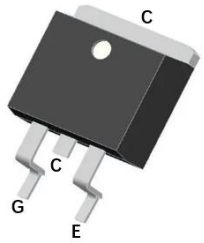
DGB40N65CTL2A

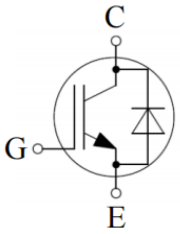
RoHS COMPLIANT



IGBT Discrete

V_{CE}	650	V
I_C	40	A
$V_{CE(SAT)}$ I_C=40A	1.60	V

Circuit



Applications

- AC and DC servo drive amplifier
- Uninterruptible power supply
- Motion/servo control

Features

- Low switching losses
- Maximum junction temperature 175℃
- Positive temperature coefficient
- High ruggedness, temperature stable
- High short circuit capability(5us)

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	650	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}≤ 650V, T_j≤ 150°C		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}=400V, V_{CEM}≤650V	T_{sc}	5	μs
Power Dissipation , Tj=175°C, Tc=25°C	P_{tot}	187	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=250μA	650		-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=1mA	4.1	5.1	6.1	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		1.60 1.85 2.00	1.90	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 4.00	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	-	2.03	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.02	-	
Gate Charge	Q_G	V_{CC}=400V,I_C=40A, V_{GE}=15V	-	0.14	-	uC
Short Circuit Collector Current	I_{SC}	V_{GE}=15V, tsc≤5us, Vcc=400V,Tj⩽150°C	-	185	-	A

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		1.60 1.50 1.40	2.10	V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=40A, V_{GE}= -5V~15V, Rg=20Ω	-	55	-	ns
Rise Time	t_r		-	72	-	ns
Turn-on Energy	E_{on}		-	1.34	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	129	-	ns
Fall Time	t_f		-	116	-	ns
Turn-off Energy	E_{off}		-	0.91	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=40A, V_{GE}= -5V~15V, Rg=20Ω	-	52	-	ns
Rise Time	t_r		-	74	-	ns
Turn-on Energy	E_{on}		-	1.47	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	140	-	ns
Fall Time	t_f		-	159	-	ns
Turn-off Energy	E_{off}		-	1.14	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=400V, I_C=40A, V_{GE}= -5V~15V, Rg=20Ω	-	50	-	ns
Rise Time	t_r		-	75	-	ns
Turn-on Energy	E_{on}		-	1.53	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	144	-	ns
Fall Time	t_f		-	178	-	ns
Turn-off Energy	E_{off}		-	1.24	-	mJ

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=400V -di/dt=450A/μs,	-	15	-	A
Reverse Recovery Charge	Q_{rr}		-	1.38	-	uC
Diode reverse recovery time	trr		-	133	-	ns
Reverse Recovery Energy	Erec		-	0.23	-	mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=40A,V_R=400V -di/dt=450A/μs,	-	21	-	A
Reverse Recovery Charge	Q_{rr}		-	2.36	-	uC
Diode reverse recovery time	trr		-	171	-	ns
Reverse Recovery Energy	Erec		-	0.58	-	mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=40A,V_R=400V -di/dt=450A/μs,	-	24	-	A
Reverse Recovery Charge	Q_{rr}		-	3.32	-	uC
Diode reverse recovery time	trr		-	205	-	ns
Reverse Recovery Energy	Erec		-	0.69	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	0.8	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	1.05	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	40	K/W

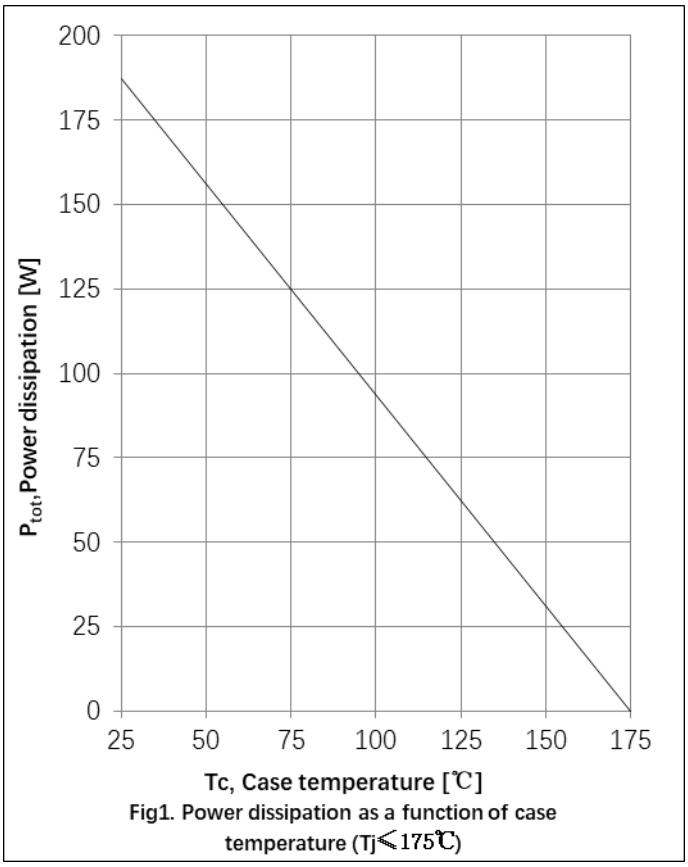


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

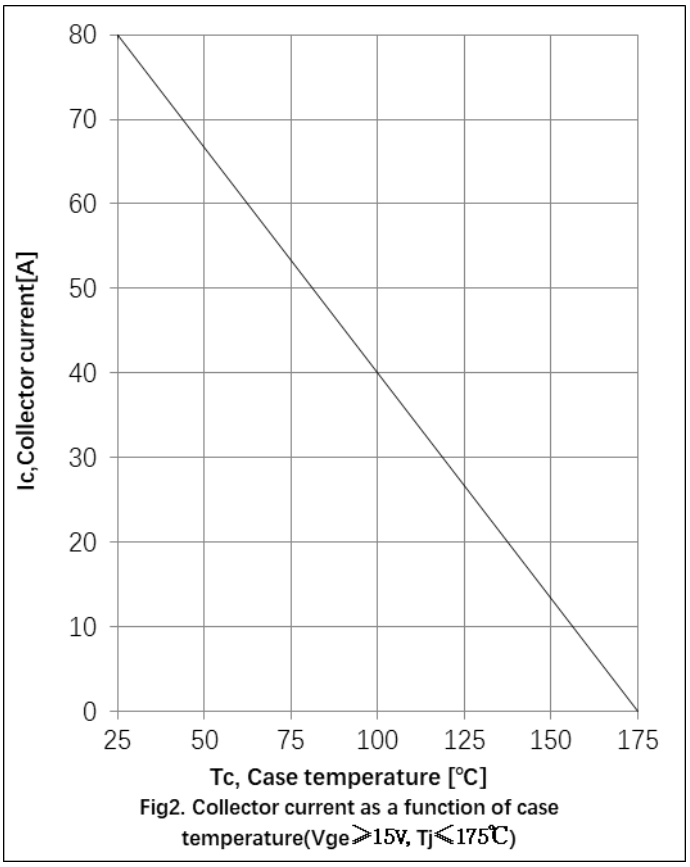


Fig2. Collector current as a function of case temperature(Vge≥15V, Tj≤175℃)

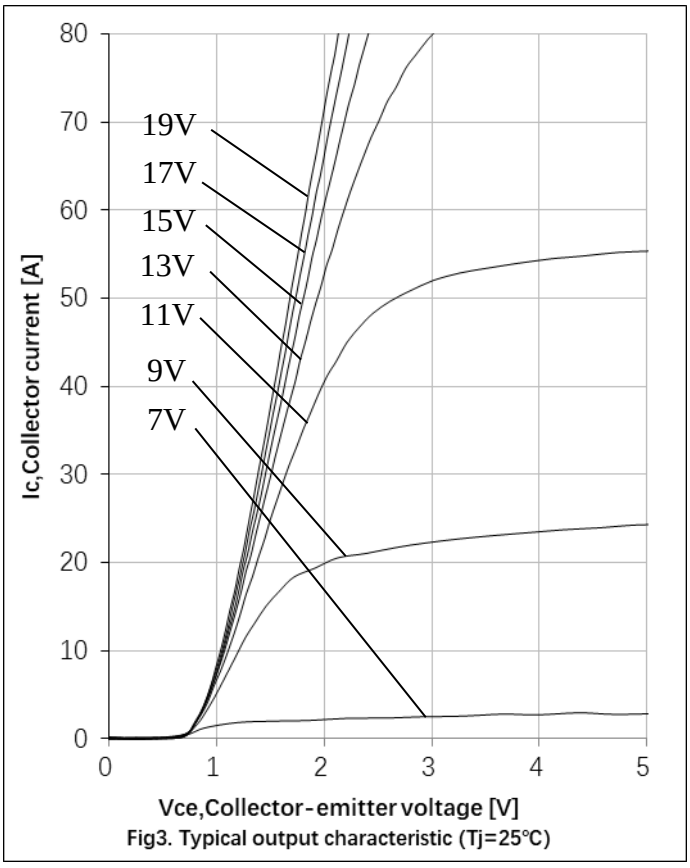


Fig3. Typical output characteristic (Tj=25℃)

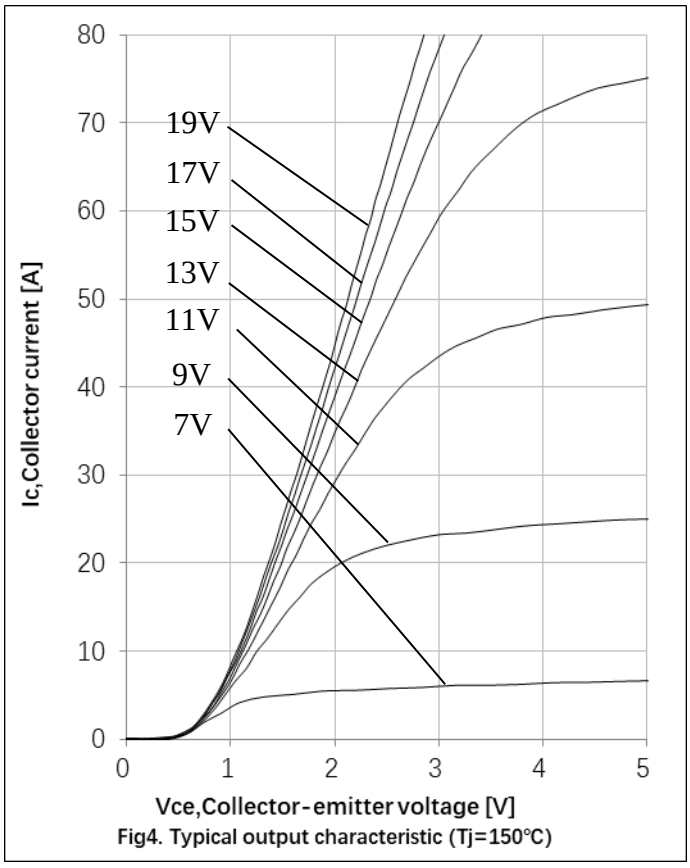


Fig4. Typical output characteristic (Tj=150℃)

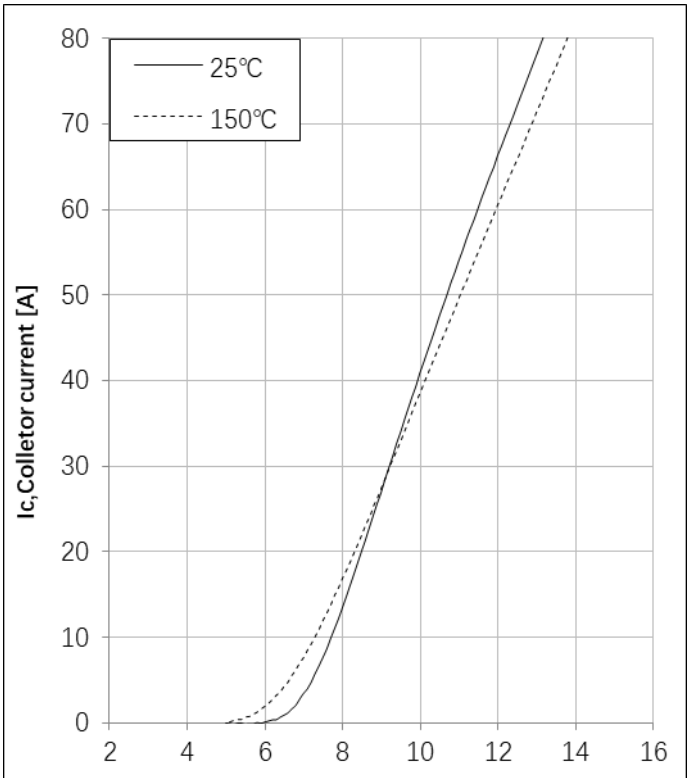


Fig5. Typical transfer characteristic (Vce=20V)

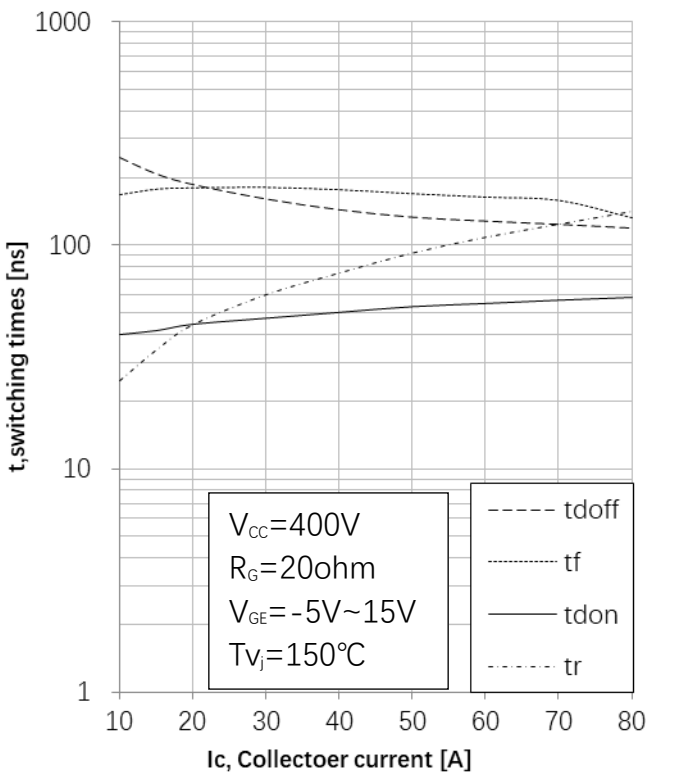


Fig6. Typical switching times as a function of collect current

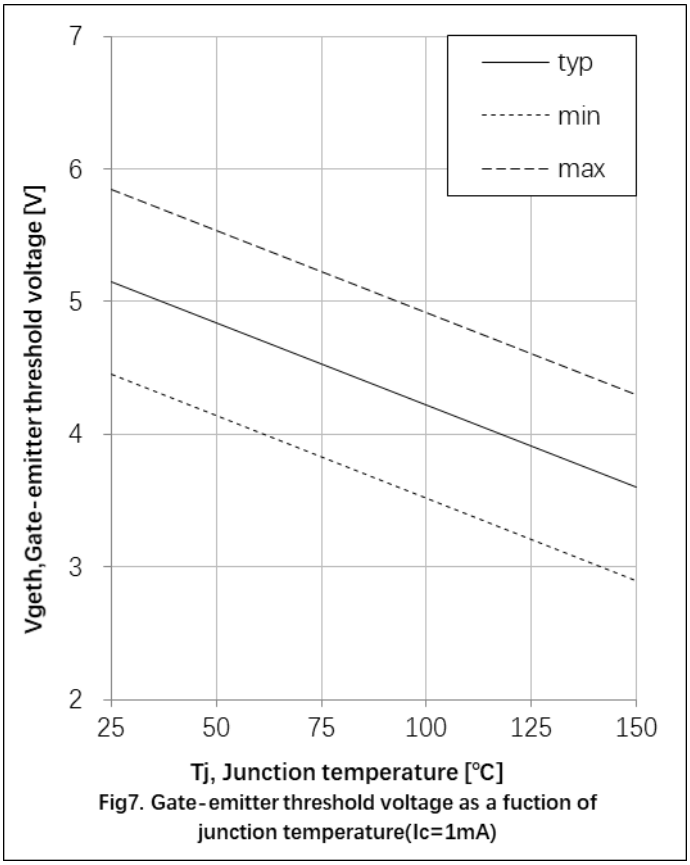


Fig7. Gate-emitter threshold voltage as a fuction of junction temperature(Ic=1mA)

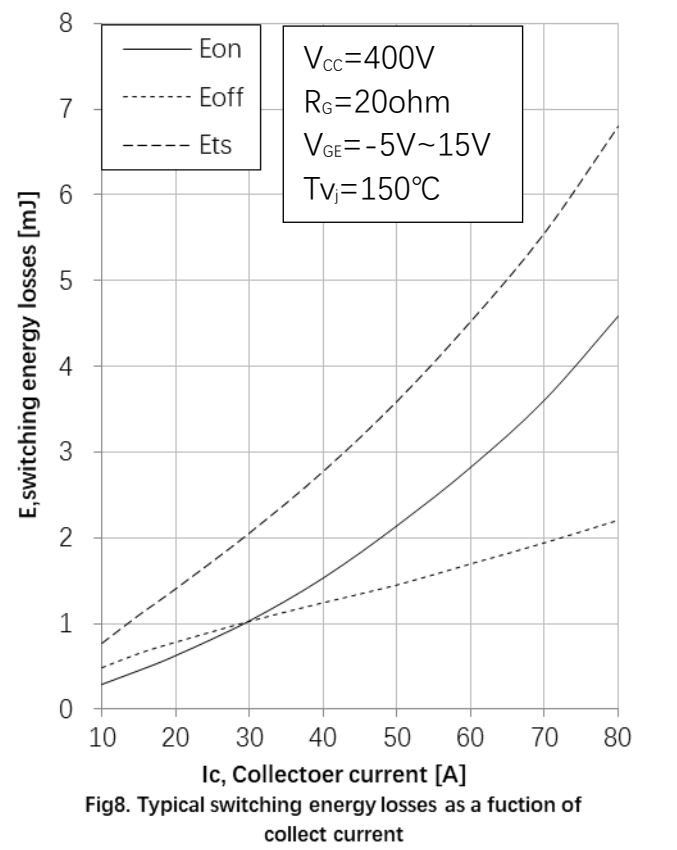


Fig8. Typical switching energy losses as a fuction of collect current

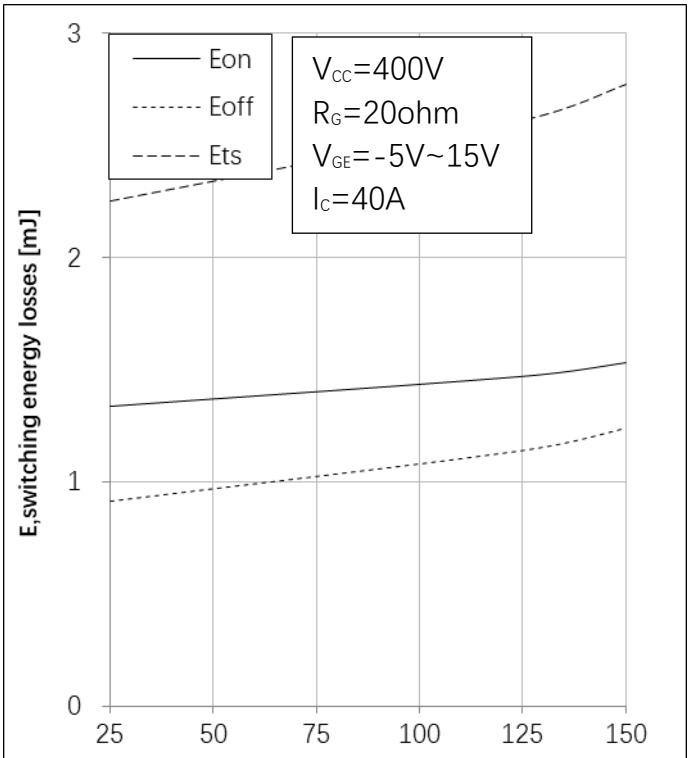


Fig9. Typical switching energy losses as a fuction of junction temperature

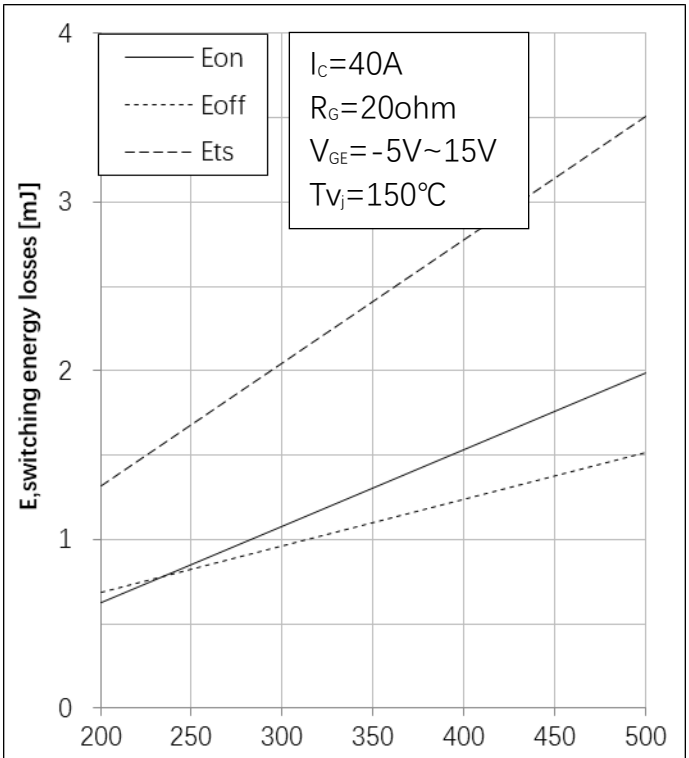


Fig10. Typical switching energy losses as a fuction of collector-emitter voltage

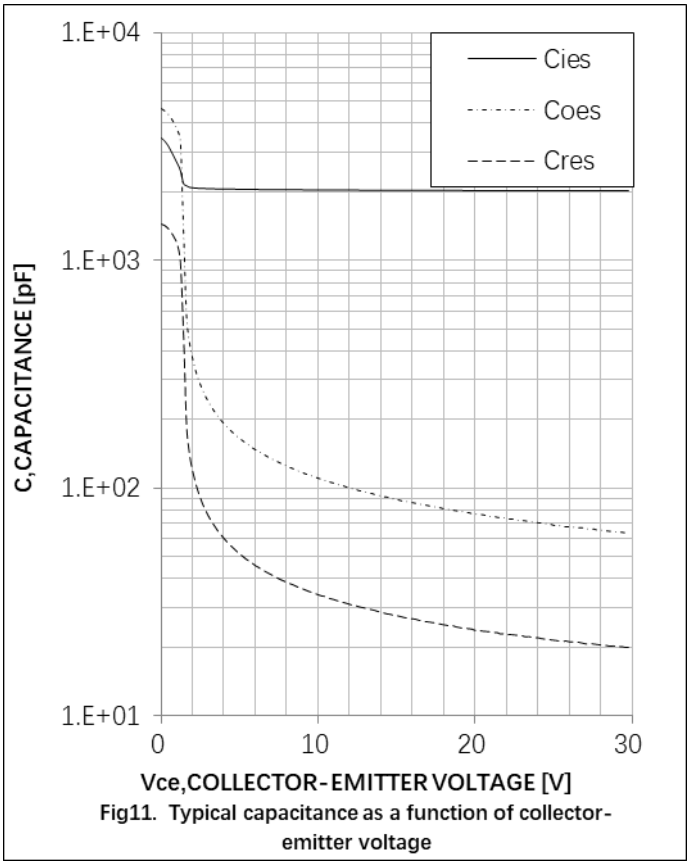


Fig11. Typical capacitance as a function of collector-emitter voltage

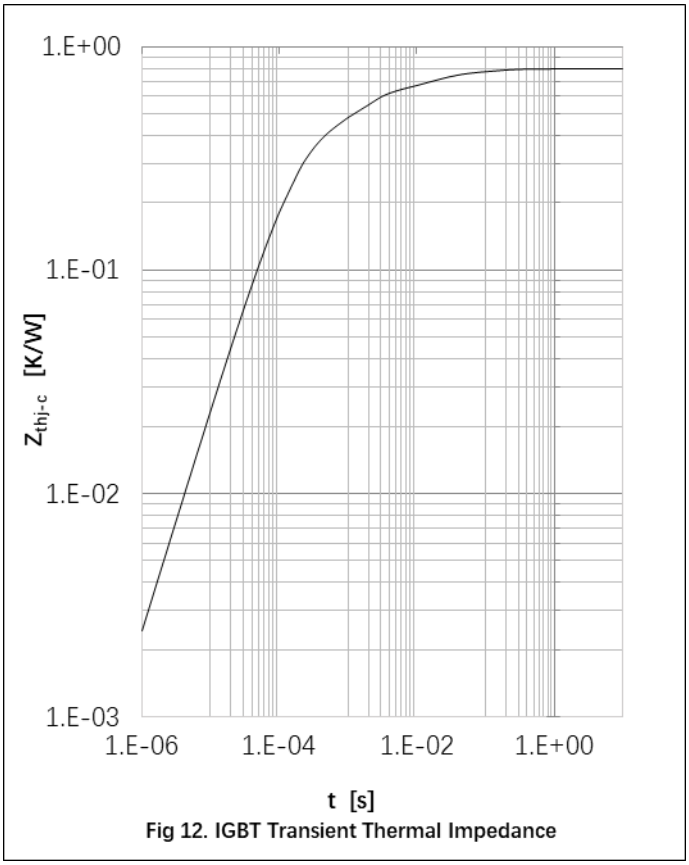


Fig 12. IGBT Transient Thermal Impedance

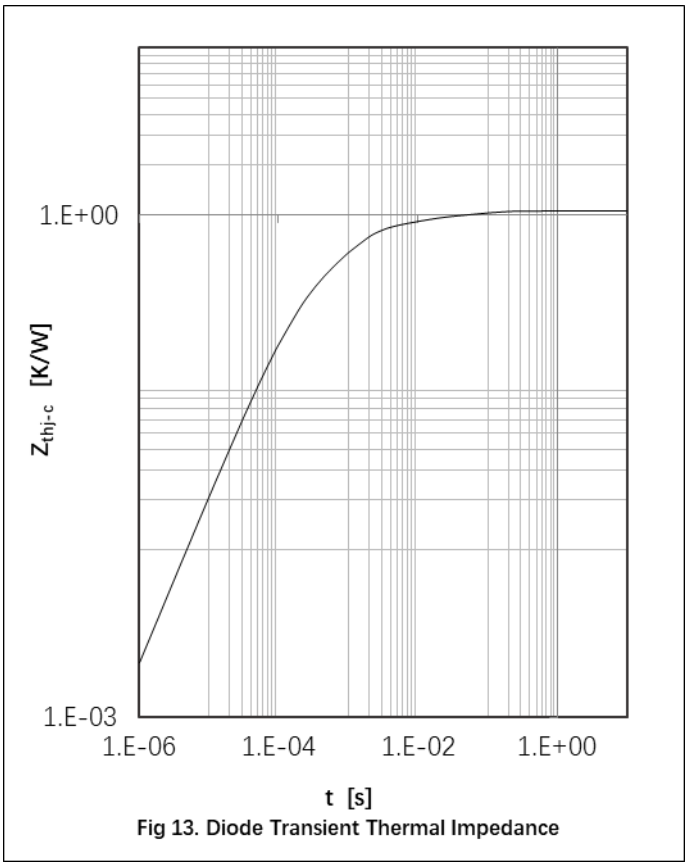


Fig 13. Diode Transient Thermal Impedance

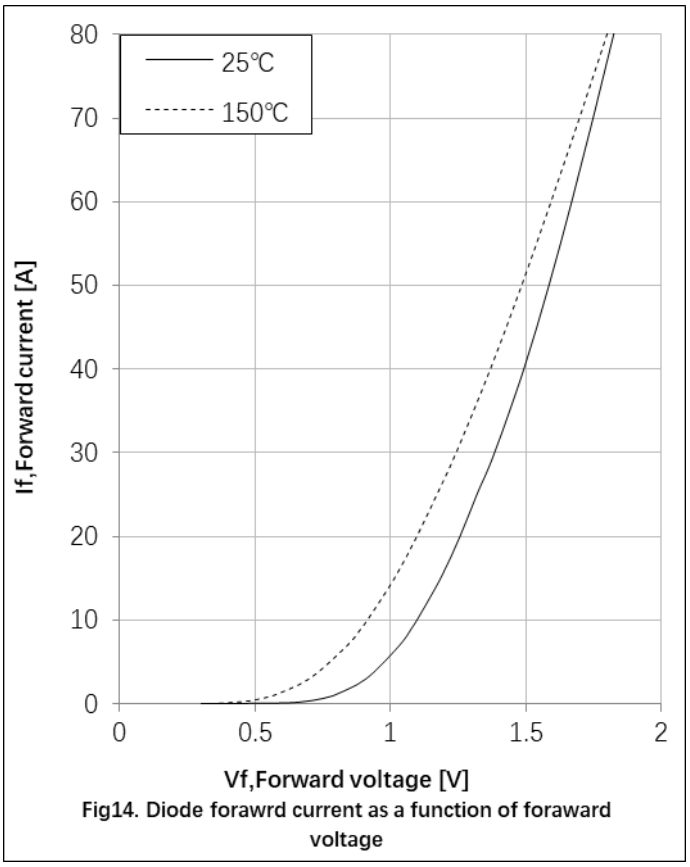
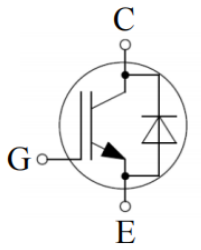
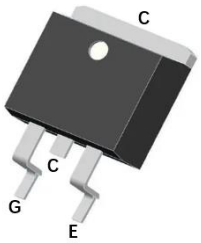


Fig14. Diode forawrd current as a function of foraward voltage

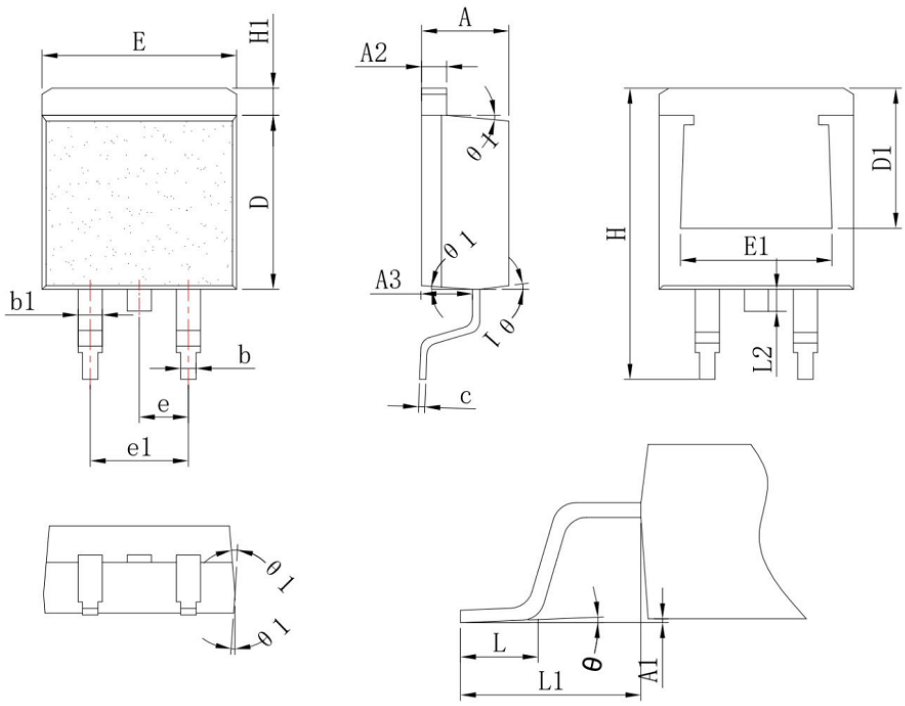
Circuit Diagram





Package Outline Information

CASE: TO 263



SYMBOL	mm		
	MIN	NOM	MAX
*A	4.42	4.52	4.62
*A1	0.00	0.10	0.20
*A2	1.24	1.27	1.32
*A3	2.50	2.60	2.70
*b	0.75	0.80	0.85
*b1	1.20	1.25	1.30
*c	0.33	0.38	0.43
*D	8.88	9.00	9.12
D1	7.25REF		
*E	9.92	10.07	10.22
E1	7.85	8.00	8.15
*e	2.50	2.54	2.58
e1	5.08REF		
*H	14.80	15.10	15.30
H1	1.12	1.28	1.42
*L	2.10	2.23	2.36
L1	4.55	4.75	4.95
L2	1.10	1.30	1.50
*θ	0°	2°	5°
θ1	3°	–	9°

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