

**DOSEMI****IGBT****DG75A08TALS****750V/75A IGBT with Diode****General Description**

DOSEMI IGBT Power Discrete provides ultra low conduction loss

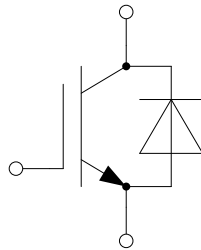
They are designed for the applications such as solar power and EV PTC.

**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
- EV PTC

**Equivalent Circuit Schematic**

Type	Package	Marking	Shipping
DG75A08TALS	TO-247-3L	DG75A08TALS	30Units/Tube

**Absolute Maximum Ratings**  $T_C=25^\circ\text{C}$  unless otherwise noted**IGBT**

Symbol	Description	Values	Unit
$V_{CES}$	Collector-Emitter Voltage	750	V
$V_{GES}$	Gate-Emitter Voltage Transient Gate-Emitter Voltage	$\pm 20$ $\pm 30$	V
$I_C$	Collector Current @ $T_C=25^\circ\text{C}$ @ $T_C=100^\circ\text{C}$	$100^{(1)}$ 75	A
$I_{CRM}$	Repetitive Peak Collector Current tp limited by $T_{vjop}$	225	A
$P_D$	Maximum Power Dissipation @ $T_{vj}=175^\circ\text{C}$	340	W

**Diode**

Symbol	Description	Values	Unit
$V_{RRM}$	Repetitive Peak Reverse Voltage	750	V
$I_F$	Diode Continuous Forward Current @ $T_C=25^\circ\text{C}$ @ $T_C=100^\circ\text{C}$	$100^{(1)}$ 75	A
$I_{FRM}$	Repetitive Peak Forward Current tp limited by $T_{vjop}$	225	A

**Discrete**

Symbol	Description	Values	Unit
$T_{vjop}$	Operating Junction Temperature	-40 to +175	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_S$	Soldering Temperature, 1.6mm from case for 10s	260	$^\circ\text{C}$
M	Mounting Torque, Screw M3	0.6	N.m

(1) limited by bondwire

**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	$I_C=75\text{A}, V_{GE}=15\text{V}, T_{vj}=25^\circ\text{C}$		1.30	1.75	V
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_{vj}=150^\circ\text{C}$		1.35		
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_{vj}=175^\circ\text{C}$		1.35		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1.5\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^\circ\text{C}$	3.5	4.0	4.5	V
$I_{CES}$	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_{vj}=25^\circ\text{C}$			200	$\mu\text{A}$
$I_{GES}$	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_{vj}=25^\circ\text{C}$			100	nA
$R_{Gint}$	Internal Gate Resistance			0		$\Omega$
$C_{ies}$	Input Capacitance			3.76		nF
$C_{oes}$	Output Capacitance	$V_{CE}=25\text{V}, f=100\text{kHz}, V_{GE}=0\text{V}$		0.22		nF
$C_{res}$	Reverse Transfer Capacitance			0.03		nF
$Q_G$	Gate Charge	$V_{GE}=-15\dots+15\text{V}$		0.27		$\mu\text{C}$
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=400\text{V}, I_C=75\text{A}, R_G=7.5\Omega, L_S=40\text{nH}, V_{GE}=\pm 15\text{V}, T_{vj}=25^\circ\text{C}$		34		ns
$t_r$	Rise Time			80		ns
$t_{d(off)}$	Turn-Off Delay Time			192		ns
$t_f$	Fall Time			187		ns
$E_{on}$	Turn-On Switching Loss			4.02		mJ
$E_{off}$	Turn-Off Switching Loss			3.73		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=400\text{V}, I_C=75\text{A}, R_G=7.5\Omega, L_S=40\text{nH}, V_{GE}=\pm 15\text{V}, T_{vj}=150^\circ\text{C}$		37		ns
$t_r$	Rise Time			86		ns
$t_{d(off)}$	Turn-Off Delay Time			272		ns
$t_f$	Fall Time			400		ns
$E_{on}$	Turn-On Switching Loss			4.85		mJ
$E_{off}$	Turn-Off Switching Loss			7.30		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=400\text{V}, I_C=75\text{A}, R_G=7.5\Omega, L_S=40\text{nH}, V_{GE}=\pm 15\text{V}, T_{vj}=175^\circ\text{C}$		39		ns
$t_r$	Rise Time			87		ns
$t_{d(off)}$	Turn-Off Delay Time			285		ns
$t_f$	Fall Time			452		ns
$E_{on}$	Turn-On Switching Loss			5.10		mJ
$E_{off}$	Turn-Off Switching Loss			8.14		mJ

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_F$	Diode Forward Voltage	$I_C=75\text{A}, V_{GE}=0\text{V}, T_{vj}=25^\circ\text{C}$		1.55	2.00	V
		$I_C=75\text{A}, V_{GE}=0\text{V}, T_{vj}=150^\circ\text{C}$		1.50		
		$I_C=75\text{A}, V_{GE}=0\text{V}, T_{vj}=175^\circ\text{C}$		1.45		
$t_{rr}$	Diode Reverse Recovery Time	$V_R=400\text{V}, I_F=75\text{A},$ $-di/dt=630\text{A}/\mu\text{s}, L_s=40\text{nH},$ $V_{GE}=-15\text{V}, T_{vj}=25^\circ\text{C}$		140		ns
$Q_r$	Recovered Charge			2.63		$\mu\text{C}$
$I_{RM}$	Peak Reverse Recovery Current			25		A
$E_{rec}$	Reverse Recovery Energy			0.60		mJ
$t_{rr}$	Diode Reverse Recovery Time	$V_R=400\text{V}, I_F=75\text{A},$ $-di/dt=620\text{A}/\mu\text{s}, L_s=40\text{nH},$ $V_{GE}=-15\text{V}, T_{vj}=150^\circ\text{C}$		215		ns
$Q_r$	Recovered Charge			5.37		$\mu\text{C}$
$I_{RM}$	Peak Reverse Recovery Current			39		A
$E_{rec}$	Reverse Recovery Energy			1.34		mJ
$t_{rr}$	Diode Reverse Recovery Time	$V_R=400\text{V}, I_F=75\text{A},$ $-di/dt=620\text{A}/\mu\text{s}, L_s=40\text{nH},$ $V_{GE}=-15\text{V}, T_{vj}=175^\circ\text{C}$		225		ns
$Q_r$	Recovered Charge			6.21		$\mu\text{C}$
$I_{RM}$	Peak Reverse Recovery Current			43		A
$E_{rec}$	Reverse Recovery Energy			1.56		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)			0.440	K/W
	Junction-to-Case (per Diode)			0.417	
$R_{thJA}$	Junction-to-Ambient		40		K/W

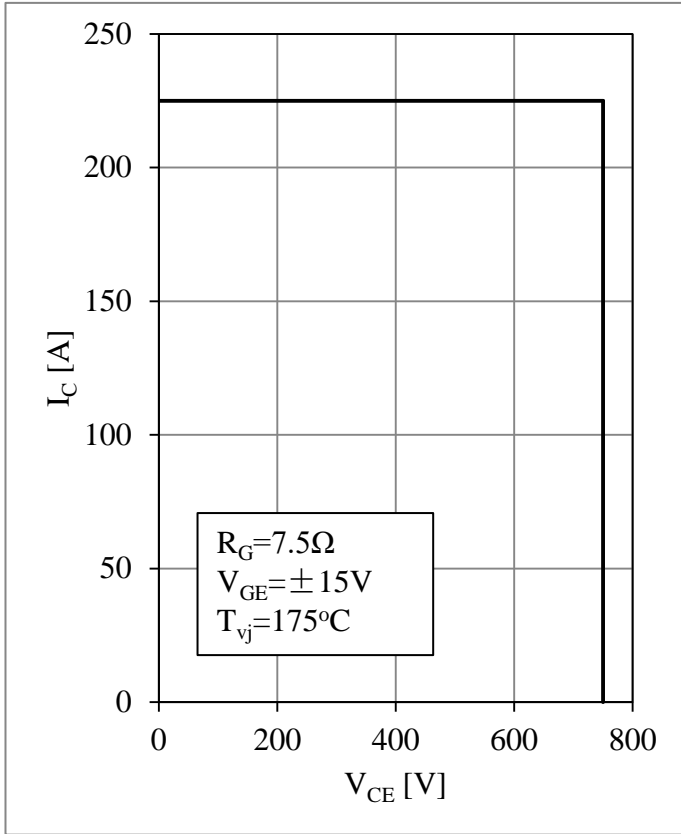


Fig 1. RBSOA

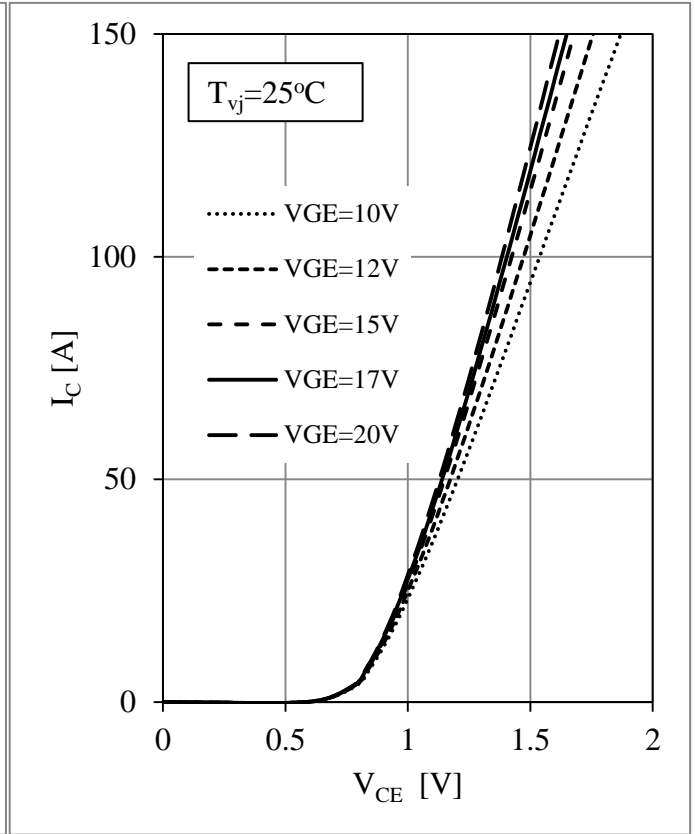


Fig 2. IGBT Output Characteristics

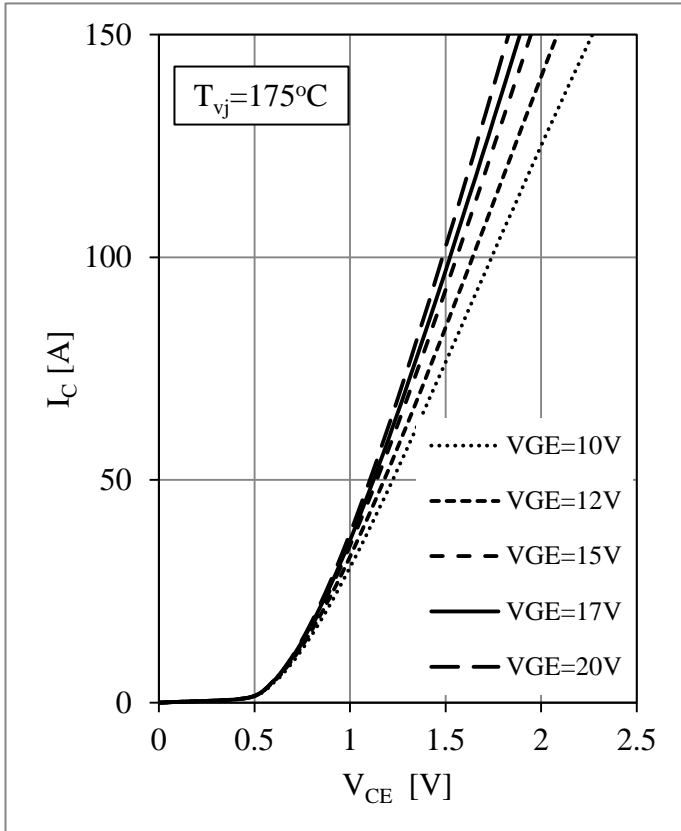


Fig 3. IGBT Output Characteristics

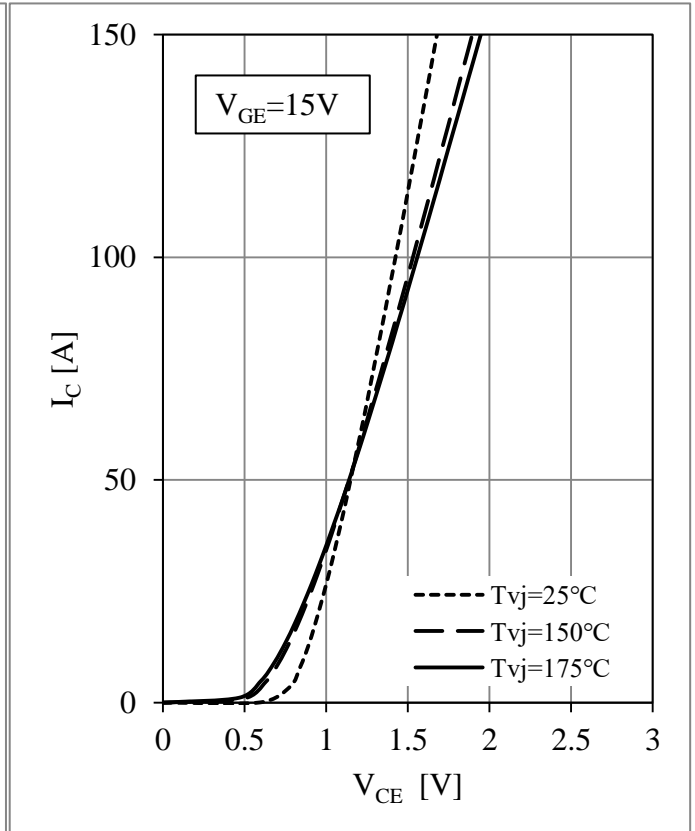


Fig 4. IGBT Output Characteristics

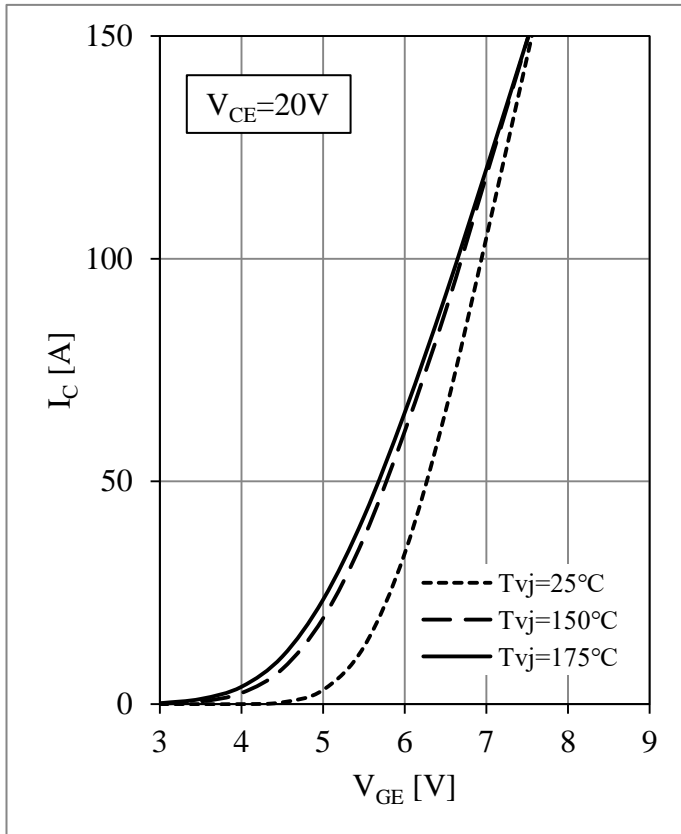


Fig 5. IGBT Transfer Characteristics

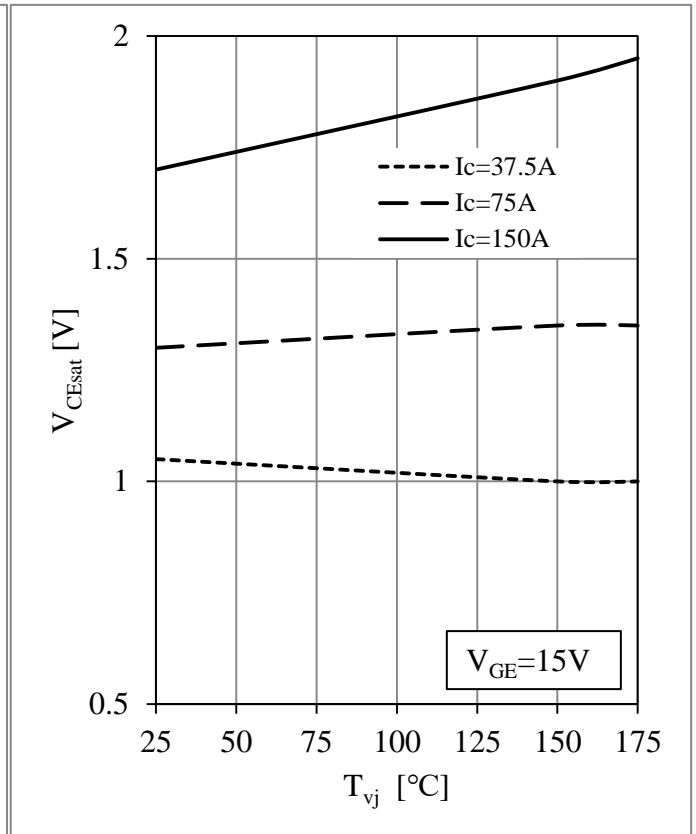


Fig 6. Collector-emitter saturation voltage vs.  $T_{vj}$

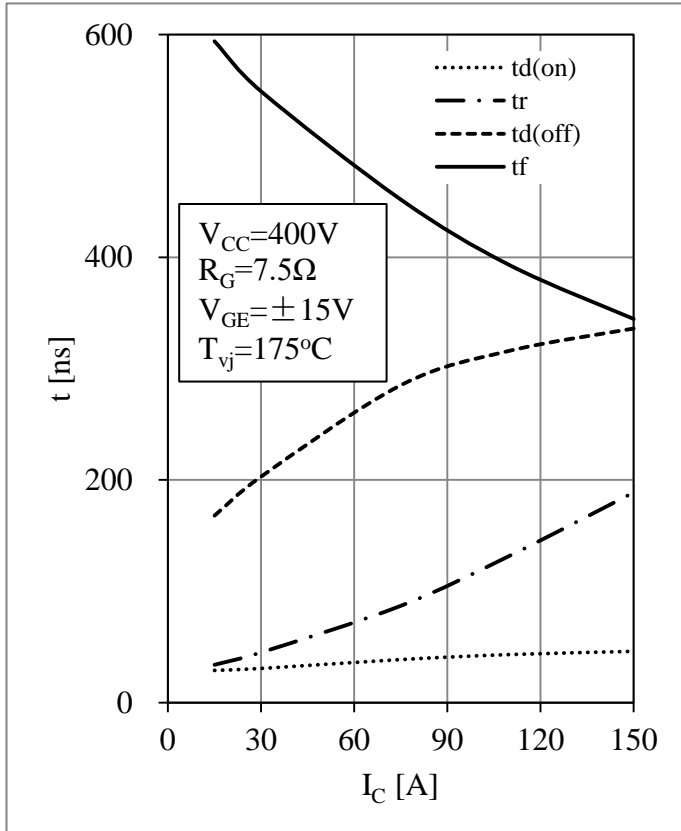


Fig 7. IGBT Switching Times vs.  $I_c$

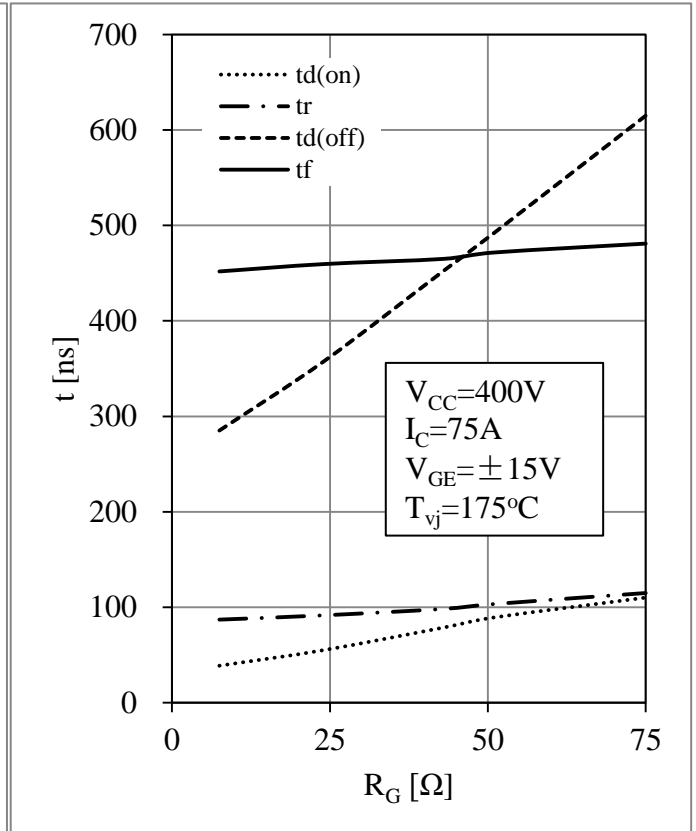


Fig 8. IGBT Switching Times vs.  $R_G$

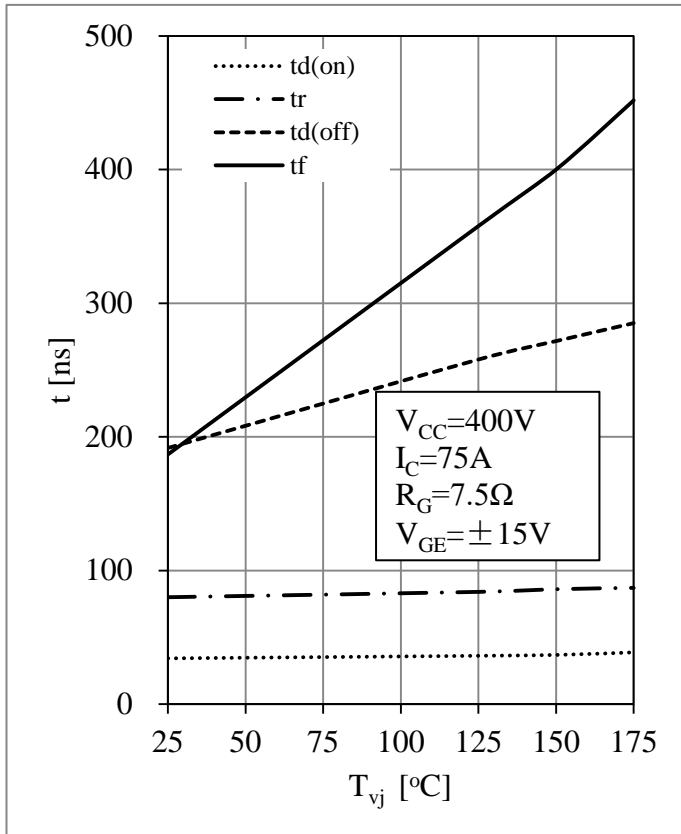


Fig 9. IGBT Switching Times vs.  $T_{vj}$

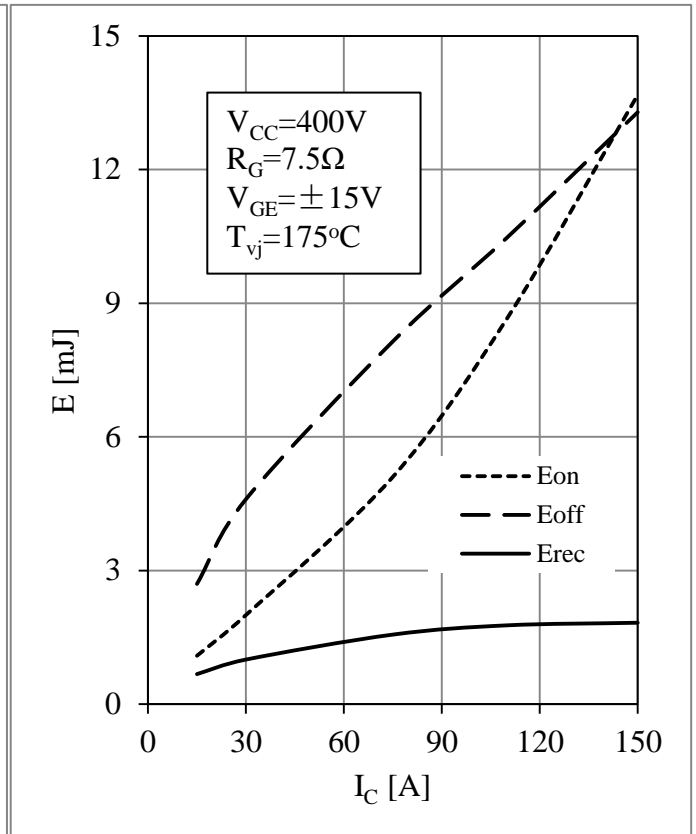


Fig 10. Switching Energy Loss vs.  $I_c$

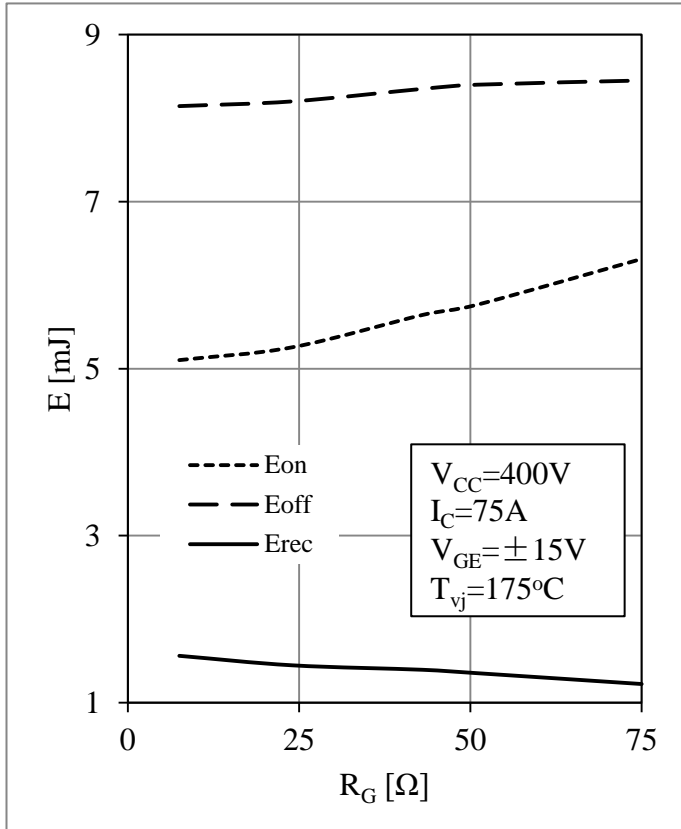


Fig 11. Switching Energy Loss vs.  $R_G$

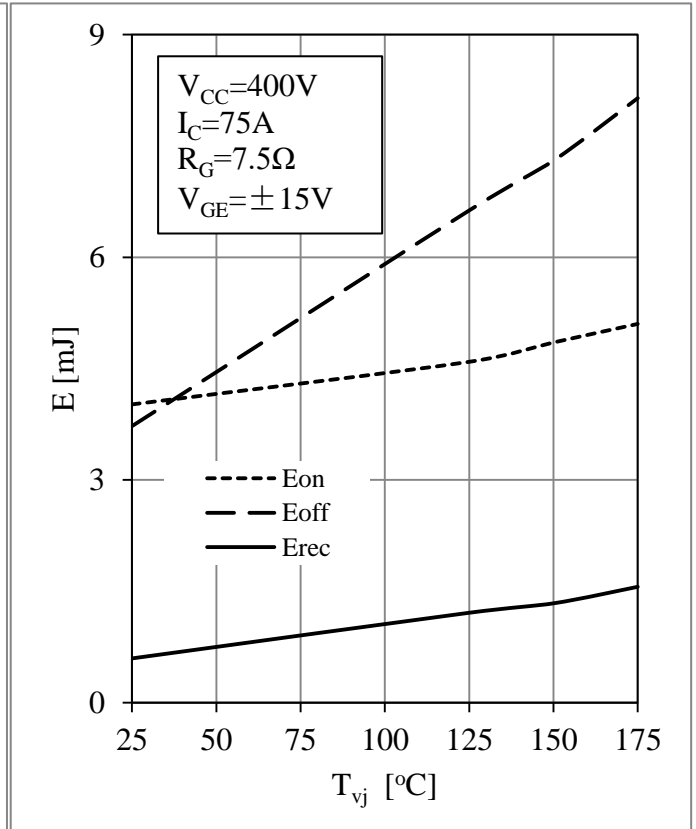


Fig 12. Switching Energy Loss vs.  $T_{vj}$

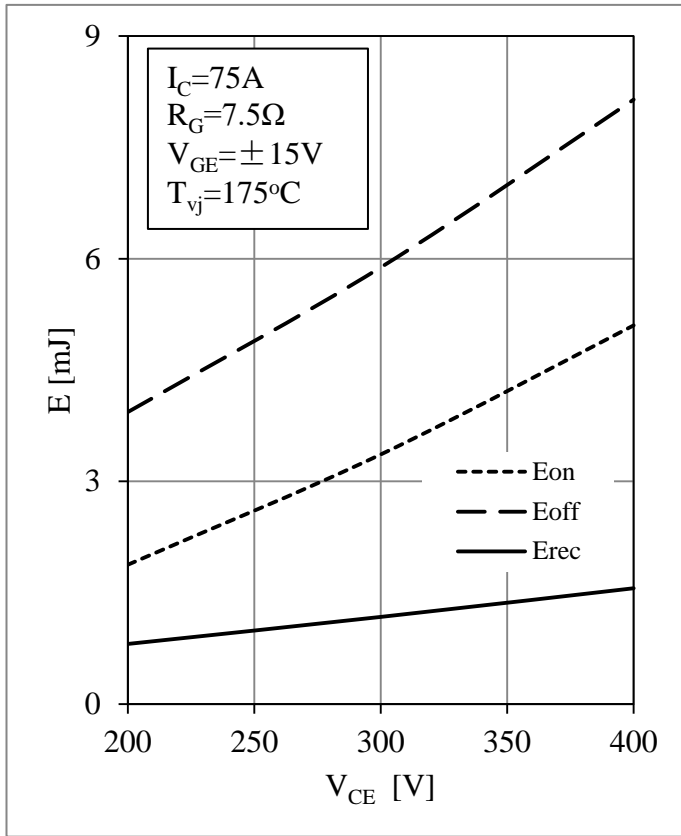


Fig 13. Switching Energy Loss vs.  $V_{CE}$

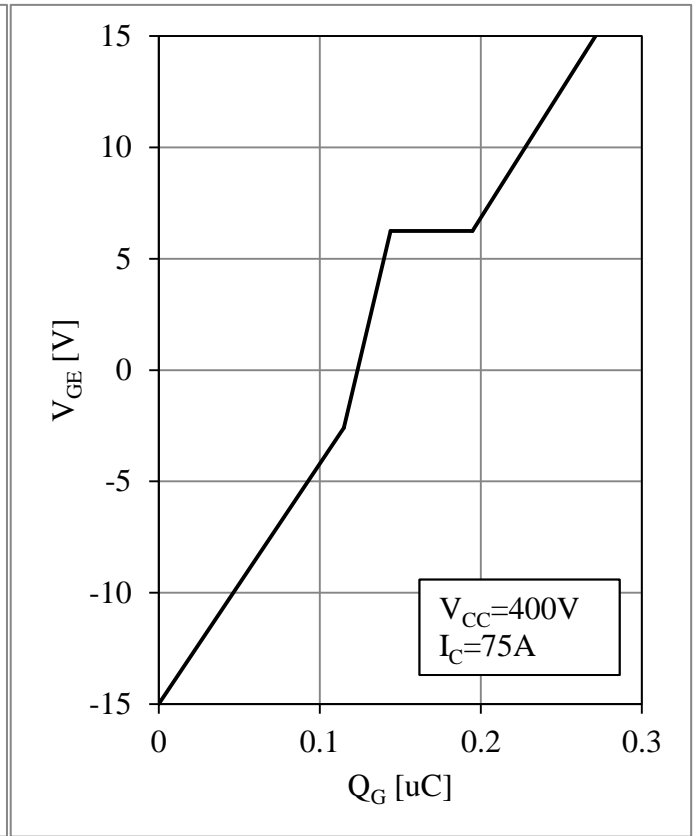


Fig 14. IGBT Gate Charge Characteristic

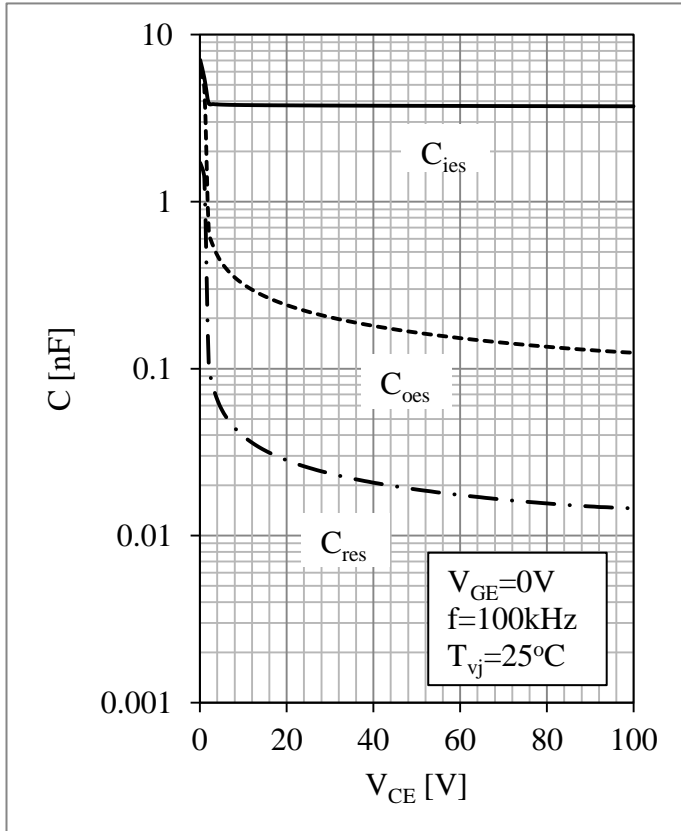


Fig 15. IGBT Capacity Characteristic

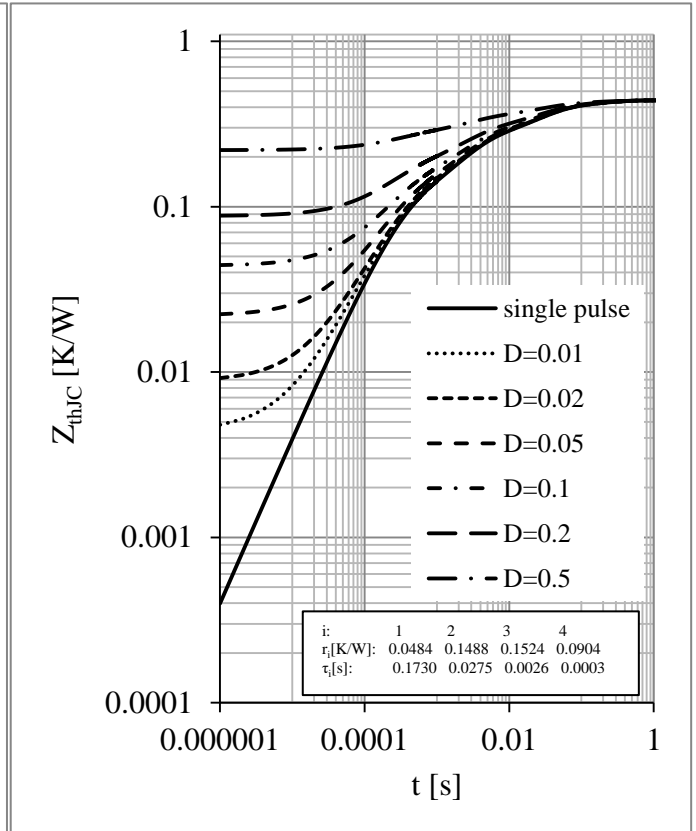


Fig 16. IGBT Transient Thermal Impedance



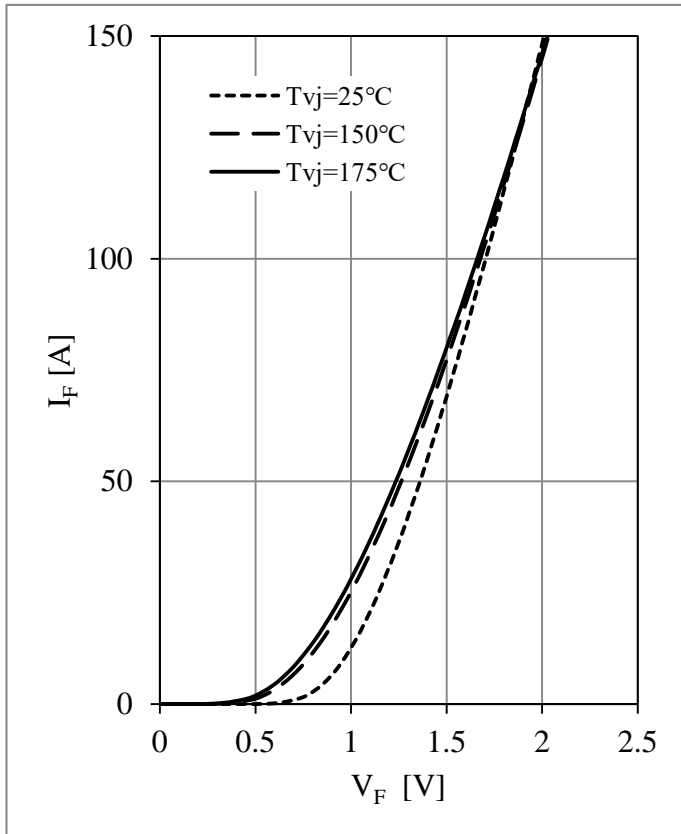


Fig 17. Diode Forward Characteristics

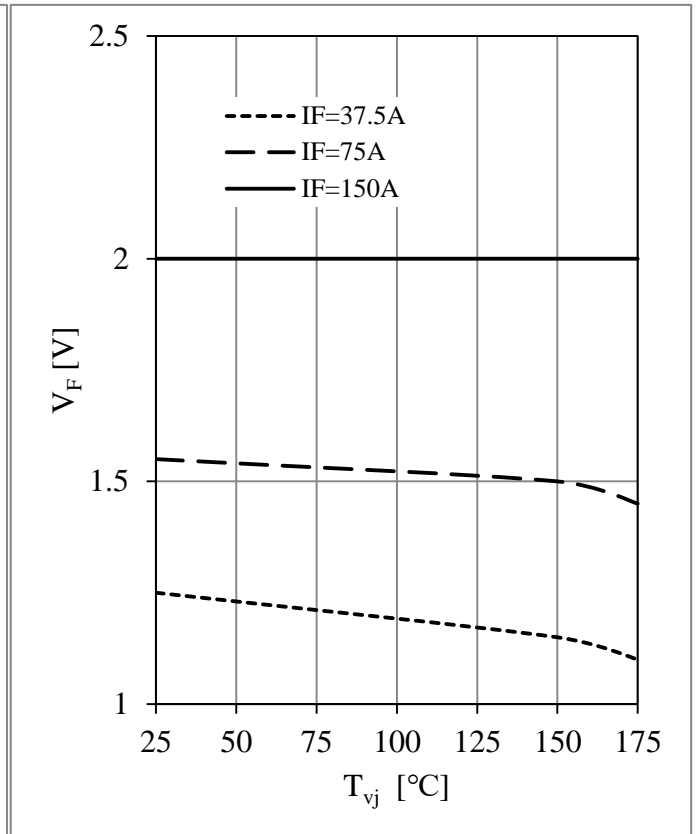


Fig 18. Diode Forward Voltage vs.  $T_{vj}$

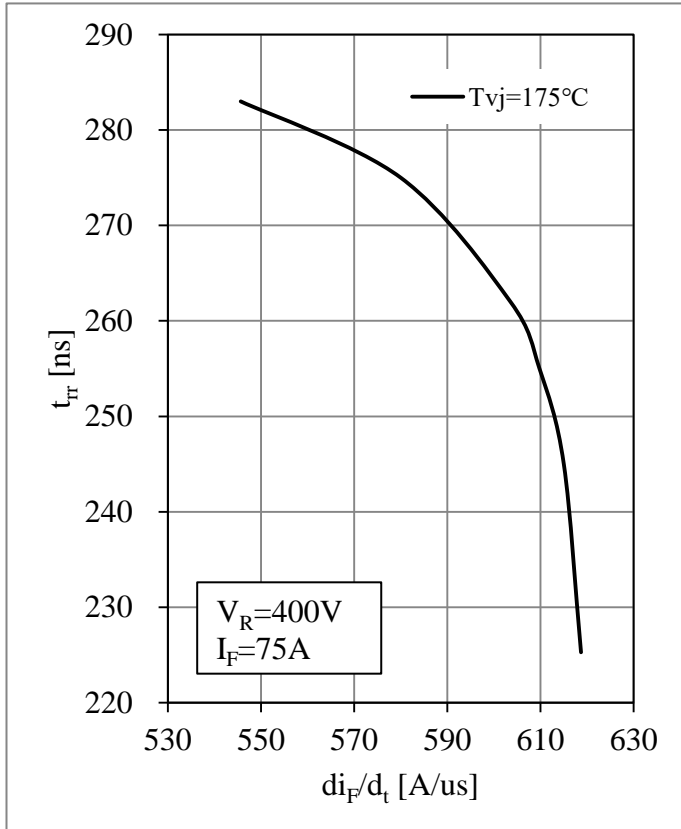


Fig 19. Reverse Recovery Time vs.  $di_F/dt$

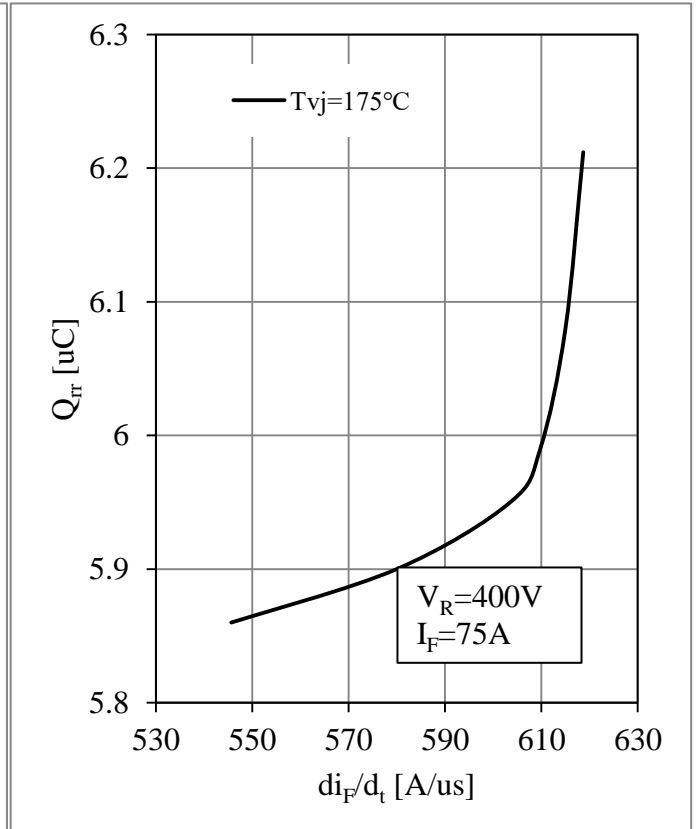


Fig 20. Reverse Recovery Charge vs.  $di_F/dt$

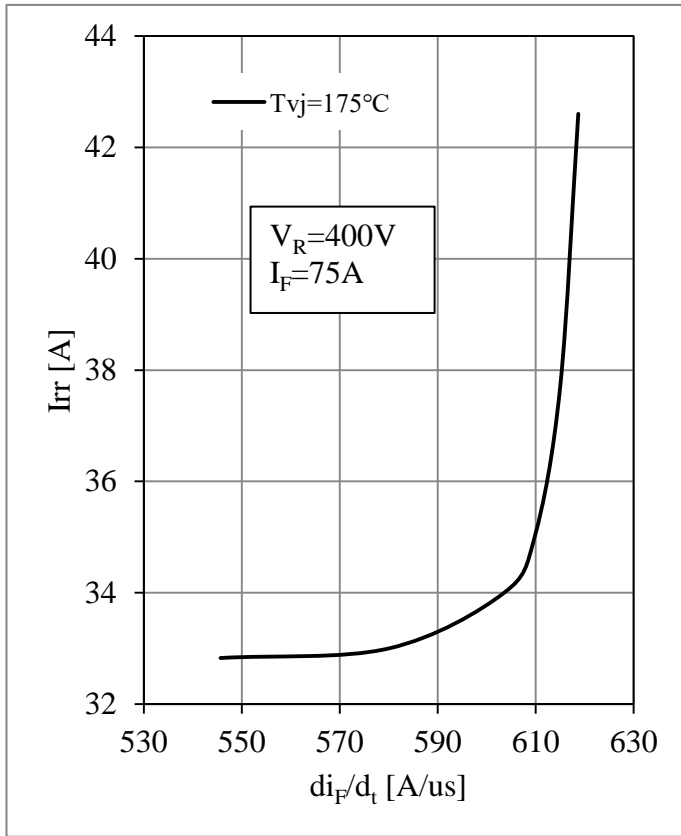


Fig 21. Reverse Recovery Current vs.  $di_F/dt$

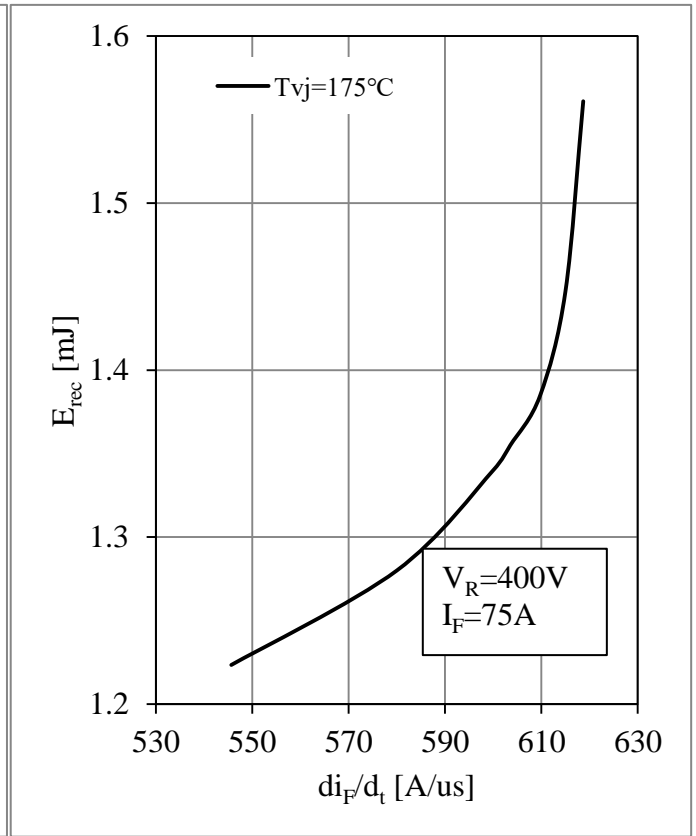


Fig 22. Reverse Energy Losses vs.  $di_F/dt$

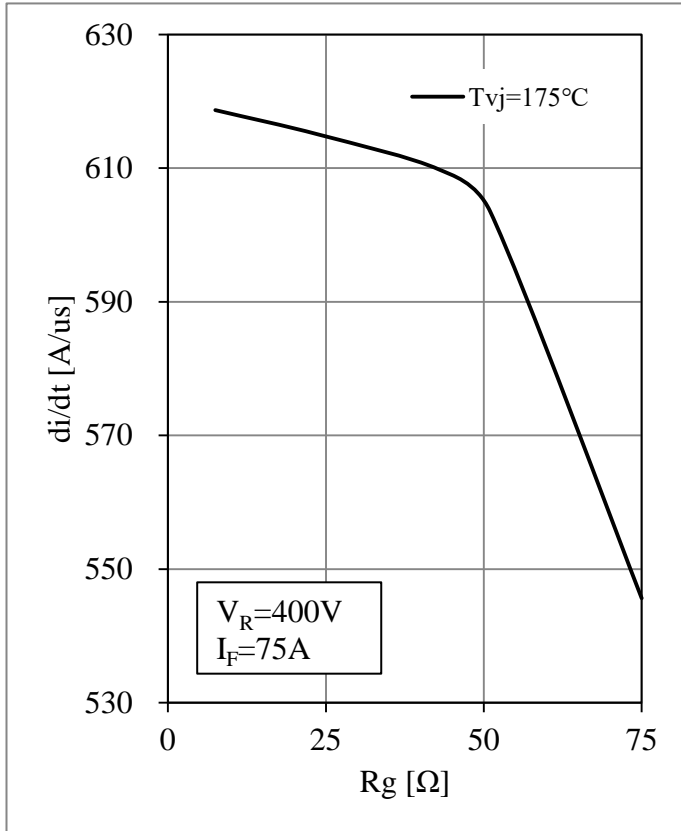


Fig 23.  $di_F/dt$  vs.  $R_g$

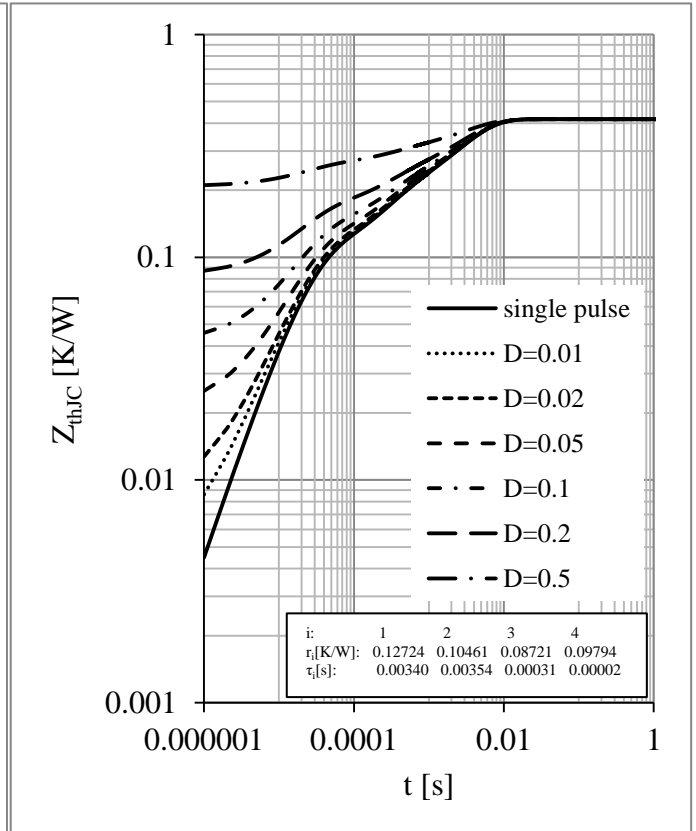
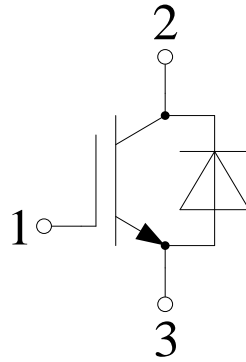


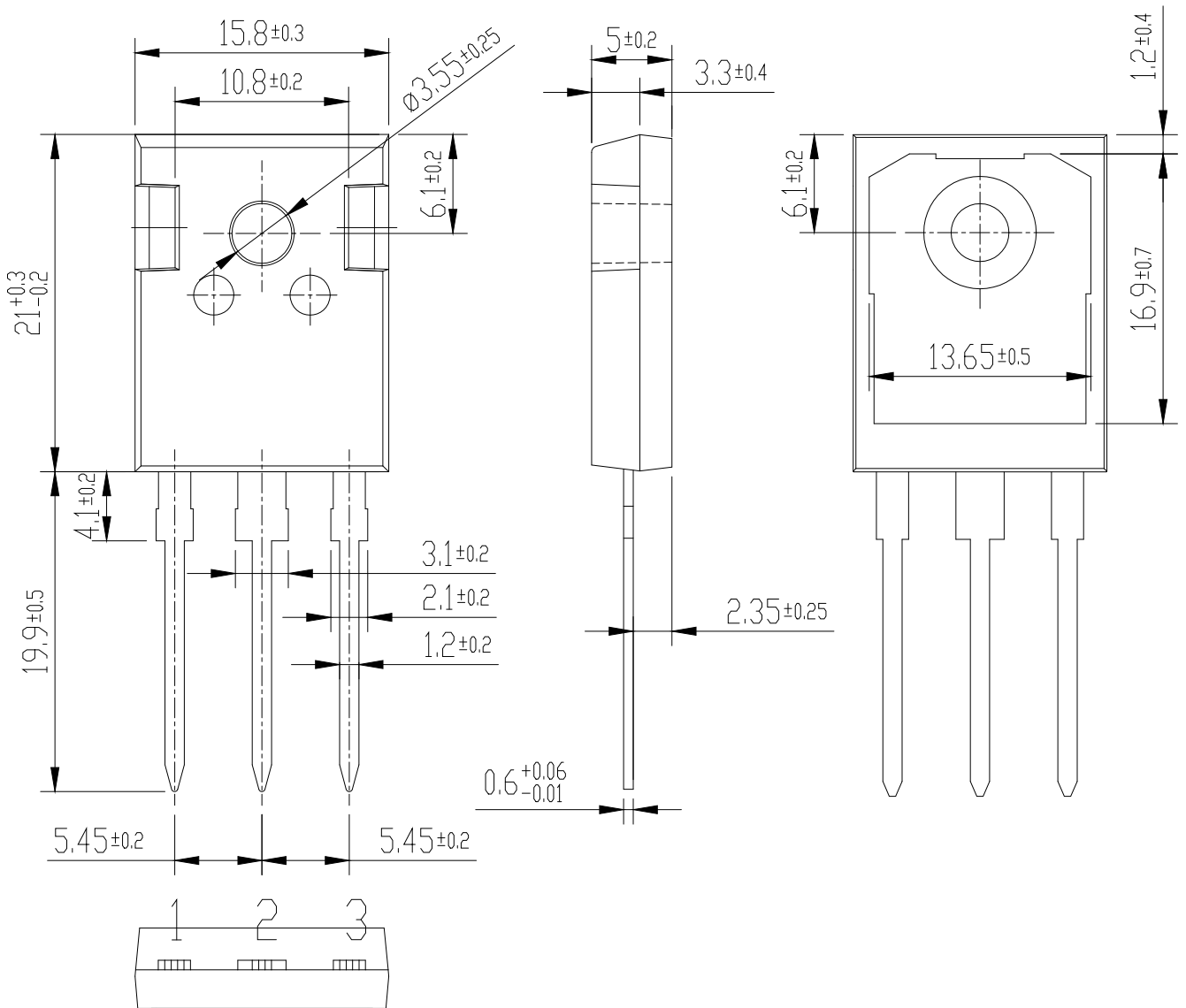
Fig 24. Diode Transient Thermal Impedance

### Circuit Schematic



### Package Dimensions

Dimensions in Millimeters



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