DOSEMI

IGBT

DG160A08TDFS

750V/160A IGBT with Diode

General Description

DOSEMI IGBT Power Discrete provides ultra low conduction loss
They are designed for the applications such as solar power and on-board charger.

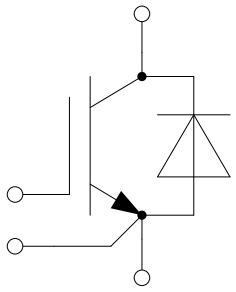
Features

- Low $V_{CE(sat)}$ IGBT technology
- Maximum junction temperature 175°C
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FWD

Typical Applications

- Solar power
- UPS
- OBC

Equivalent Circuit Schematic



Type	Package	Marking	Shipping
DG160A08TDFS	TO-247PLUS-4L	DG160A08TDFS	30Units/Tube

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 Transient Gate-Emitter Voltage	±20 ±30	V
I_C	Collector Current @ T_C=25°C @ T_C=100°C	200(1) 160	A
I_{CM}	Pulsed Collector Current t_p limited by T_{vjmax}	320	A
P_D	Maximum Power Dissipation @ T_{vj}=175°C	625	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	750	V
I_F	Diode Continuous Forward Current @ T_C=25°C @ T_C=100°C	200(1) 160	A
I_{FM}	Diode Pulsed Current t_p limited by T_{vjmax}	320	A

Discrete

Symbol	Description	Values	Unit
T_{vjop}	Operating Junction Temperature	-40 to +175	°C
T_{STG}	Storage Temperature Range	-55 to +150	°C
T_S	Soldering Temperature,1.6mm from case for 10s	260	°C

(1) limited by bondwire

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=160A,V_{GE}=15V, T_{vj}=25°C		1.45	1.90	V
		I_C=160A,V_{GE}=15V, T_{vj}=150°C		1.75		
		I_C=160A,V_{GE}=15V, T_{vj}=175°C		1.80		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=3.2mA,V_{CE}=V_{GE}, T_{vj}=25°C	3.5	4.0	4.5	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_{vj}=25°C			200	uA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_{vj}=25°C			100	nA
R_{Gint}	Internal Gate Resistance			0		Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=100kHz, V_{GE}=0V		6.96		nF
C_{oes}	Output Capacitance			0.31		nF
C_{res}	Reverse Transfer Capacitance			0.03		nF
Q_G	Gate Charge	V_{GE}=0…+15V		0.24		uC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=160A, R_{Gon}=27Ω,R_{Goff}=20Ω, L_S=40nH, V_{GE}=0/+15V, T_{vj}=25°C		62		ns
t_r	Rise Time			60		ns
$t_{d(off)}$	Turn-Off Delay Time			470		ns
t_f	Fall Time			54		ns
E_{on}	Turn-On Switching Loss			8.20		mJ
E_{off}	Turn-Off Switching Loss			1.07		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=160A, R_{Gon}=27Ω,R_{Goff}=20Ω, L_S=40nH, V_{GE}=0/+15V, T_{vj}=150°C		46		ns
t_r	Rise Time			66		ns
$t_{d(off)}$	Turn-Off Delay Time			523		ns
t_f	Fall Time			57		ns
E_{on}	Turn-On Switching Loss			9.80		mJ
E_{off}	Turn-Off Switching Loss			1.79		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=400V,I_C=160A, R_{Gon}=27Ω,R_{Goff}=20Ω, L_S=40nH, V_{GE}=0/+15V, T_{vj}=175°C		44		ns
t_r	Rise Time			71		ns
$t_{d(off)}$	Turn-Off Delay Time			538		ns
t_f	Fall Time			61		ns
E_{on}	Turn-On Switching Loss			9.83		mJ
E_{off}	Turn-Off Switching Loss			1.89		mJ

Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=160A,V_{GE}=0V,T_{vj}=25°C		1.65	2.10	V
		I_F=160A,V_{GE}=0V,T_{vj}=150°C		1.65		
		I_F=160A,V_{GE}=0V,T_{vj}=175°C		1.65		
t_{rr}	Diode Reverse Recovery Time	V_R=400V,I_F=160A, -di/dt=2500A/μs,L_S=40nH, V_{GE}=0V,T_{vj}=25°C		127		ns
Q_r	Recovered Charge			7.25		μC
I_{RM}	Peak Reverse Recovery Current			104		A
E_{rec}	Reverse Recovery Energy			0.52		mJ
t_{rr}	Diode Reverse Recovery Time	V_R=400V,I_F=160A, -di/dt=2310A/μs,L_S=40nH, V_{GE}=0V,T_{vj}=150°C		201		ns
Q_r	Recovered Charge			13.4		μC
I_{RM}	Peak Reverse Recovery Current			125		A
E_{rec}	Reverse Recovery Energy			1.81		mJ
t_{rr}	Diode Reverse Recovery Time	V_R=400V,I_F=160A, -di/dt=2244A/μs,L_S=40nH, V_{GE}=0V,T_{vj}=175°C		220		ns
Q_r	Recovered Charge			14.5		μC
I_{RM}	Peak Reverse Recovery Current			126		A
E_{rec}	Reverse Recovery Energy			2.04		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)			0.240 0.330	K/W
R_{thJA}	Junction-to-Ambient		40		K/W

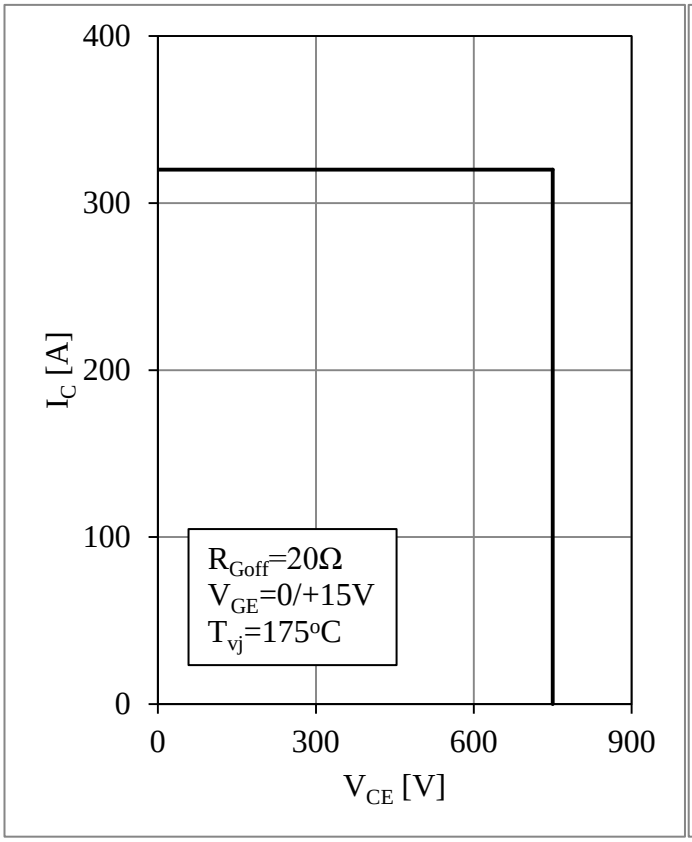


Fig 1. RBSOA

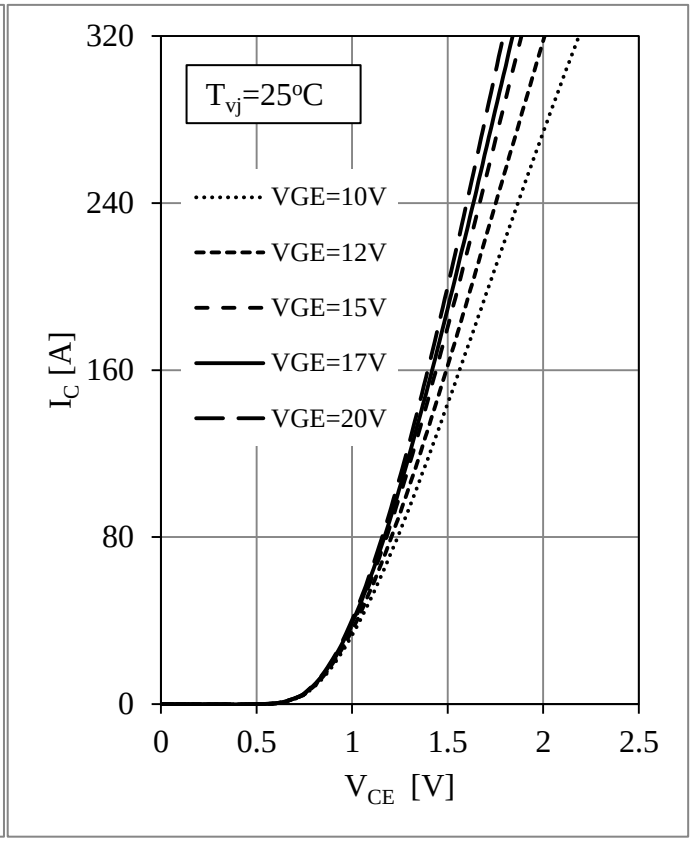


Fig 2. IGBT Output Characteristics

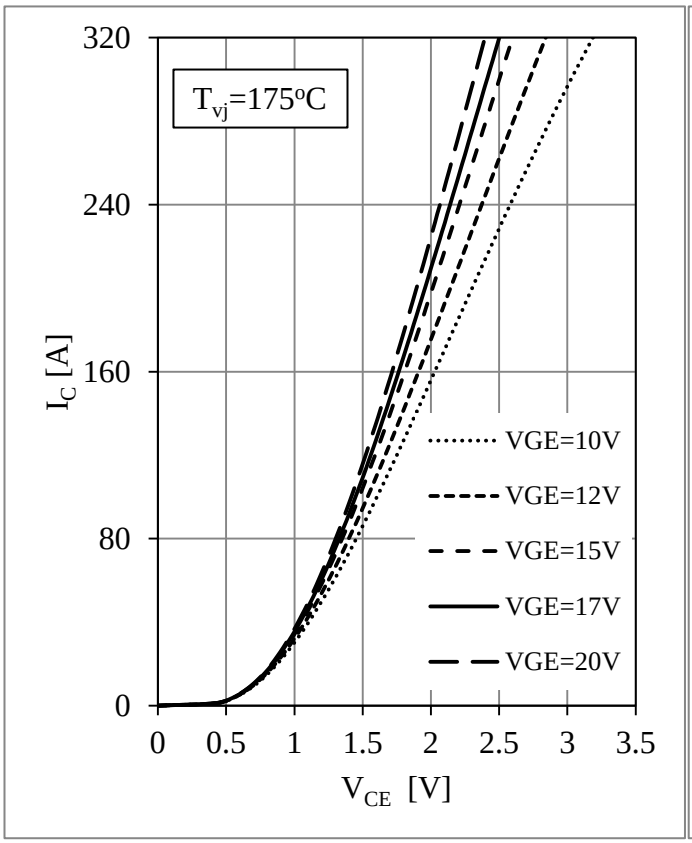


Fig 3. IGBT Output Characteristics

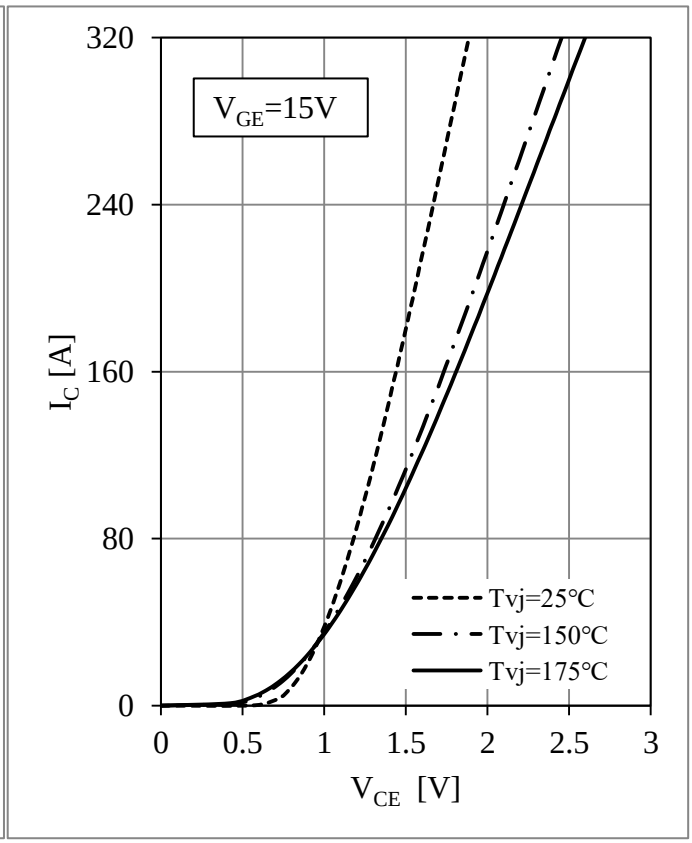


Fig 4. IGBT Output Characteristics

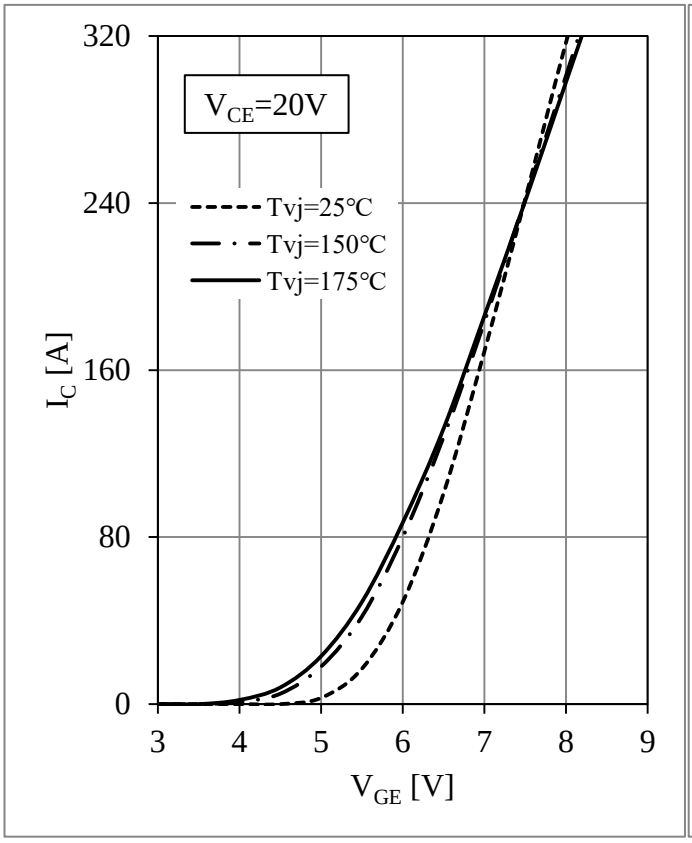


Fig 5. IGBT Transfer Characteristics

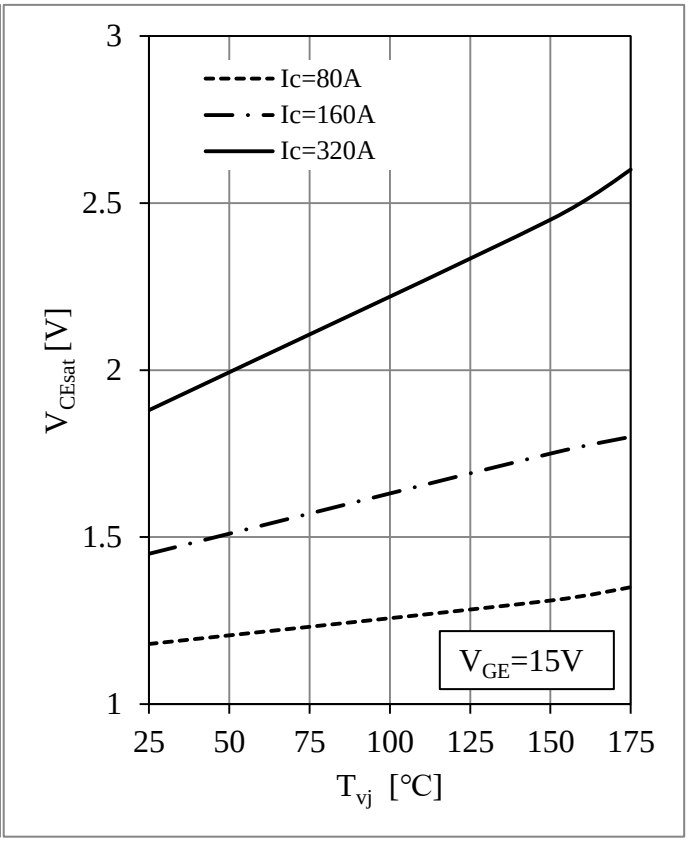


Fig 6. Collector-emitter saturation voltage vs T_{vj}

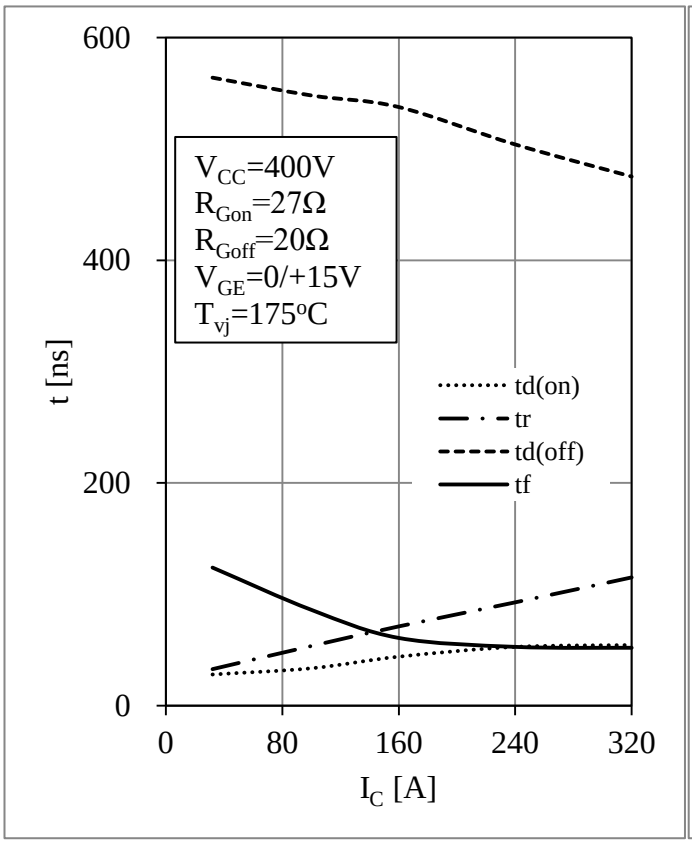


Fig 7. IGBT Switching Times vs. Ic

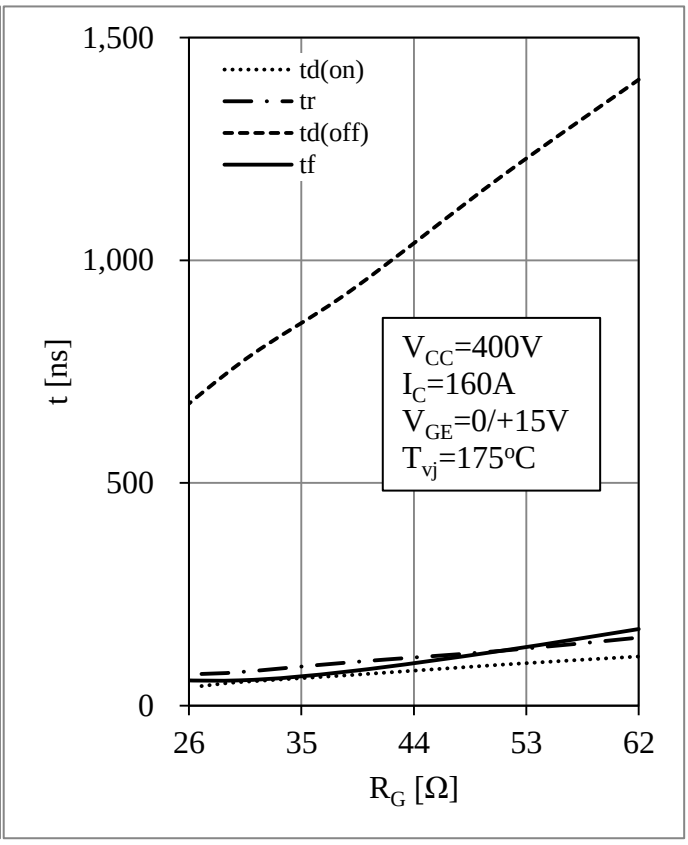


Fig 8. IGBT Switching Times vs. R_G

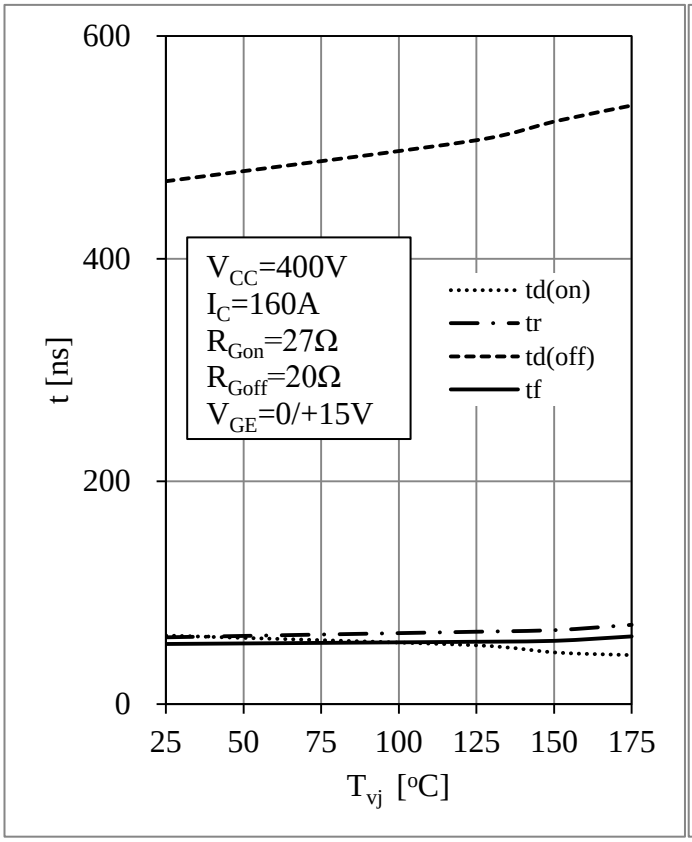


Fig 9. IGBT Switching Times vs. T_{vj}

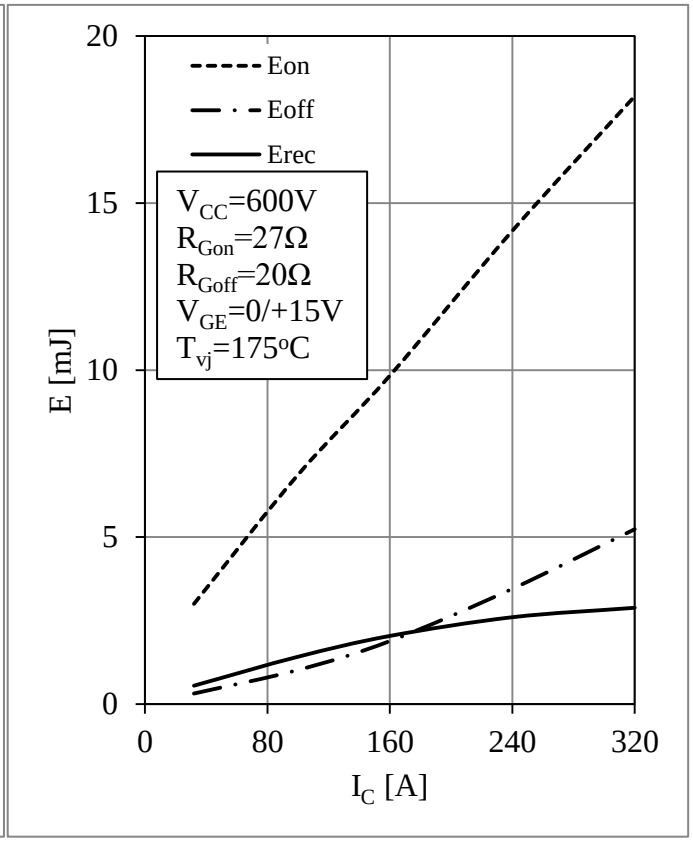


Fig 10. Switching Energy Loss vs. I_C

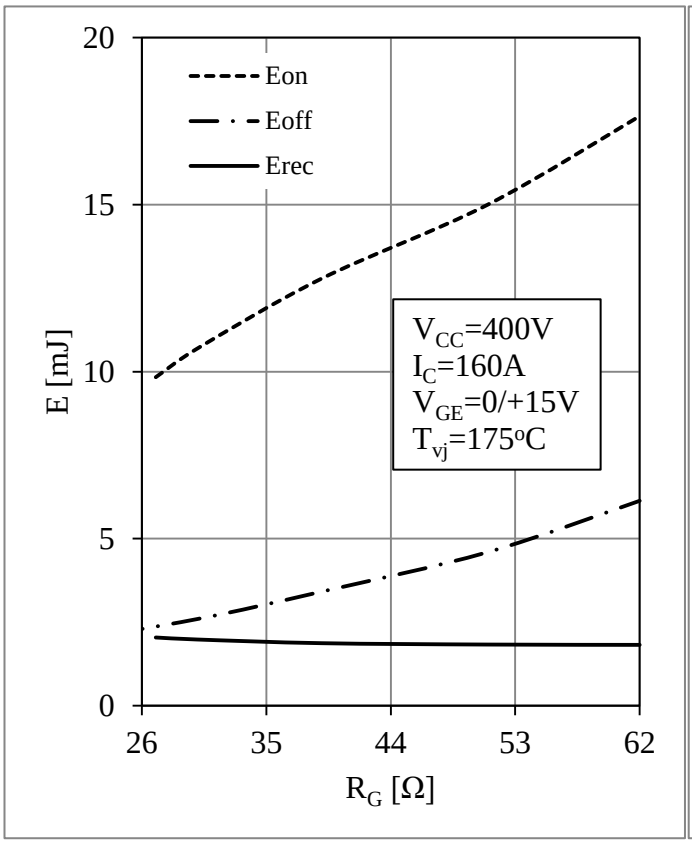


Fig 11. Switching Energy Loss vs. R_G

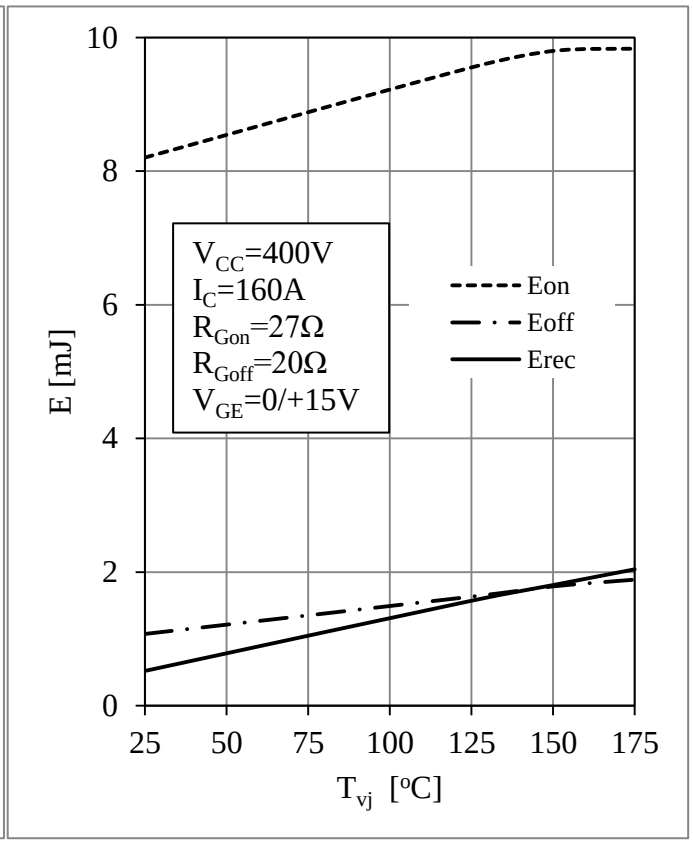


Fig 12. Switching Energy Loss vs. T_{vj}

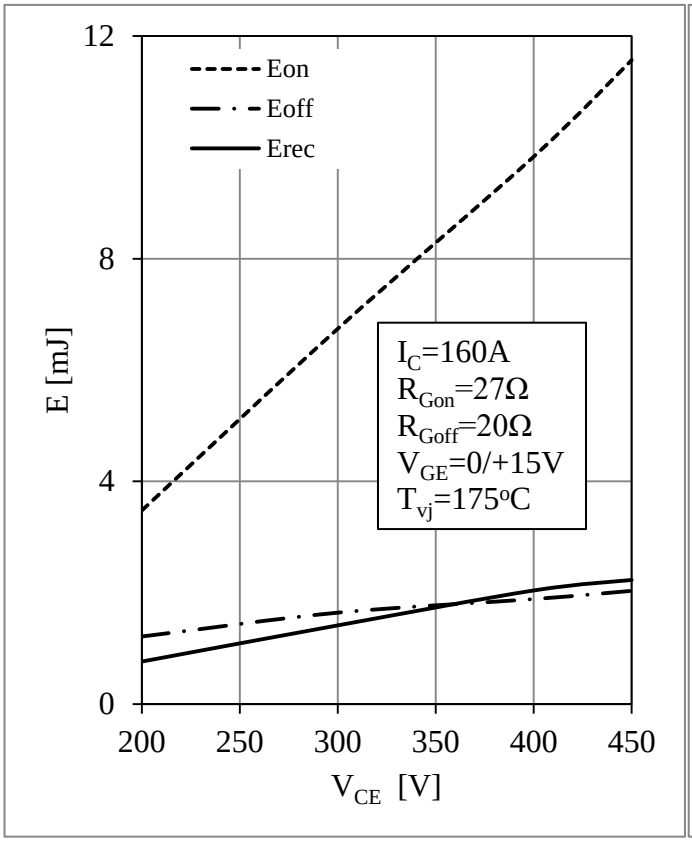


Fig 13. Switching Energy Loss vs. V_{CE}

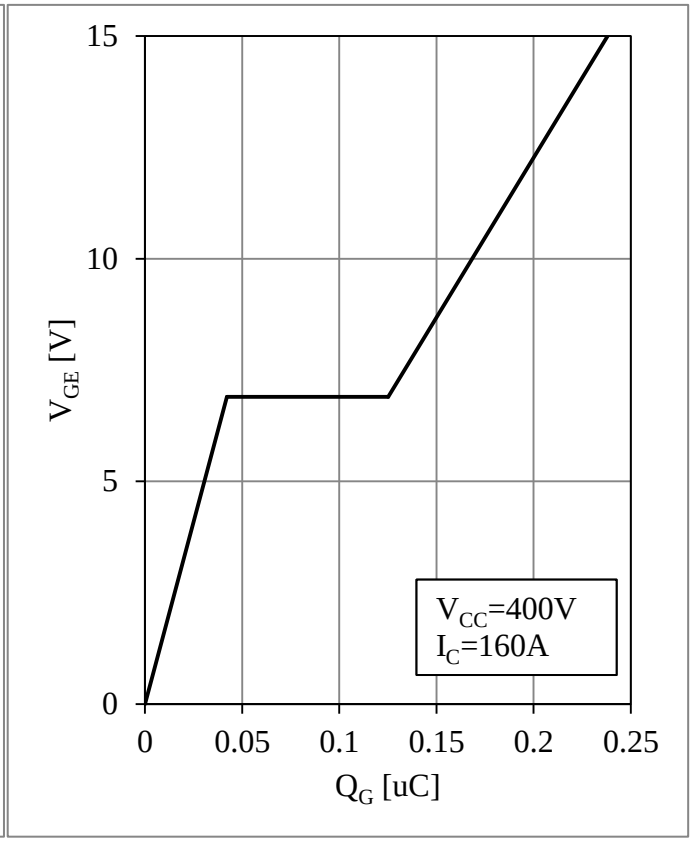


Fig 14. IGBT Gate Charge Characteristic

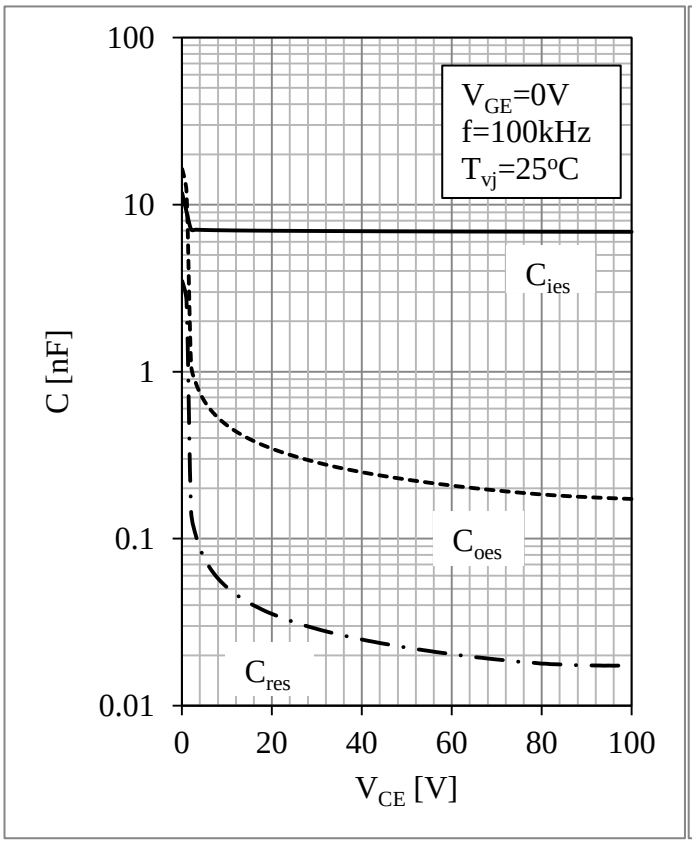


Fig 15. IGBT Capacity Charcteristic

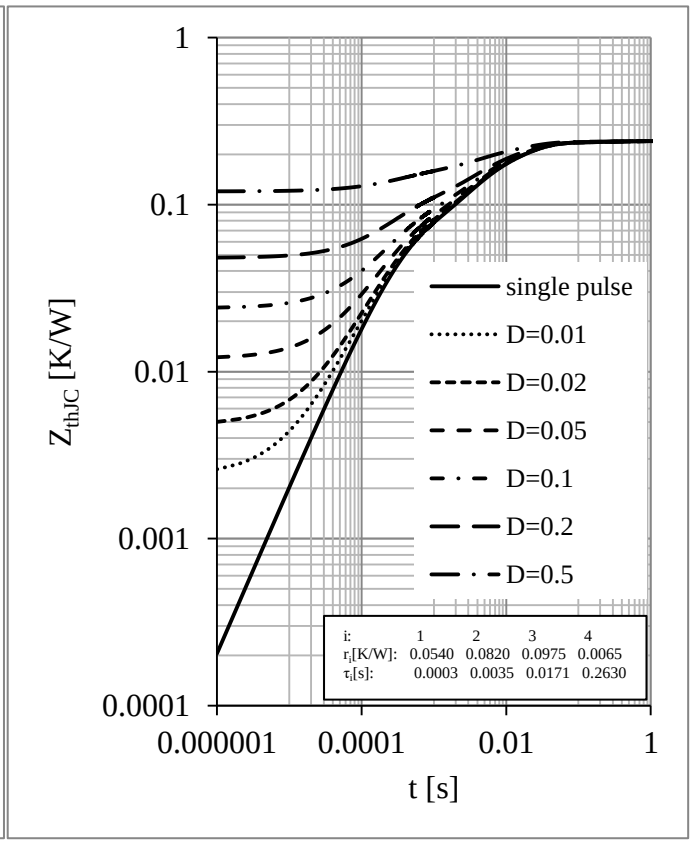


Fig 16. IGBT Transient Thermal Impedance

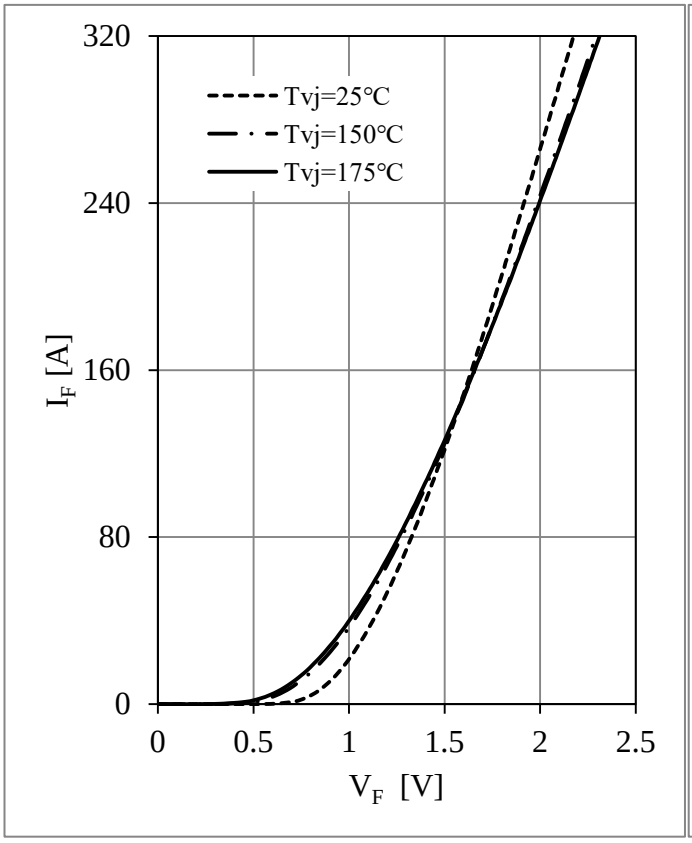


Fig 17. Diode Forward Characteristics

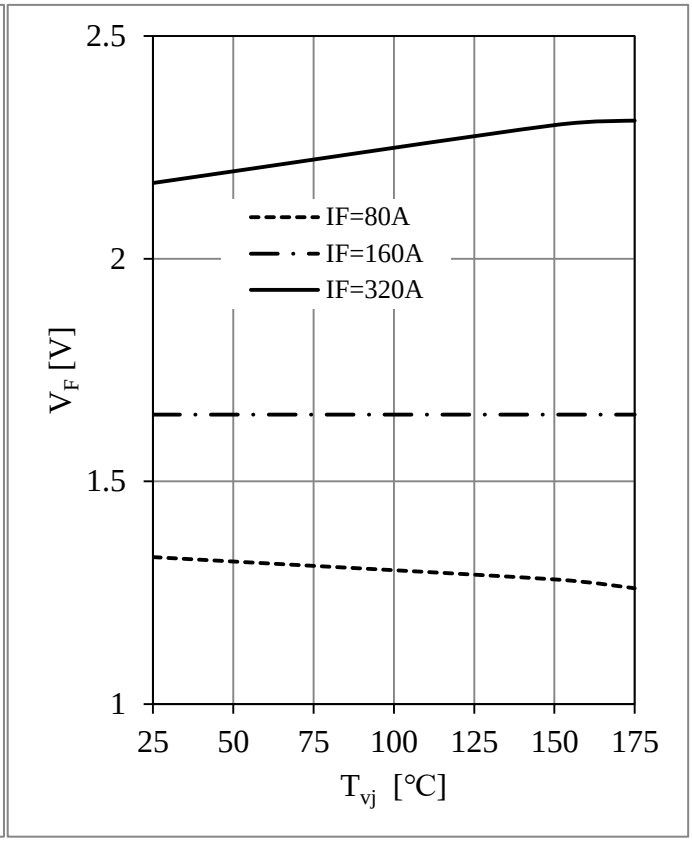


Fig 18. Diode Forward Voltage vs. T_{vj}

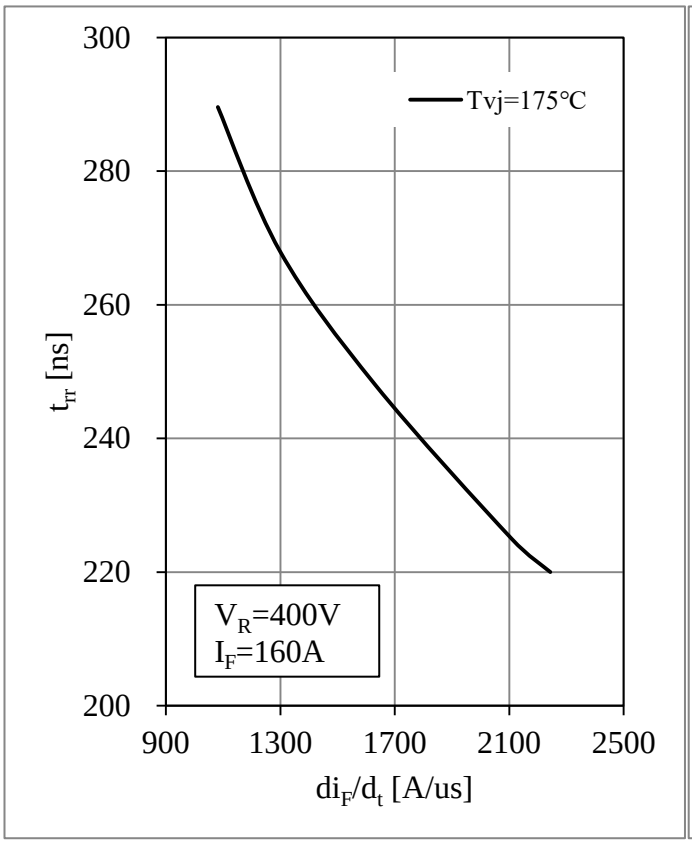


Fig 19. Reverse Recovery Time vs. di_F/d_t

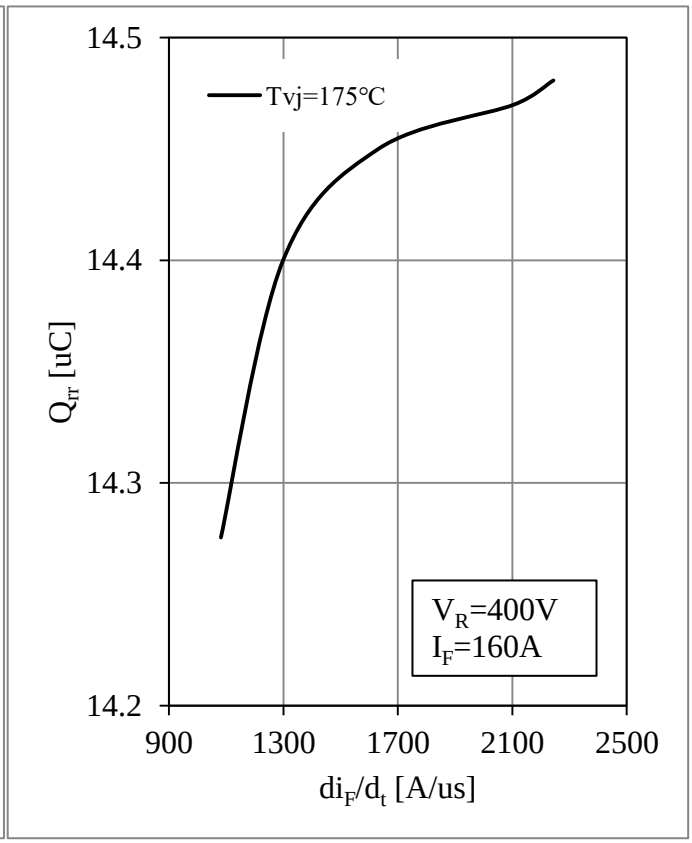


Fig 20. Reverse Recovery Charge vs. di_F/d_t

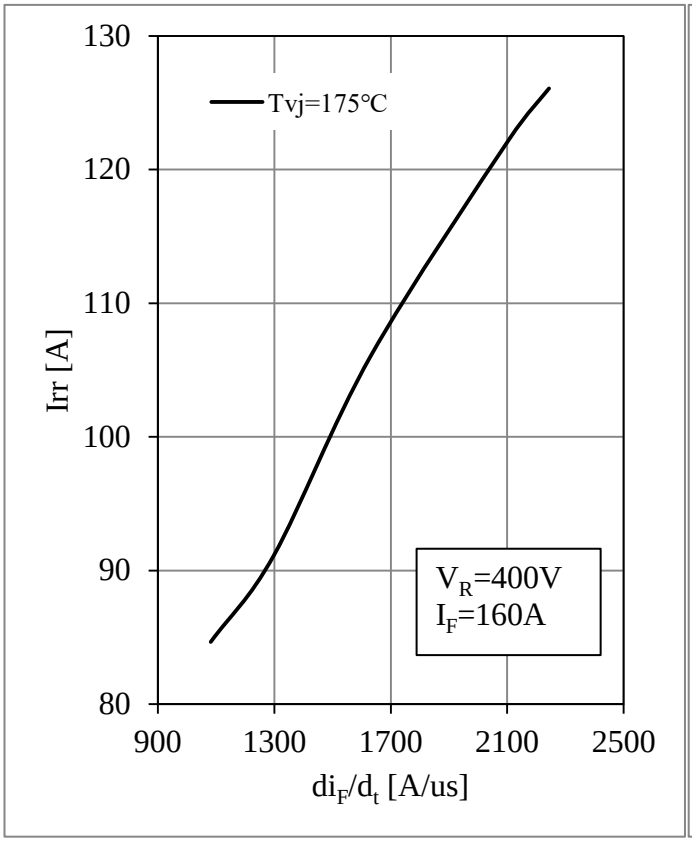


Fig 21. Reverse Recovery Current vs. di_F/d_t

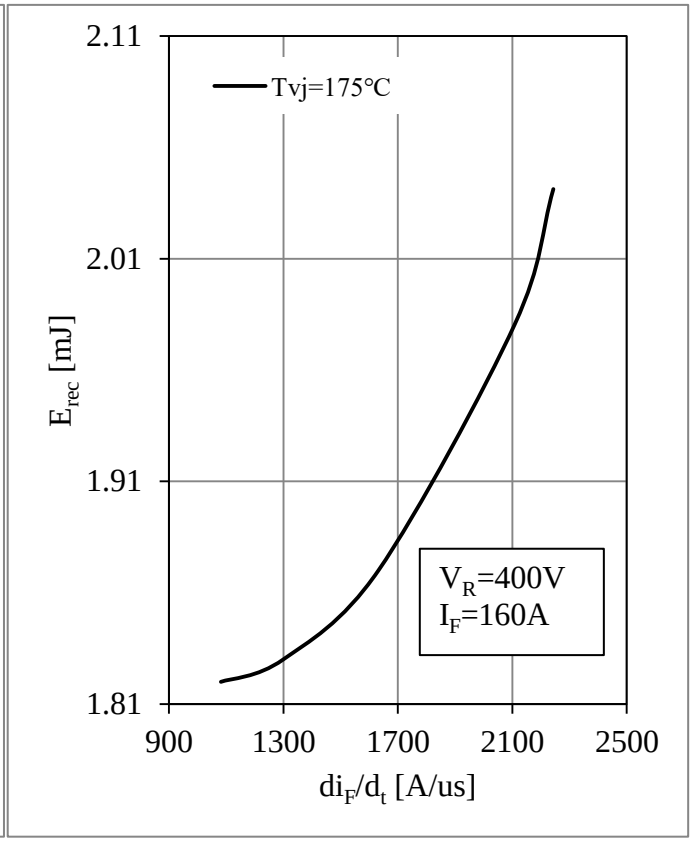


Fig 22. Reverse Energy Losses vs. di_F/d_t

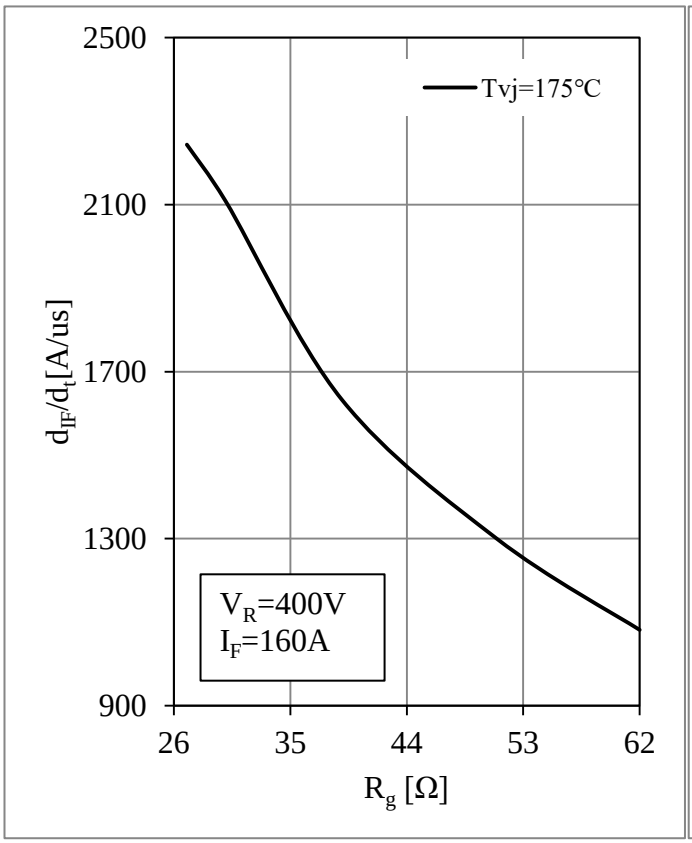


Fig 23. di_F/d_t vs. R_G

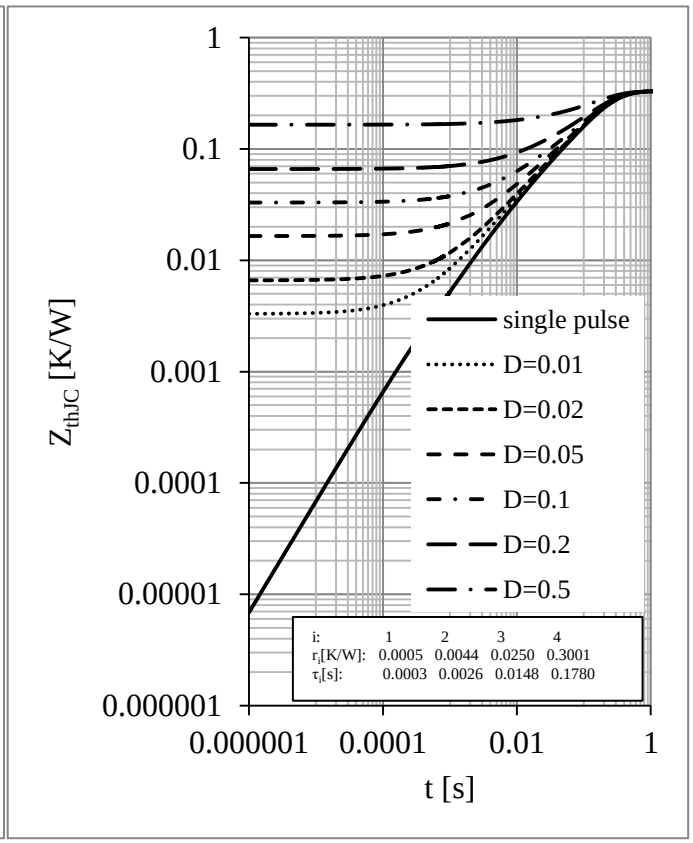
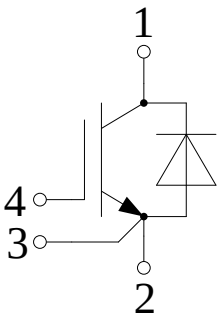


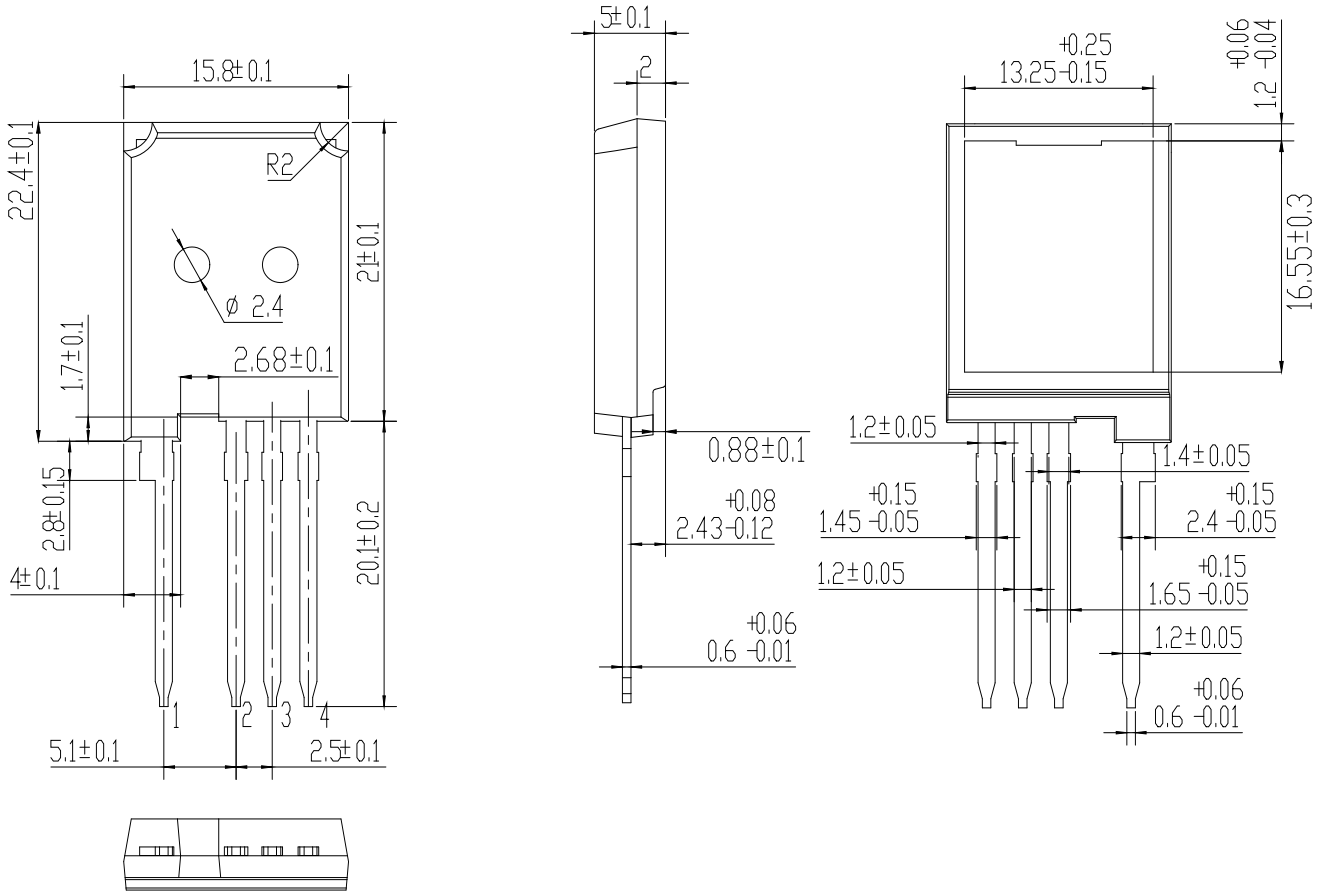
Fig 24. Diode Transient Thermal Impedance

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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