE}=15\text{V}, T_{vj}=150^{\circ}\text{C}, V_{CC}=400\text{V}, V_{CEM} \leq 750\text{V}$		1400		A

Diode Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	$I_F=300\text{A}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$		1.85	2.30	V
		$I_F=300\text{A}, V_{GE}=0\text{V}, T_{vj}=150^{\circ}\text{C}$		1.90		
		$I_F=300\text{A}, V_{GE}=0\text{V}, T_{vj}=175^{\circ}\text{C}$		1.90		
		$I_F=340\text{A}, V_{GE}=0\text{V}, T_{vj}=150^{\circ}\text{C}$		2.00		
		$I_F=340\text{A}, V_{GE}=0\text{V}, T_{vj}=175^{\circ}\text{C}$		2.00		
t_{rr}	Reverse Recovery Time	$V_R=400\text{V}, I_F=300\text{A},$ $-di/dt=2100\text{A}/\mu\text{s}, V_{GE}=-8\text{V}$ $L_S=60\text{nH}, T_{vj}=25^{\circ}\text{C}$		140		ns
Q_r	Recovered Charge			7.10		μC
I_{RM}	Peak Reverse Recovery Current			93		A
E_{rec}	Reverse Recovery Energy			1.93		mJ
t_{rr}	Reverse Recovery Time	$V_R=400\text{V}, I_F=300\text{A},$ $-di/dt=2100\text{A}/\mu\text{s}, V_{GE}=-8\text{V}$ $L_S=60\text{nH}, T_{vj}=150^{\circ}\text{C}$		239		ns
Q_r	Recovered Charge			13.8		μC
I_{RM}	Peak Reverse Recovery Current			112		A
E_{rec}	Reverse Recovery Energy			3.35		mJ
t_{rr}	Reverse Recovery Time	$V_R=400\text{V}, I_F=300\text{A},$ $-di/dt=2100\text{A}/\mu\text{s}, V_{GE}=-8\text{V}$ $L_S=60\text{nH}, T_{vj}=175^{\circ}\text{C}$		252		ns
Q_r	Recovered Charge			15.2		μC
I_{RM}	Peak Reverse Recovery Current			121		A
E_{rec}	Reverse Recovery Energy			3.42		mJ

Discrete Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise noted

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

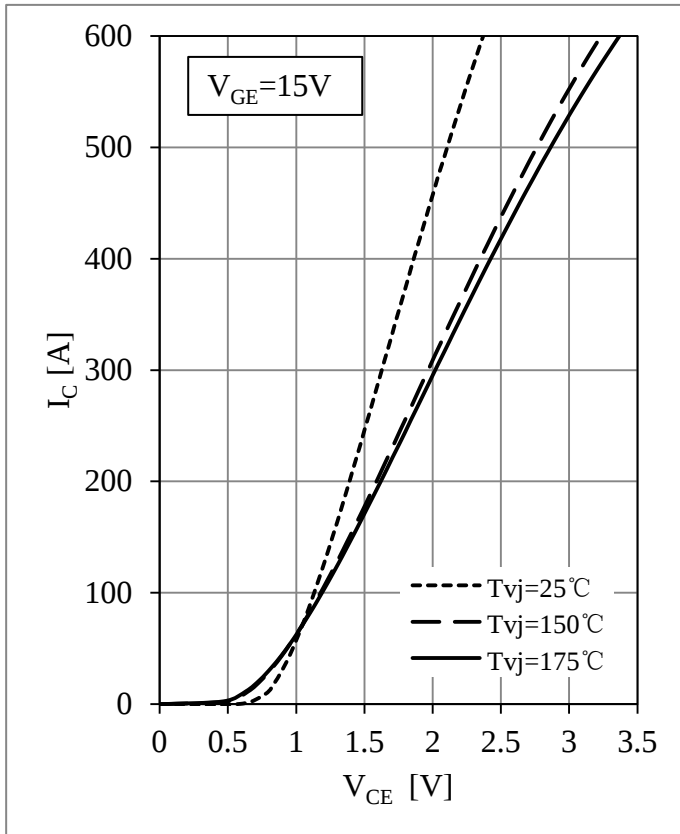


Fig 1. IGBT Output Characteristics

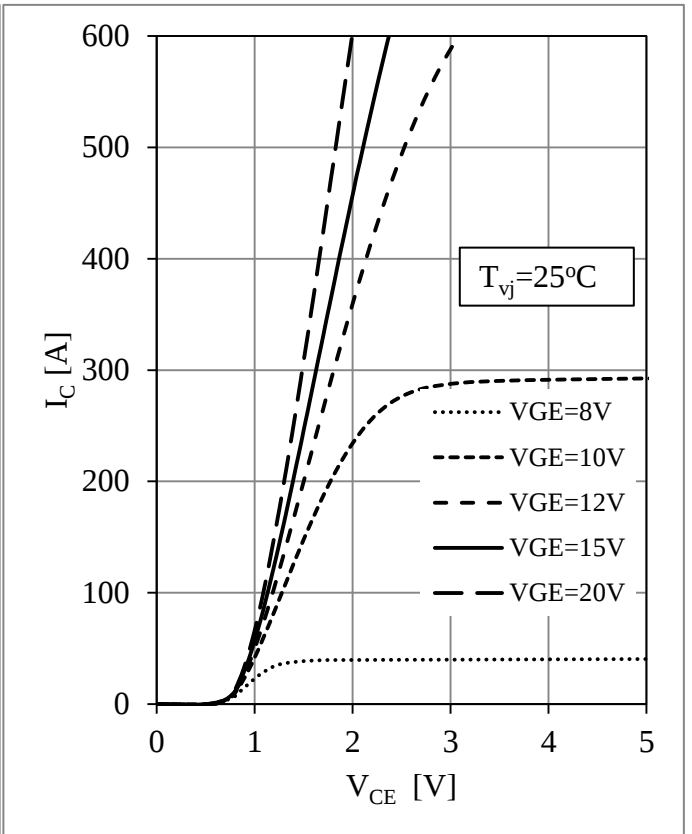


Fig 2. IGBT Output Characteristics

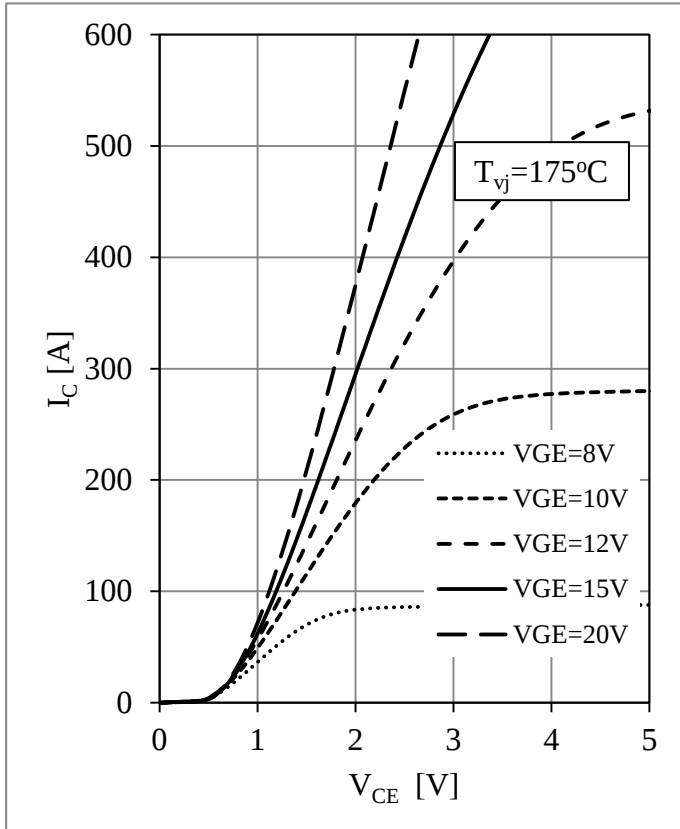


Fig 3. IGBT Output Characteristics

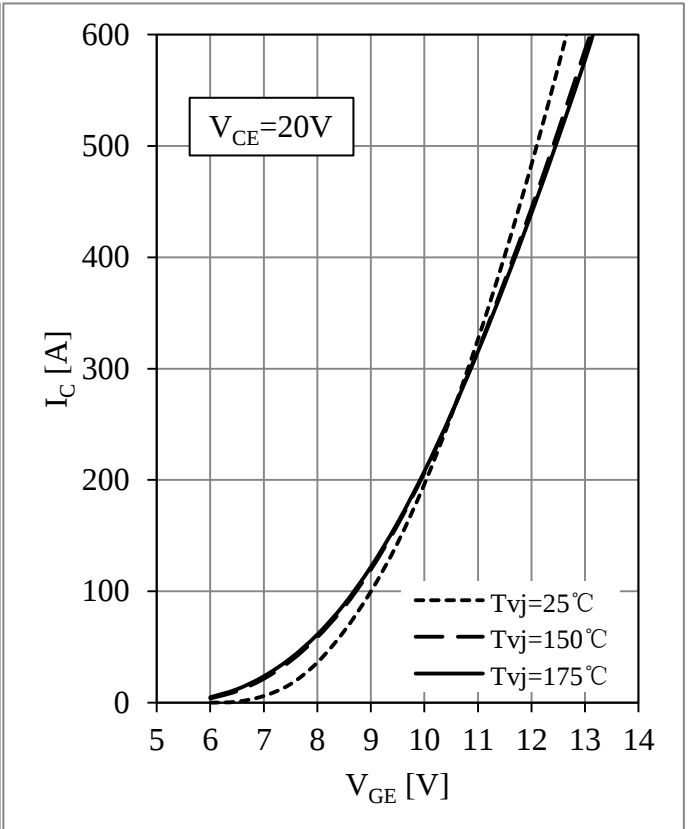
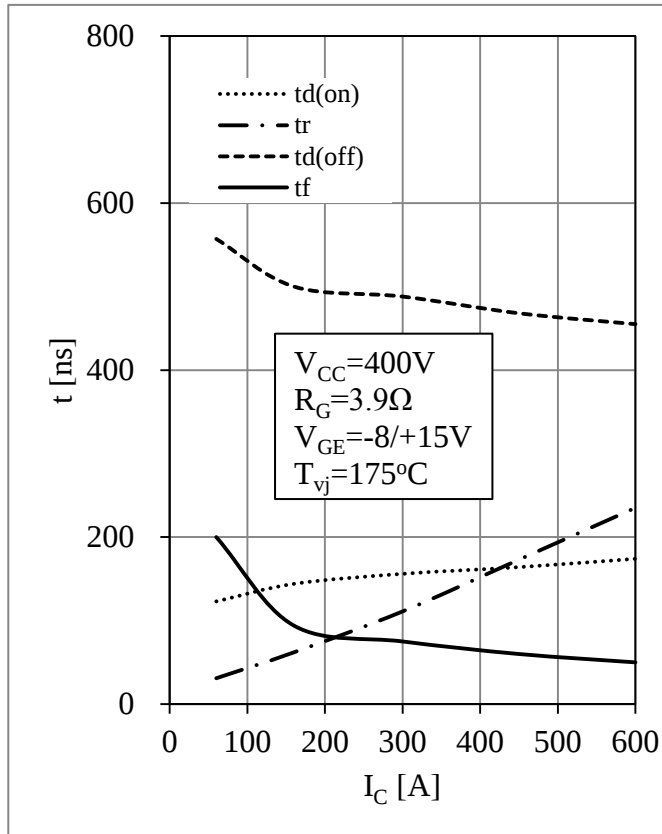
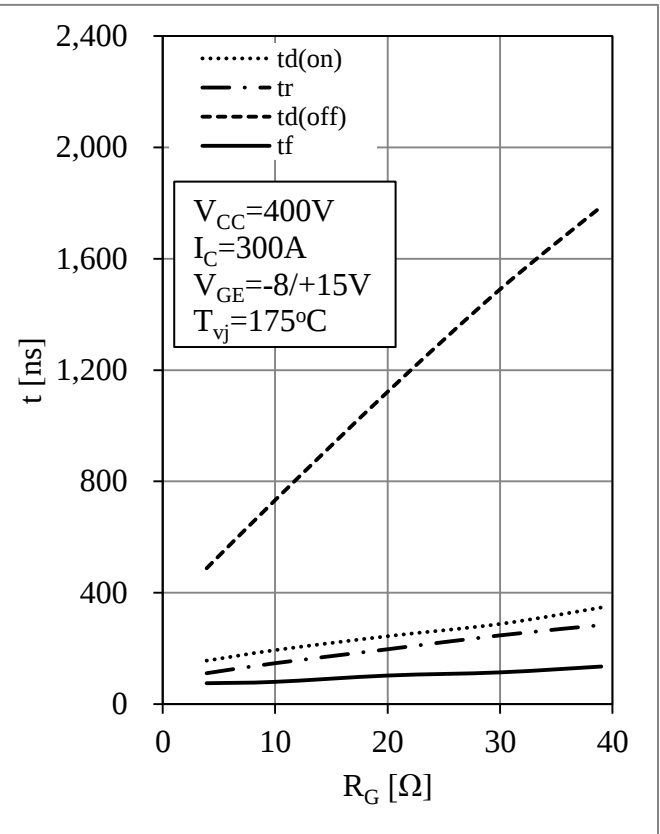
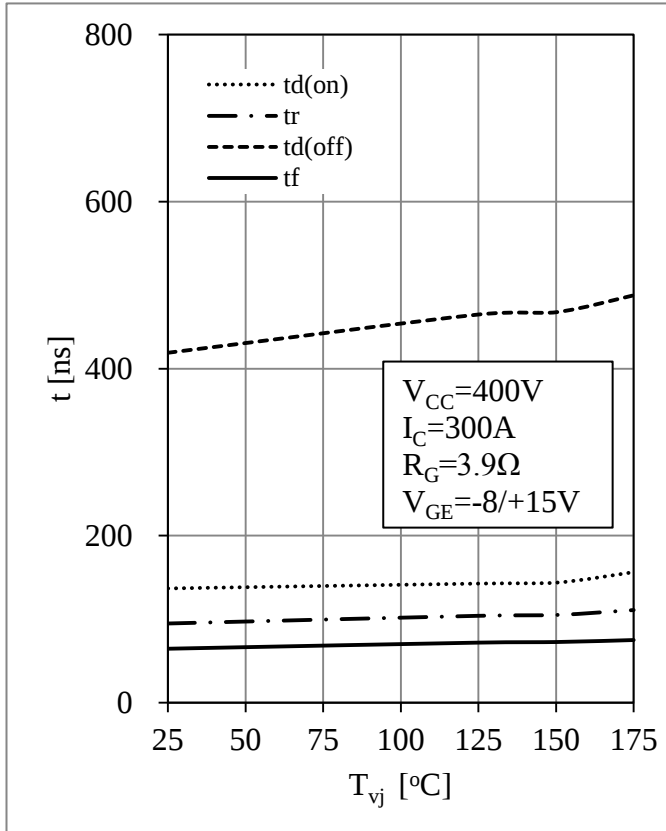
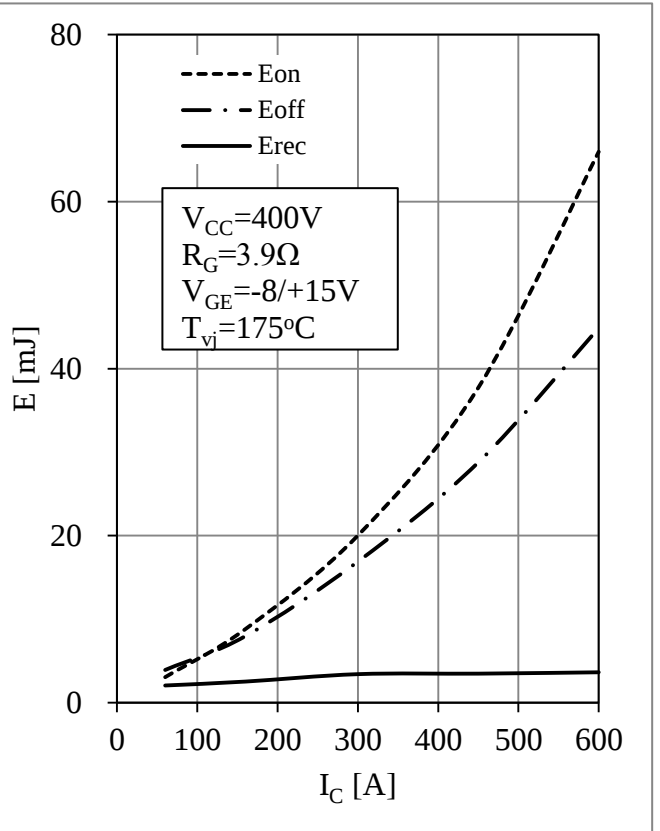


Fig 4. IGBT Transfer Characteristics

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

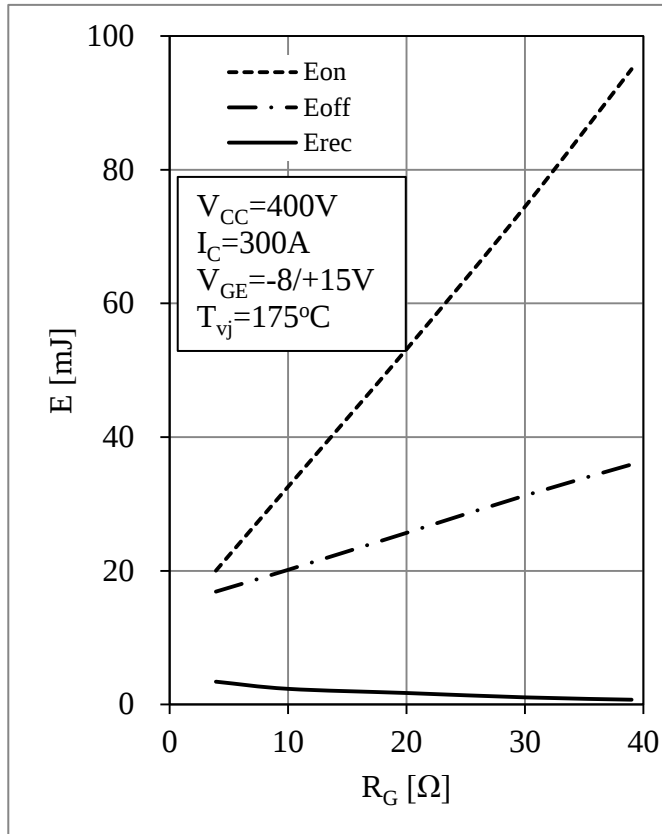
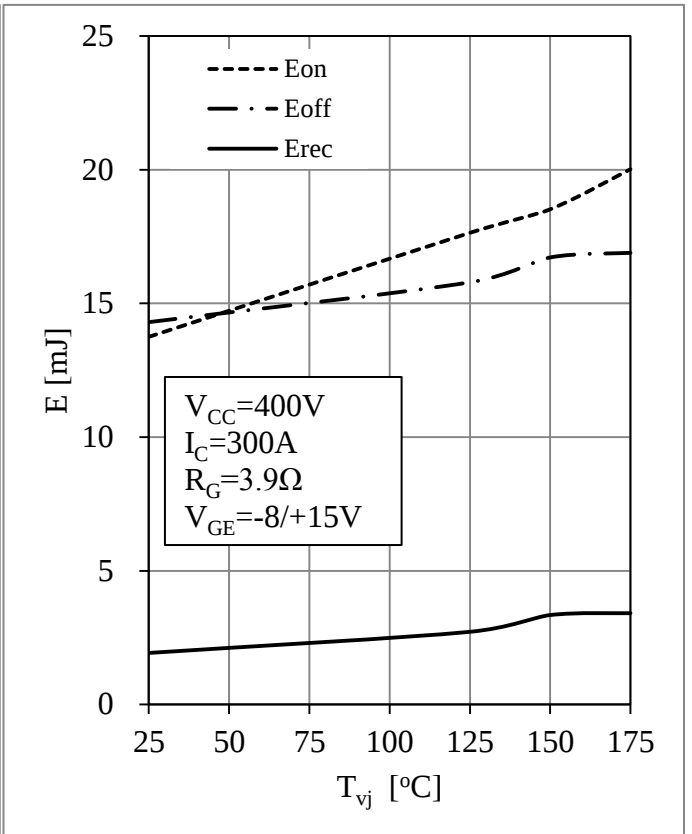
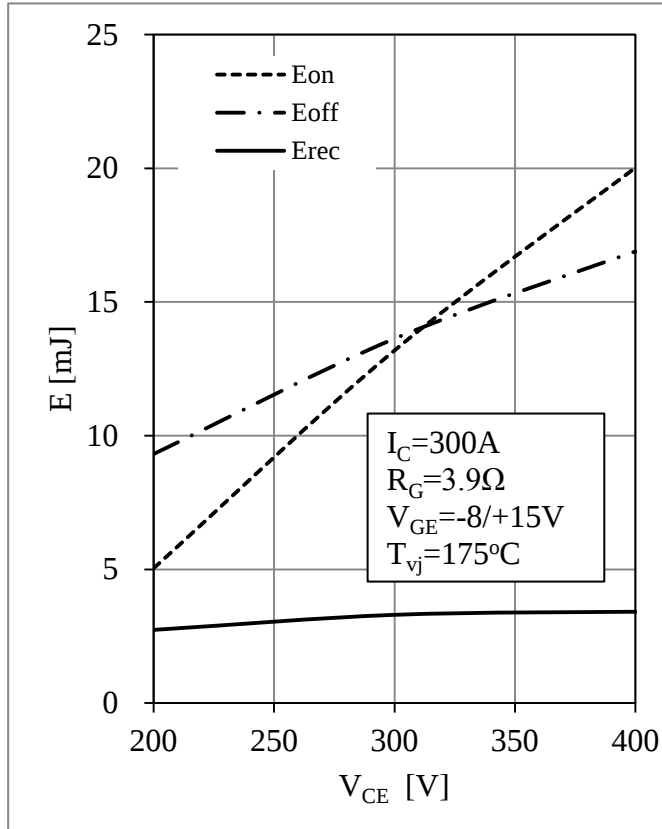
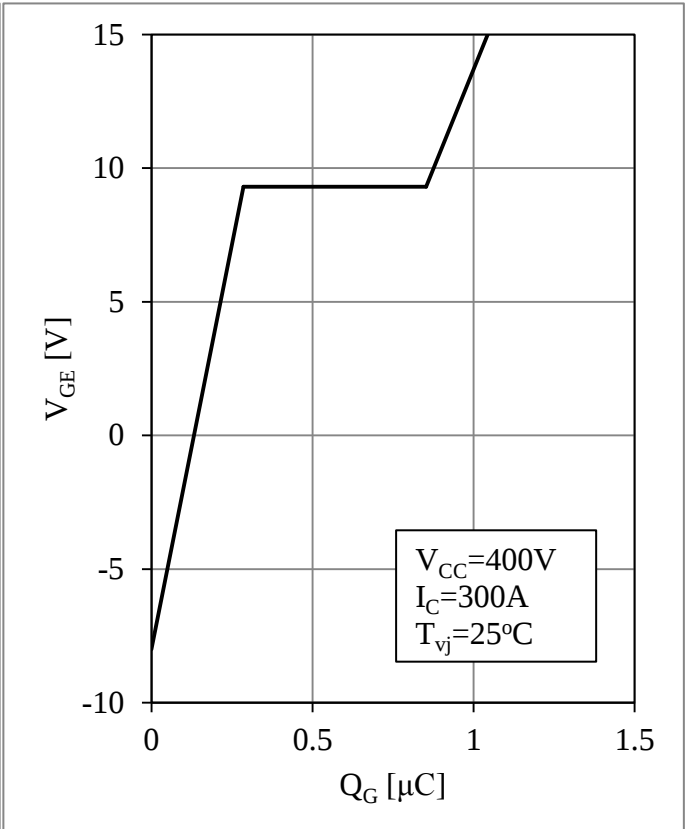
Fig 9. Switching Energy Loss vs. R_G Fig 10. Switching Energy Loss vs. T_j Fig 11. Switching Energy Loss vs. V_{CE} 

Fig 12. IGBT Gate Charge Characteristic

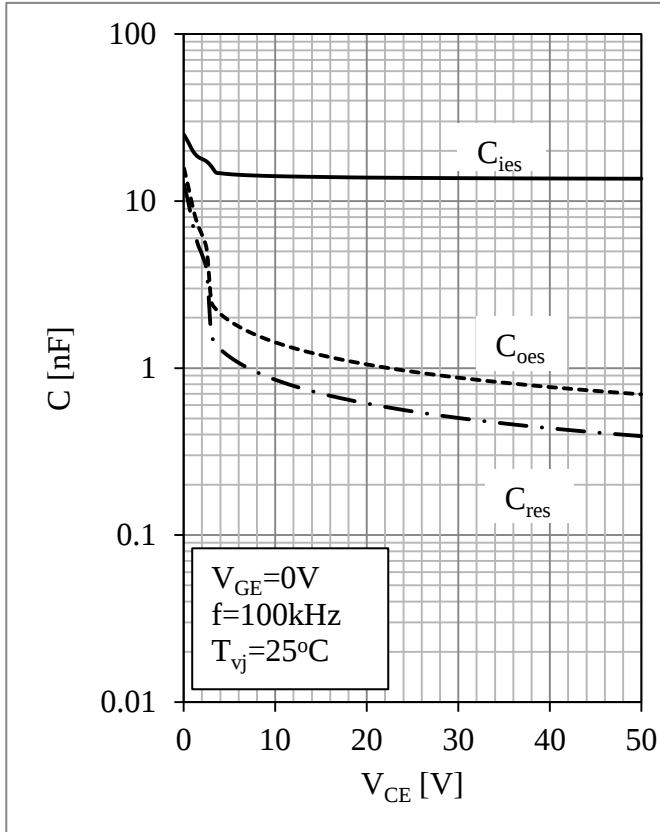


Fig 13. IGBT Capacity Characteristic

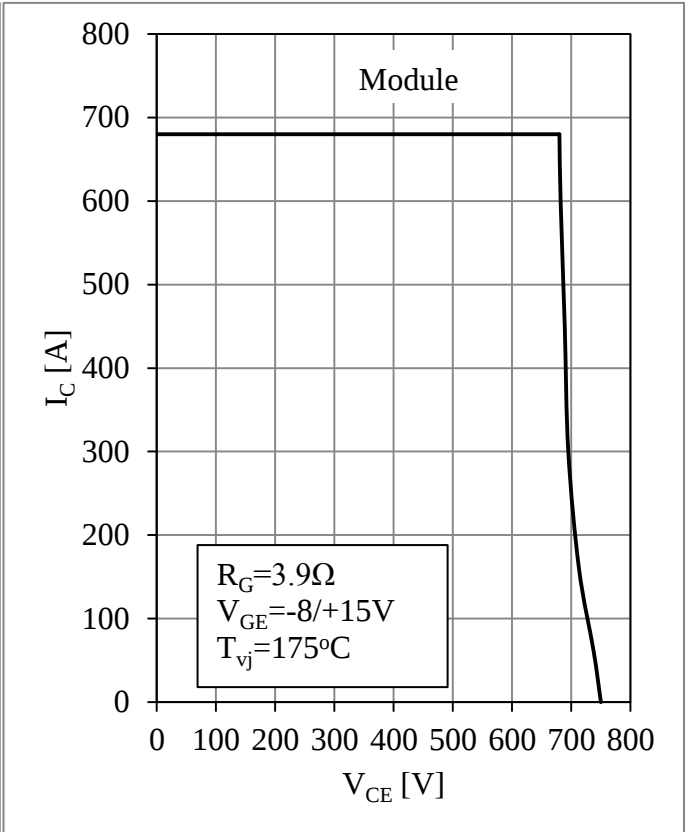


Fig 14. RBSOA

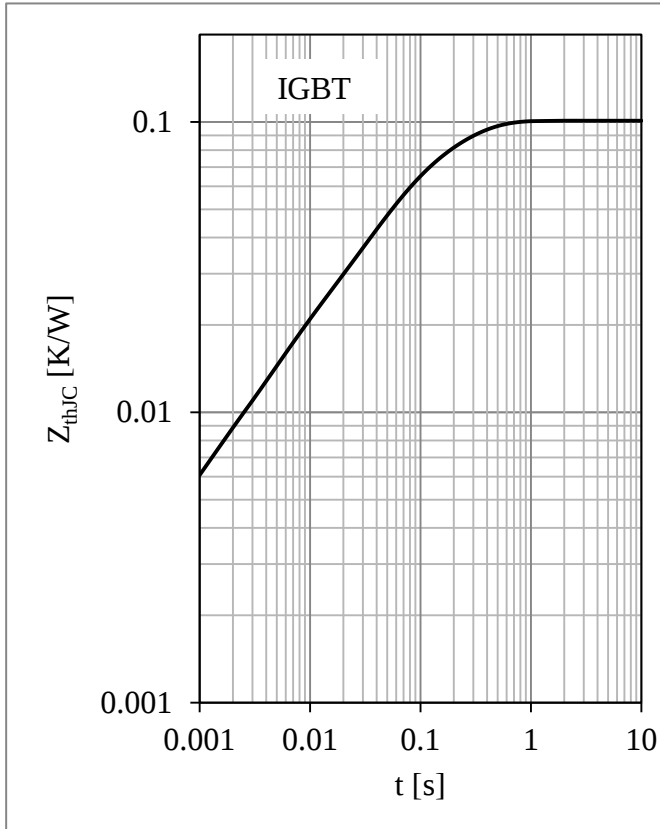


Fig 15. IGBT Transient Thermal Impedance

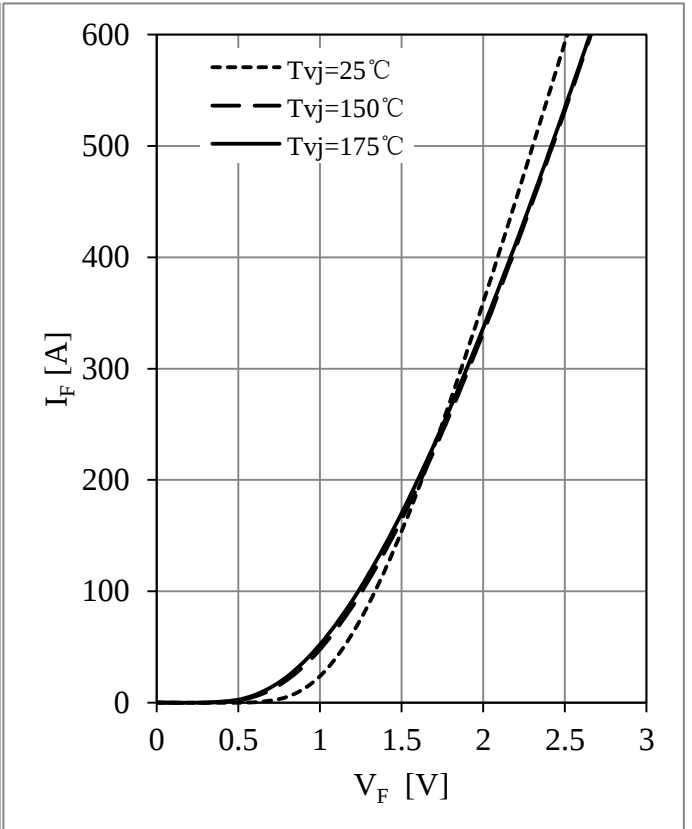
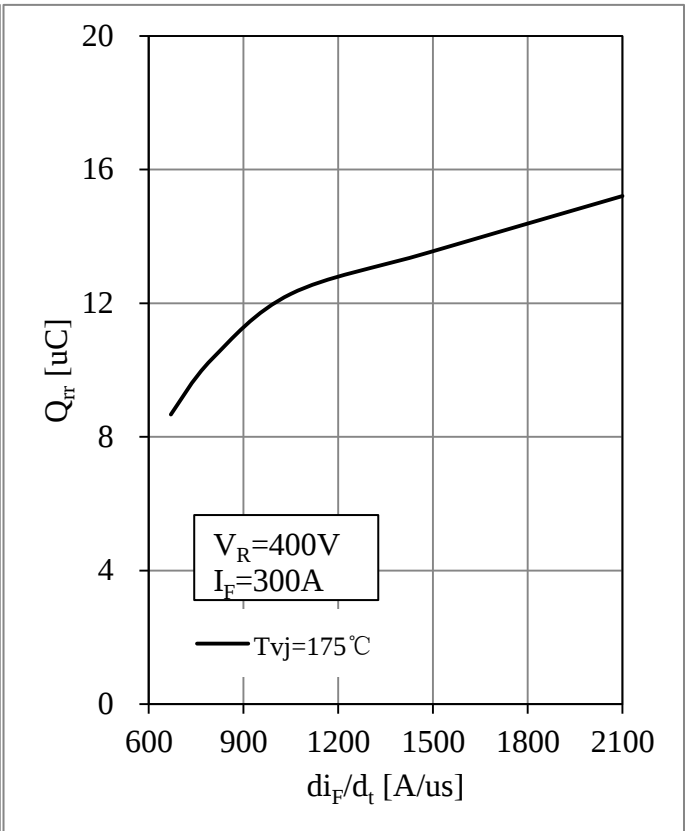
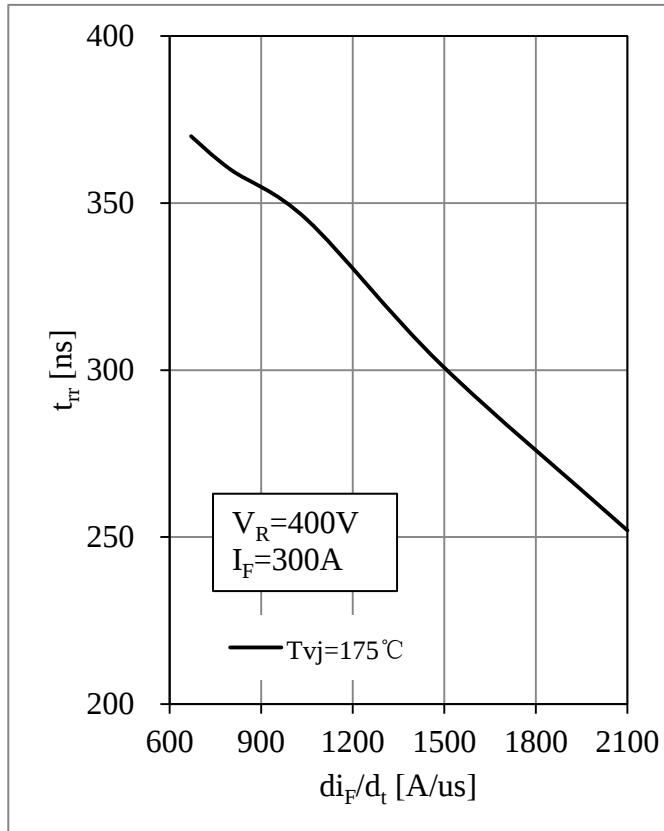
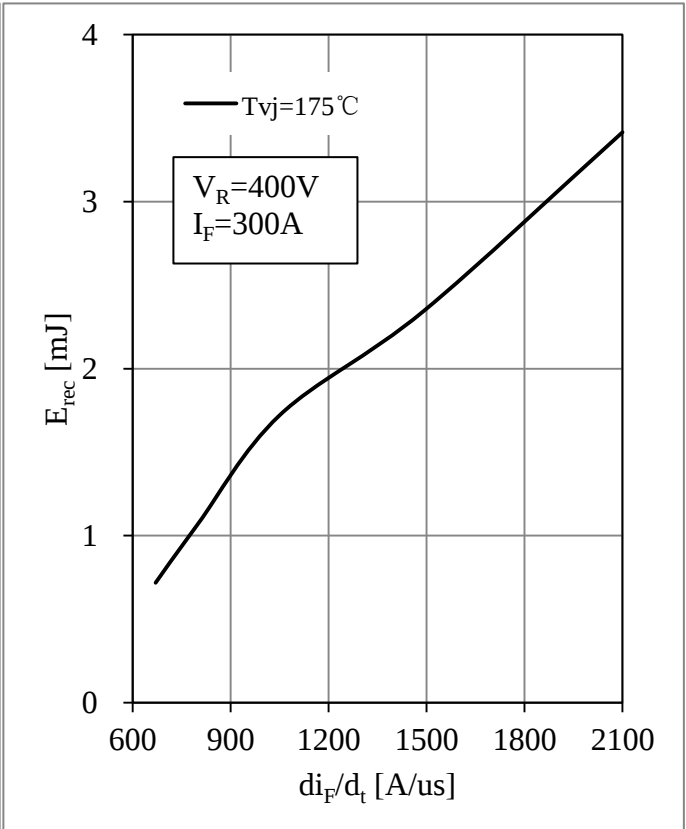
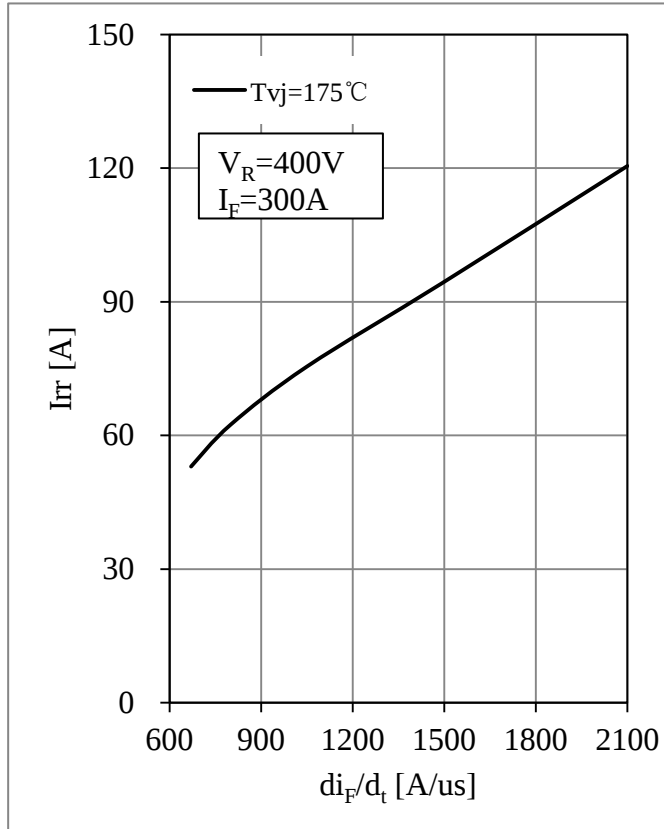


Fig 16. Diode Forward Characteristics

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

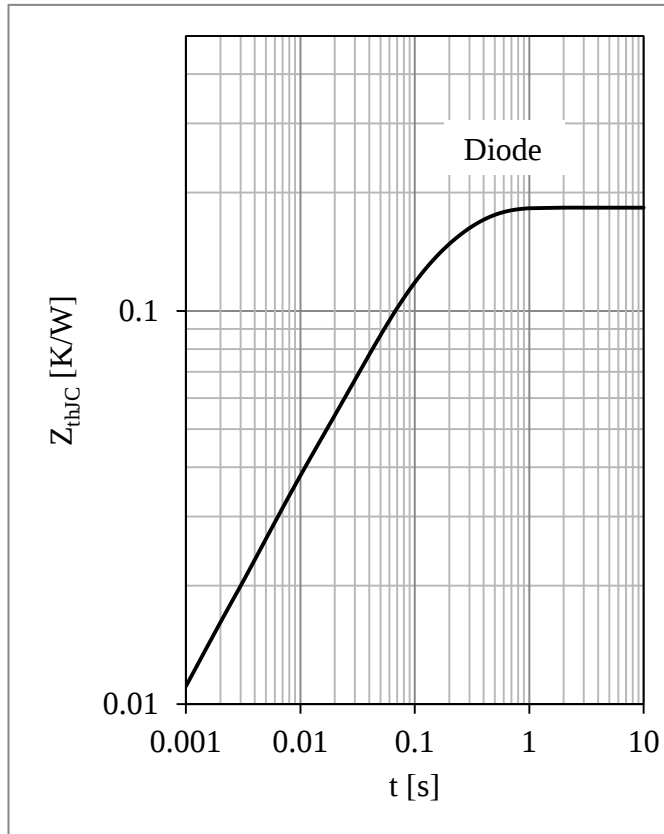


Fig 21. Diode Transient Thermal Impedance

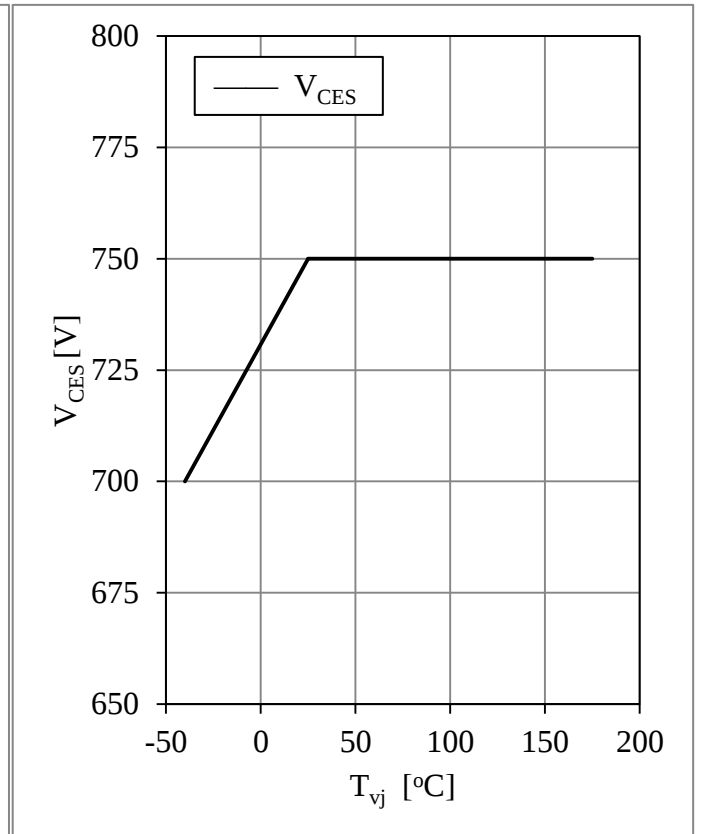
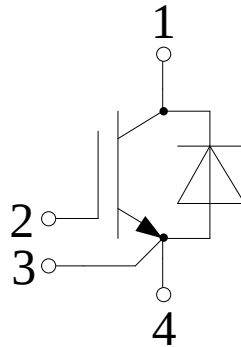


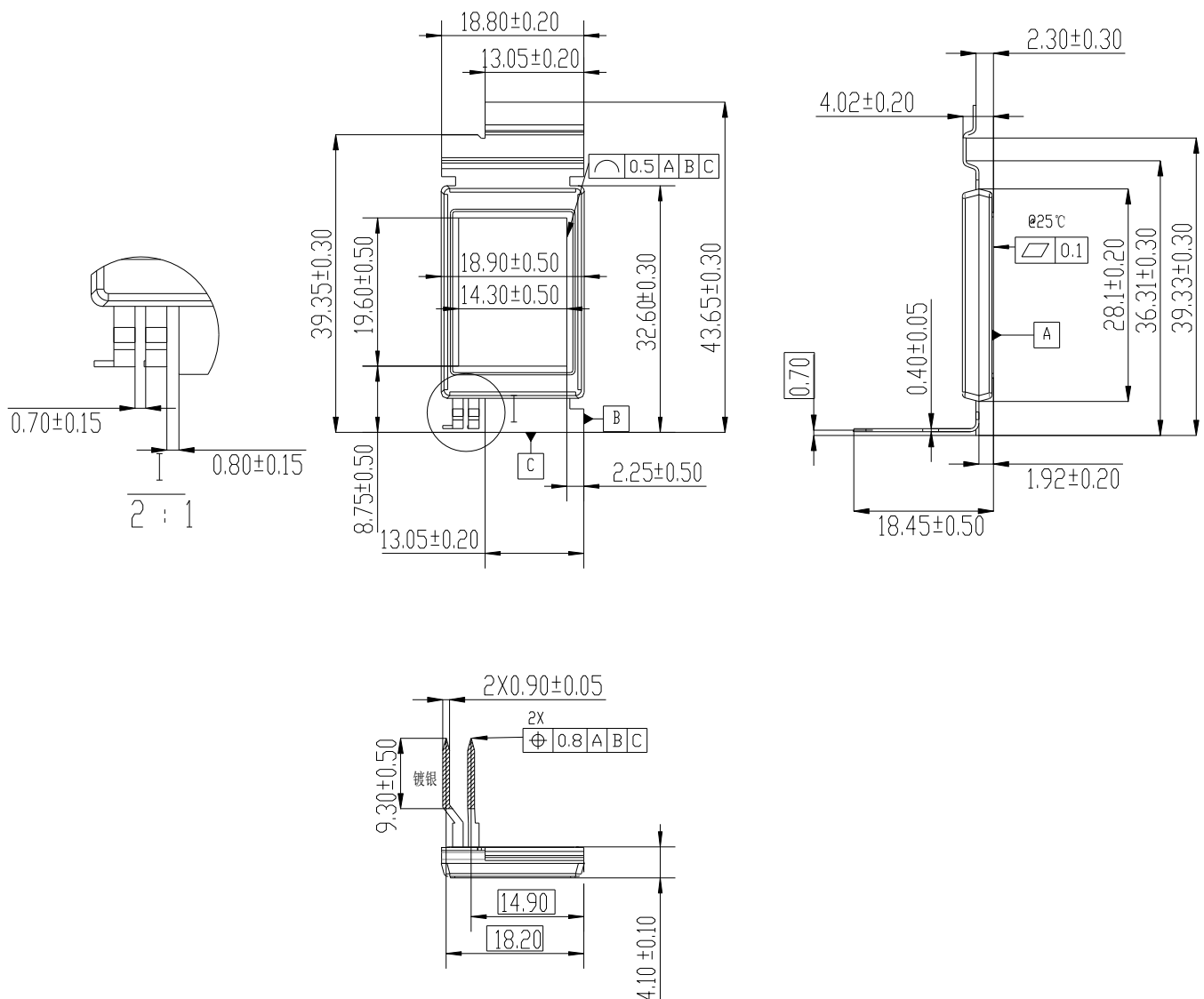
Fig 15. Maximum Allowed Collector-Emitter Voltage

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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