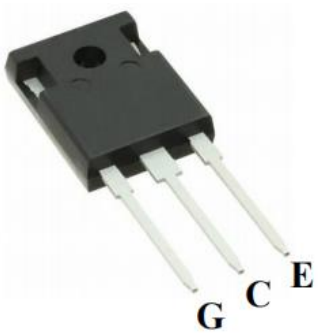
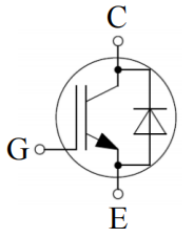
DGW40N120CTL1A1

IGBT Discrete

V_{CE}	1200	V
I_C	40	A
$V_{CE(SAT)}$ I_C=40A	1.65	V



Circuit



Applications

Inverter for motor drive
AC and DC servo drive amplifier

Features

High breakdown voltage to 1200V for improved reliability
Maximum junction temperature 175
Positive temperature coefficient
Including fast & soft recovery anti-parallel FWD
High short circuit capability(10us)

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	1200	V
DC Collector Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_C	 80 40	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	 80 40	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage (tp ≤ 10µs,D<0.010)	V_{GE}	± 30	V
Turn off Safe Operating Area V_{CE} T_j		120	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	120	A
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	120	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CC} 600V V_{CEM} ≤ 1200V	T_{sc}	10	
Power Dissipation , Tj=175°C Tc=25°C	P_{tot}	320	W

Operating Junction Temperature	T_j	-40...+175	°C
Storage Temperature	T_s	-55...+150	°C
Soldering Temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	°C

Electrical Characteristics of the IGBT T_j= 25 unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V, I_C	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=1.0mA	5.2	5.8	6.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=40A T_j=25°C, T_j=125°C T_j=150°C		1.65 1.95 2.05	1.95	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 4	mA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}= 0V, V_{GE}= ± 20V			100	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	V_{CE}= 25V, V_{GE}= 0V, f = 1MHz	-	6.76	-	nF
Output Capacitance	C_{oes}		-	0.19	-	
Reverse Transfer Capacitance	C_{res}		-	0.07	-	
Gate Charge	Q_G	V_{CC}=600V,I_C=40A, V_{GE}=15V	-	0.27	-	uC

Electrical Characteristics of the Diode T_j= 25 unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	I_F= 40A T_j= 25°C, T_j= 125°C T_j= 150°C		2.00 1.90 1.80	2.60	V

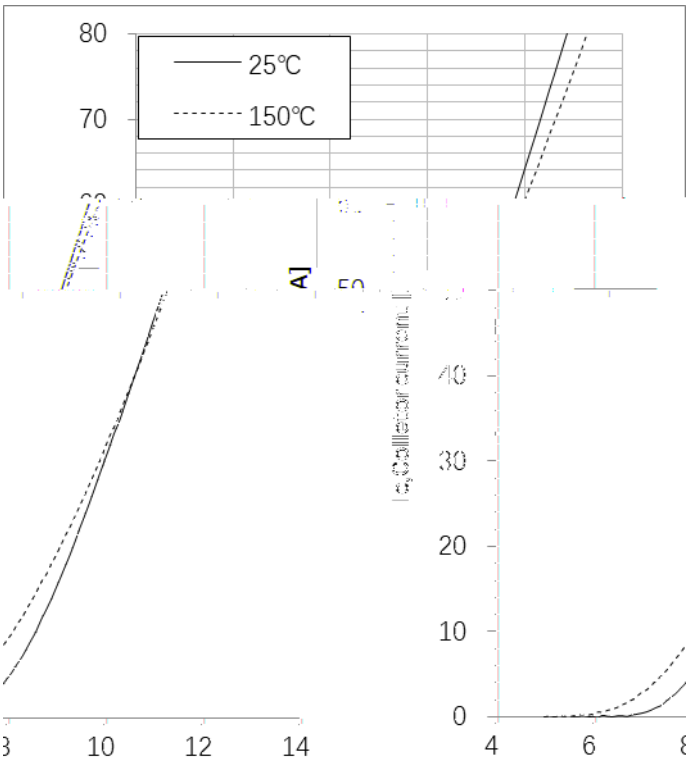
SwitN(d)21( )10TE[ ]JTETQEMC /MCID 8Lang (enS)>BDC 4q0.14 0.40001 0.48ref8.3 60.14 45.624 0

Electrical Characteristics of the DIODE

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25						
Reverse Recovery Current	I_{rr}	I_F=40A, V_R=600V, di/dt= -500	-	11	-	A
Diode reverse recovery time	trr		-	225	-	ns
Reverse Recovery Charge	Q_{rr}		-	1.29	-	uC
Reverse Recovery Energy	Erec		-	0.33	-	mJ
Dynamic , at Tj= 125						
Reverse Recovery Current	I_{rr}	I_F=40A, V_R=600V, di/dt= -500	-	15	-	A
Diode reverse recovery time	trr		-	315	-	ns
Reverse Recovery Charge	Q_{rr}		-	3.58	-	uC
Reverse Recovery Energy	Erec		-	1.07	-	mJ
Dynamic , at Tj= 150						
Reverse Recovery Current	I_{rr}	I_F=40A, V_R=600V, di/dt= -500A/	-	16	-	A
Diode reverse recovery time	trr		-	344	-	ns
Reverse Recovery Charge	Q_{rr}		-	4.11	-	uC
Reverse Recovery Energy	Erec		-	1.23	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R (j-c)	0.47	K/W
Diode Thermal Resistance, Junction - Case	R (j-c)	1.00	K/W
Thermal Resistance, Junction - Ambient	R (j-a)	40	K/W



itter voltage [V]
characteristic (Vce=20V)

Vge,Gate-em
Fig5. Typical transfer c

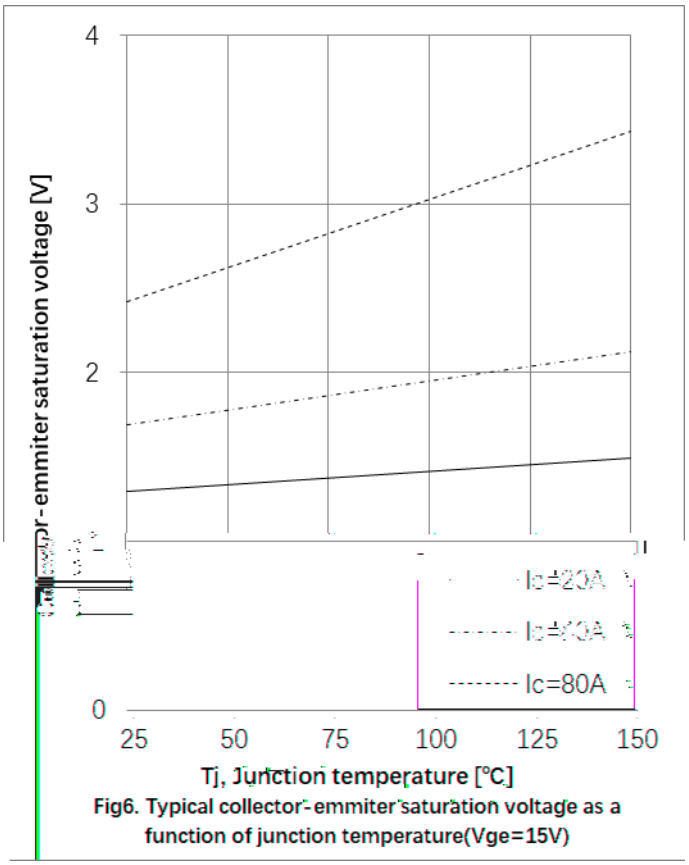


Fig6. Typical collector-emmiter saturation voltage as a function of junction temperature(Vge=15V)

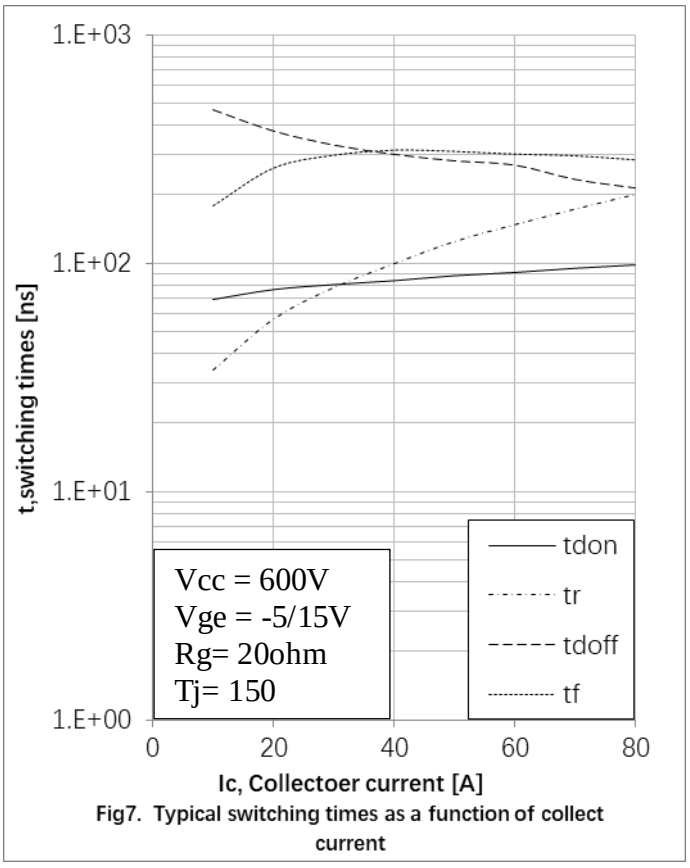
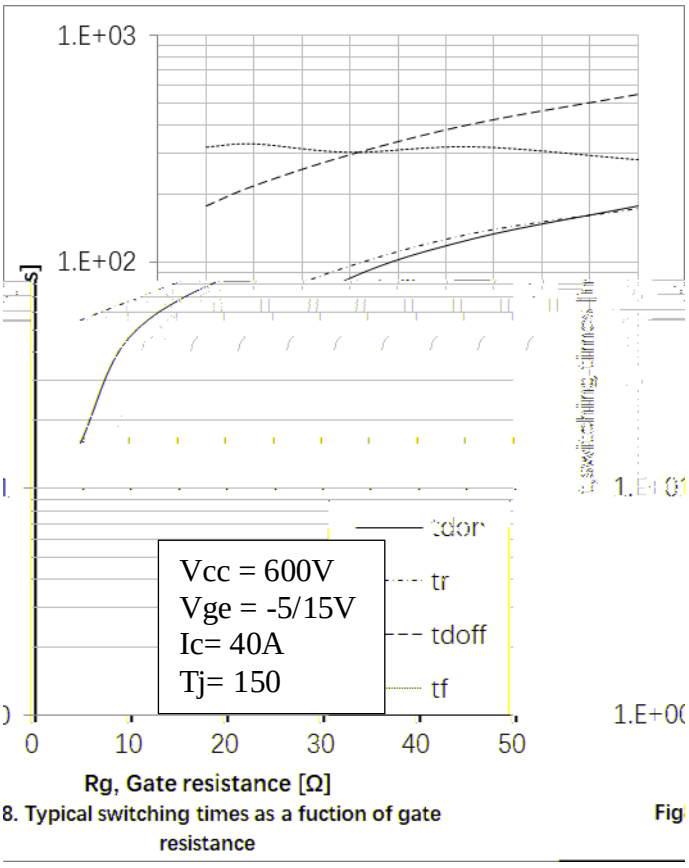


Fig7. Typical switching times as a function of collect current



8. Typical switching times as a fuction of gate resistance

Fig

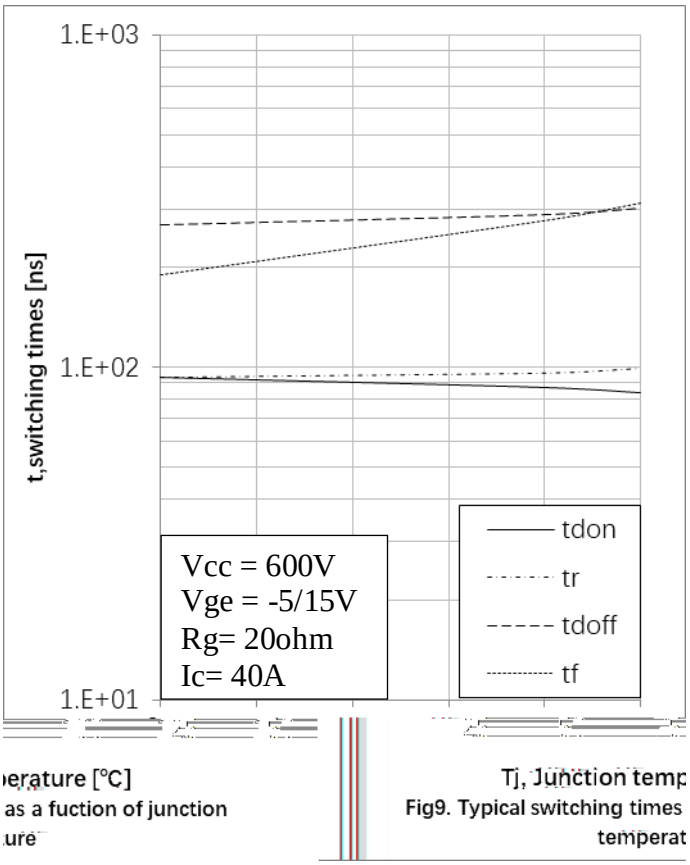
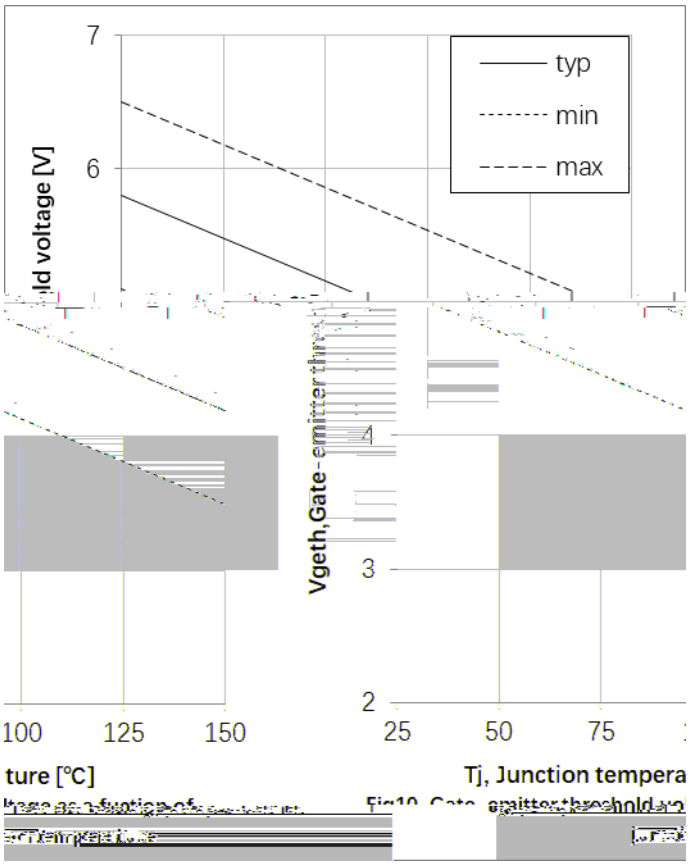


Fig9. Typical switching times as a fuction of junction temperat



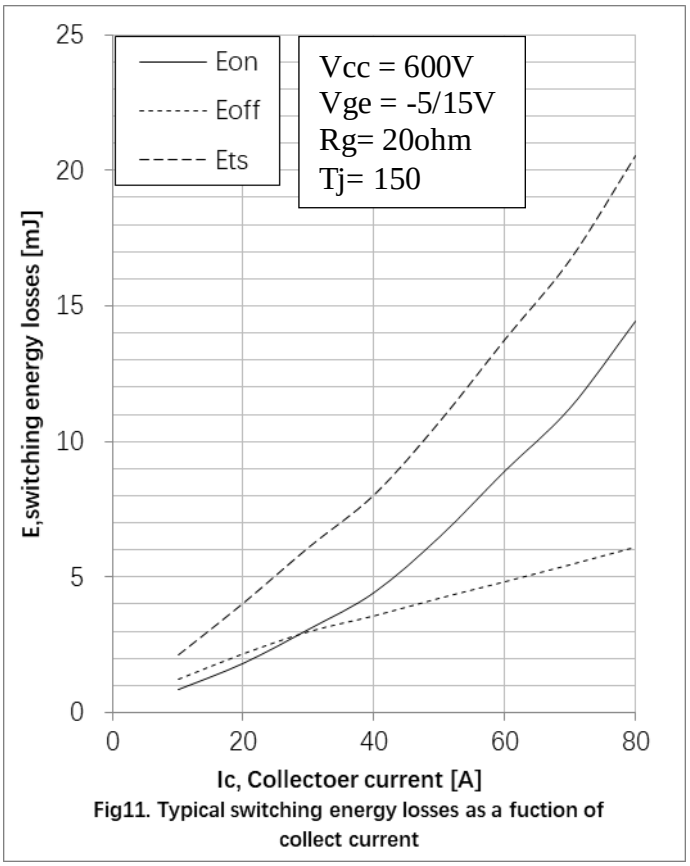


Fig11. Typical switching energy losses as a fuction of collect current

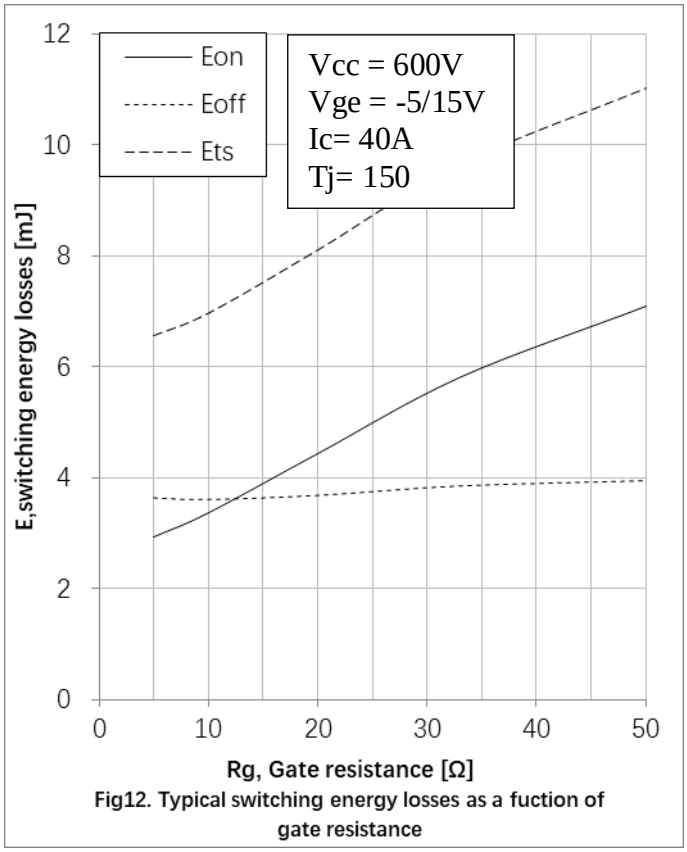


Fig12. Typical switching energy losses as a fuction of gate resistance

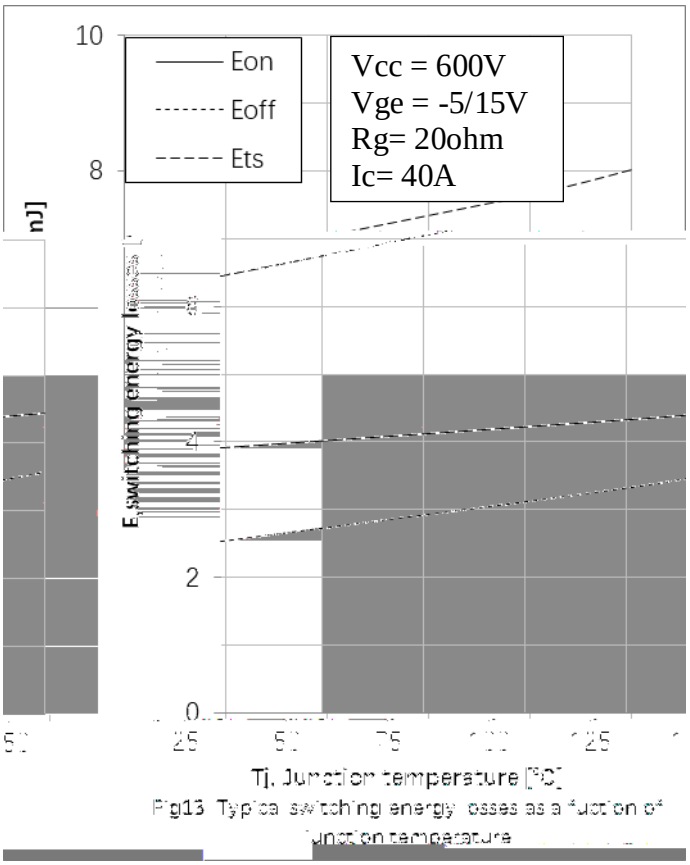


Fig13 Typical switching energy losses as a function of junction temperature

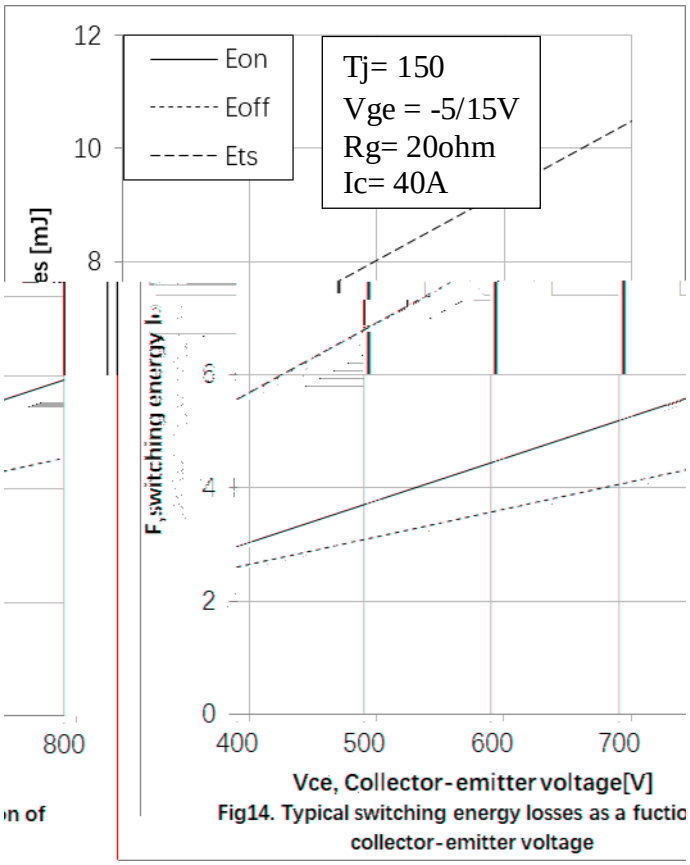


Fig14. Typical switching energy losses as a fuctio collector-emitter voltage

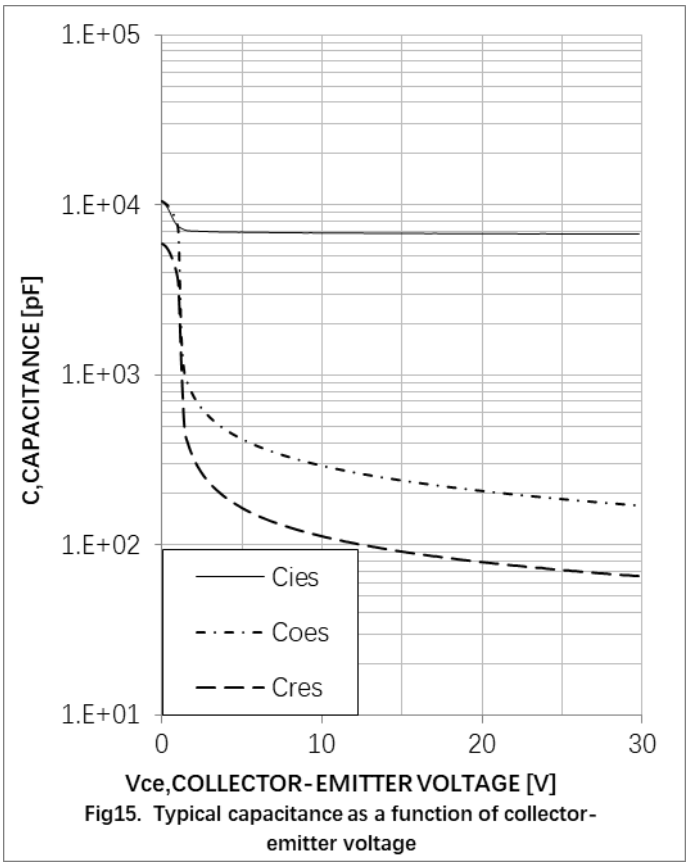


Fig15. Typical capacitance as a function of collector-emitter voltage

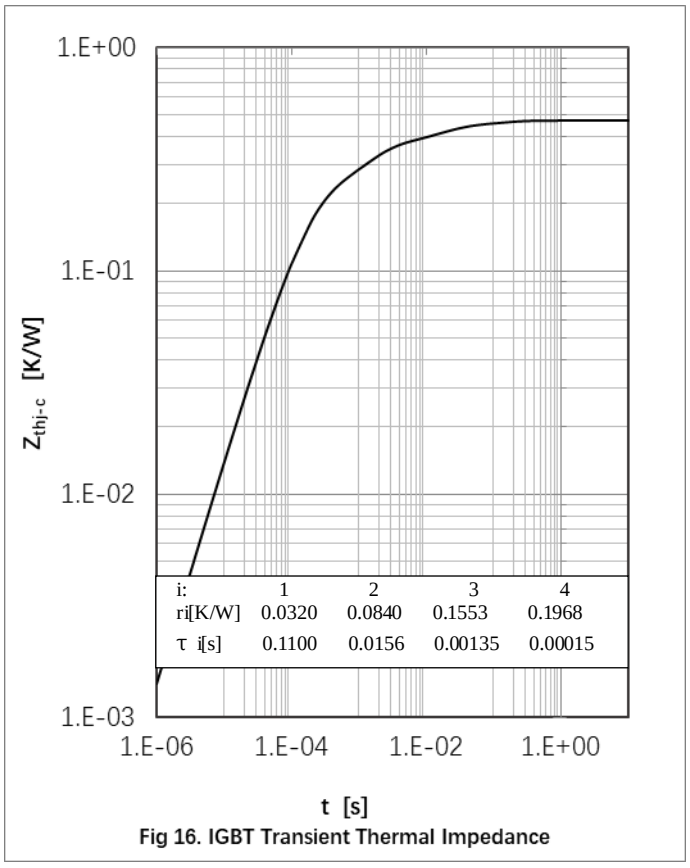


Fig 16. IGBT Transient Thermal Impedance

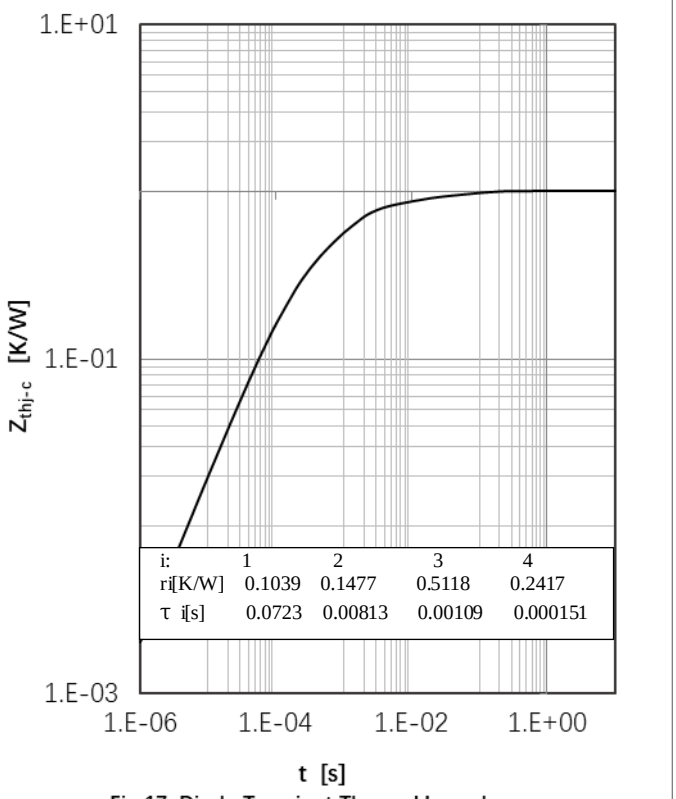


Fig 17. Diode Transient Thermal Impedance

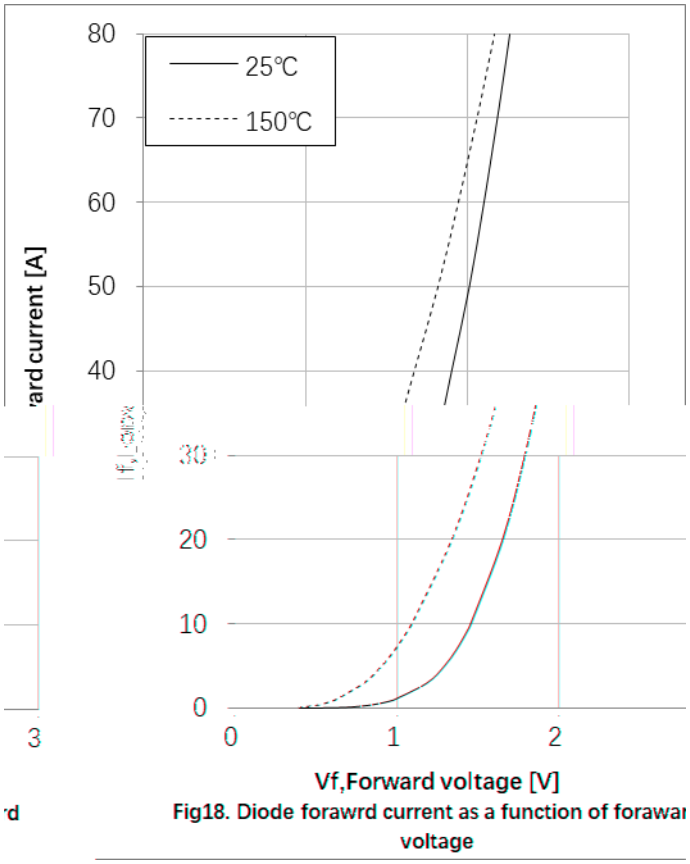


Fig18. Diode forawrd current as a function of forawar voltage

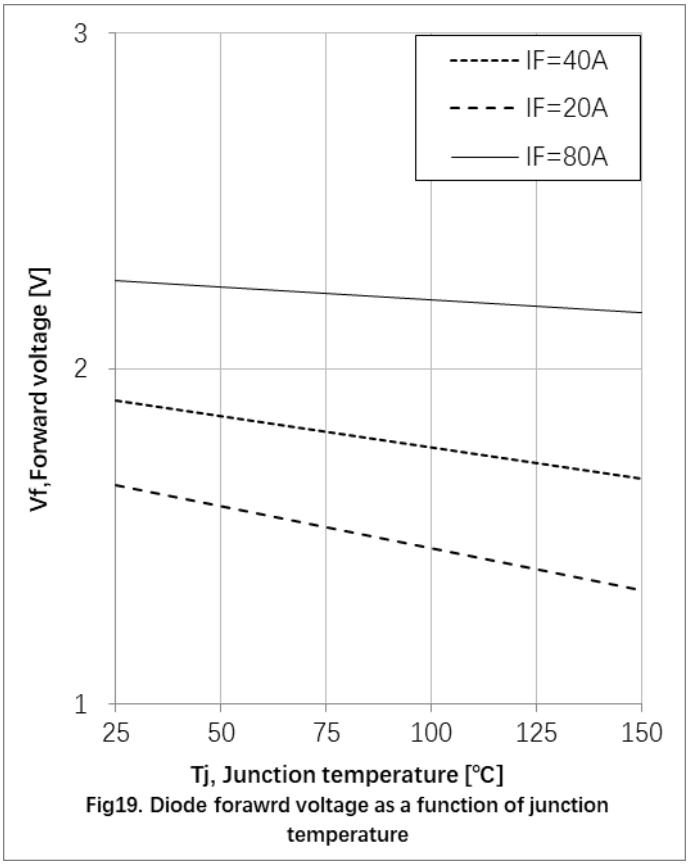


Fig19. Diode forawrd voltage as a function of junction temperature

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