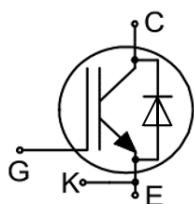


IGBT Discrete

V_{CE}	650	V
I_C	50	A
$V_{CE(SAT)} I_C=50A$	1.40	V

Circuit



Applications

- Solar converters
- Uninterruptible power supplies
- Welding converters
- Mid to high range switching frequency converters

Features

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175°C
- Positive temperature coefficient
- High ruggedness, temperature stable

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	650	V
DC Collector Current, limited by T_{jmax} $T_C=25^\circ C$ value limited by bondwire $T_C=100^\circ C$	I_C	80 60	A
Diode Forward Current, limited by T_{jmax} $T_C=25^\circ C$ value limited by bondwire $T_C=100^\circ C$	I_F	80 60	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10\mu s, D < 0.010$)	V_{GE}	± 30	V
Turn off Safe Operating Area $V_{CE} \leq 650V$, $T_j \leq 150^\circ C$		200	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	200	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	200	A
Power Dissipation, $T_j=175^\circ C, T_C=25^\circ C$	P_{tot}	283	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 ($T_j = 25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	$V_{GE}=0V, I_C=250\mu A$	650		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=0.50mA$	3.8	4.8	5.8	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=50A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$	1.10	1.40 1.60 1.70	1.70	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$ $T_j=25^\circ\text{C}$, $T_j=150^\circ\text{C}$			0.25 3.00	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			100	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	2.86	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.02	-	
Gate Charge	Q_G	$V_{CC}=520V, I_C=50A,$ $V_{GE}=15V$	-	0.14	-	uC

**Electrical Characteristics of the Diode** ($T_j = 25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	$I_F = 50\text{A}$ $T_j = 25^\circ\text{C}$, $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$		1.60 1.50 1.40	2.00	V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at $T_j = 25^\circ\text{C}$						
Turn-on Delay Time	$t_{d(\text{on})}$	$V_{CC} = 400\text{V}$, $I_C = 50\text{A}$, $V_{GE} = -5\text{V} \sim 15\text{V}$, $R_g = 10\Omega$, Inductive Load	-	24	-	ns
Rise Time	t_r		-	25	-	ns
Turn-on Energy	E_{on}		-	1.51	-	mJ
Turn-off Delay Time	$t_{d(\text{off})}$		-	82	-	ns
Fall Time	t_f		-	44	-	ns
Turn-off Energy	E_{off}		-	0.49	-	mJ
Total switching energy	E_{ts}		-	2.00	-	mJ
Dynamic , at $T_j = 125^\circ\text{C}$						
Turn-on Delay Time	$t_{d(\text{on})}$	$V_{CC} = 400\text{V}$, $I_C = 50\text{A}$, $V_{GE} = -5\text{V} \sim 15\text{V}$, $R_g = 10\Omega$, Inductive Load	-	25	-	ns
Rise Time	t_r		-	31	-	ns
Turn-on Energy	E_{on}		-	1.56	-	mJ
Turn-off Delay Time	$t_{d(\text{off})}$		-	91	-	ns
Fall Time	t_f		-	56	-	ns
Turn-off Energy	E_{off}		-	0.68	-	mJ
Total switching energy	E_{ts}		-	2.22	-	mJ
Dynamic , at $T_j = 150^\circ\text{C}$						
Turn-on Delay Time	$t_{d(\text{on})}$	$V_{CC} = 400\text{V}$, $I_C = 50\text{A}$, $V_{GE} = -5\text{V} \sim 15\text{V}$, $R_g = 10\Omega$, Inductive Load	-	26	-	ns
Rise Time	t_r		-	34	-	ns
Turn-on Energy	E_{on}		-	1.59	-	mJ
Turn-off Delay Time	$t_{d(\text{off})}$		-	96	-	ns
Fall Time	t_f		-	63	-	ns
Turn-off Energy	E_{off}		-	0.73	-	mJ
Total switching energy	E_{ts}		-	2.32	-	mJ

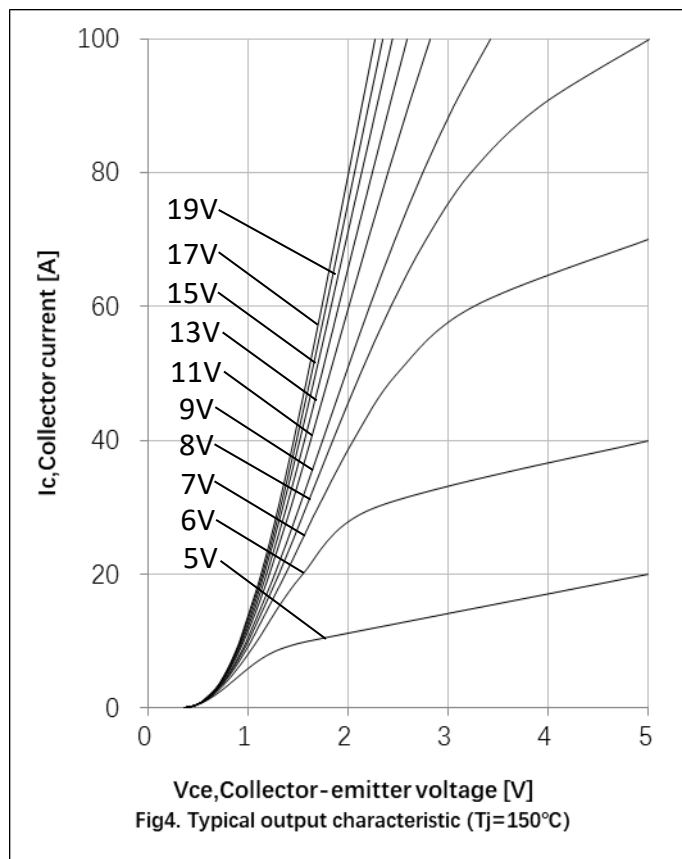
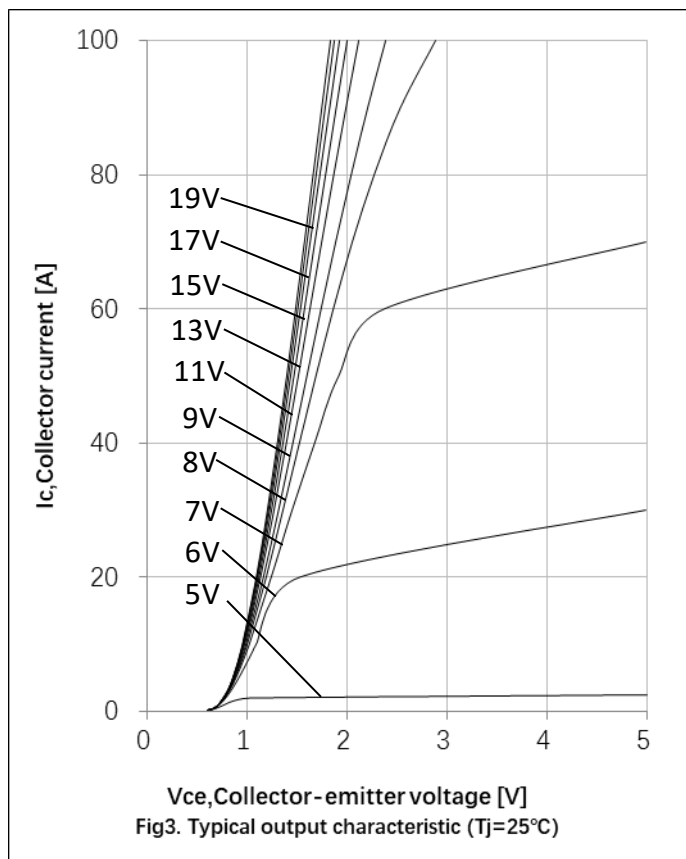
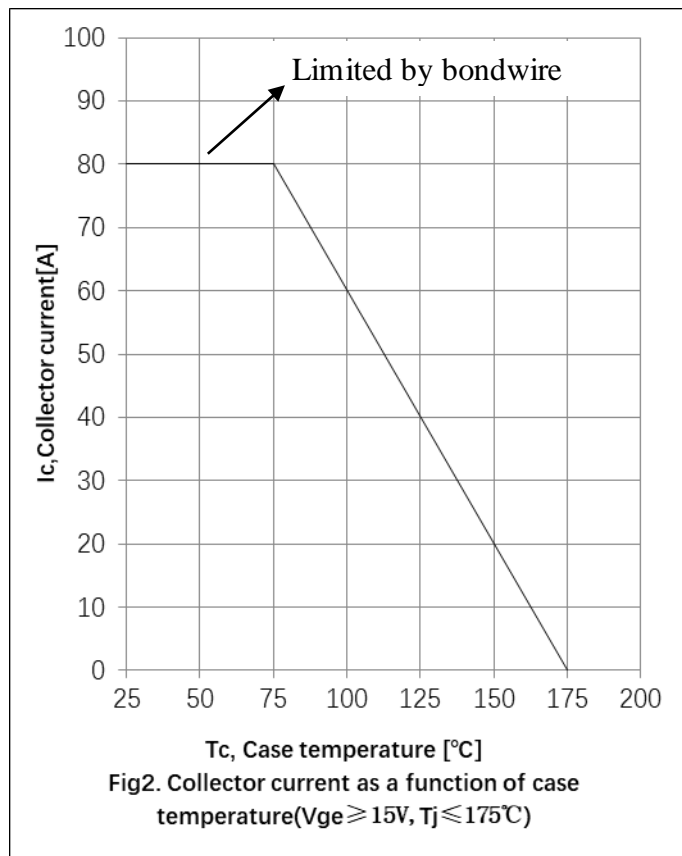
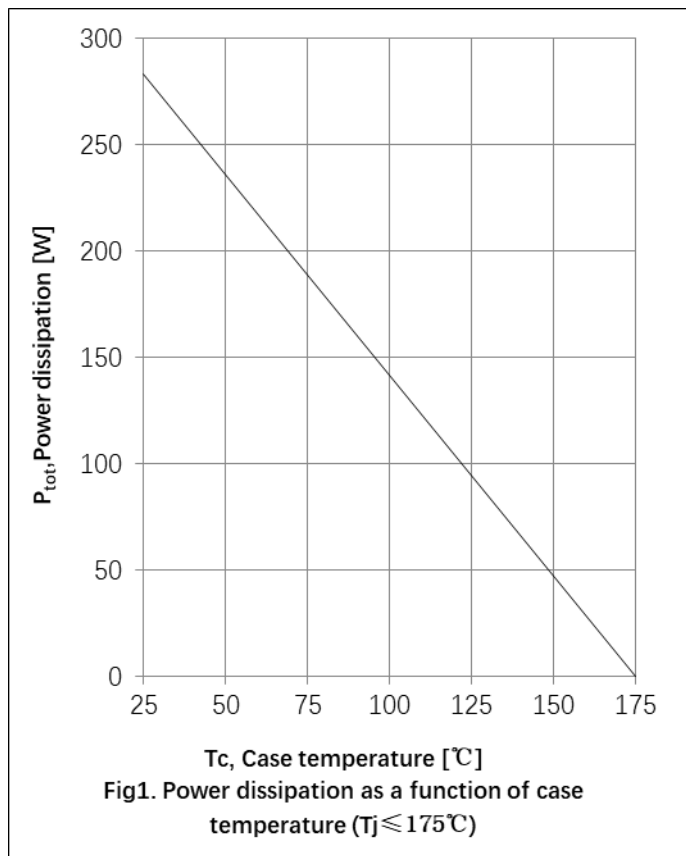


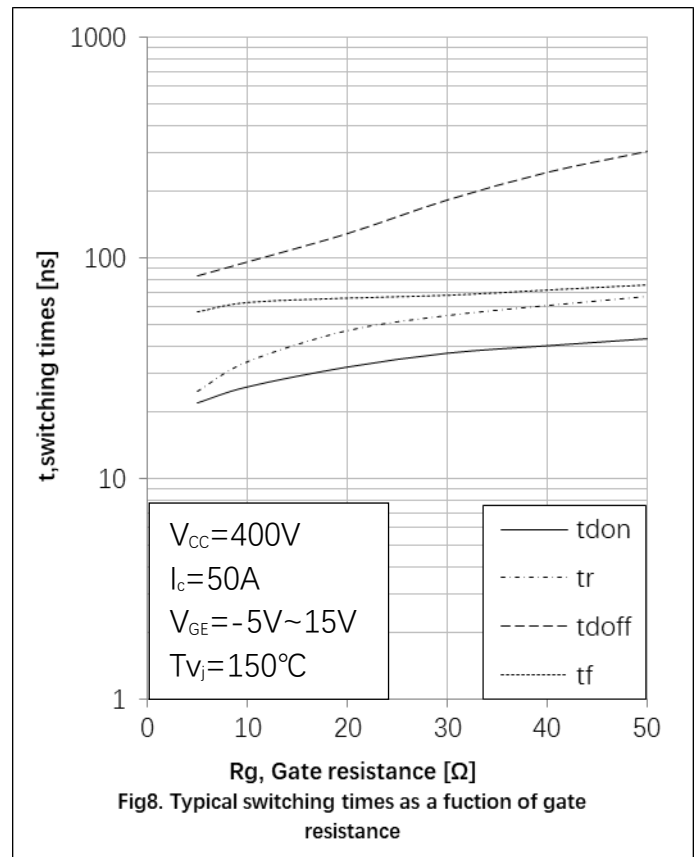
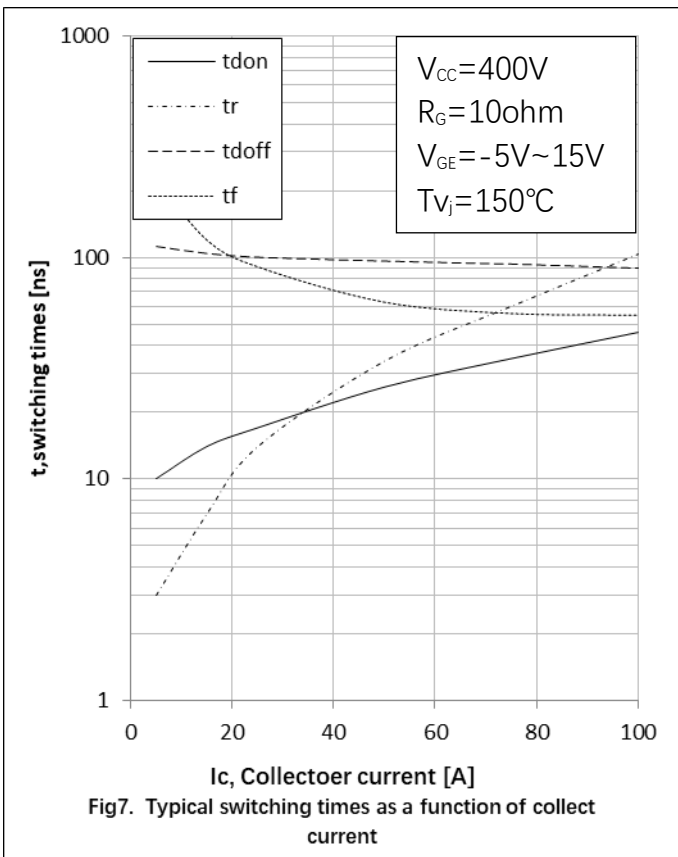
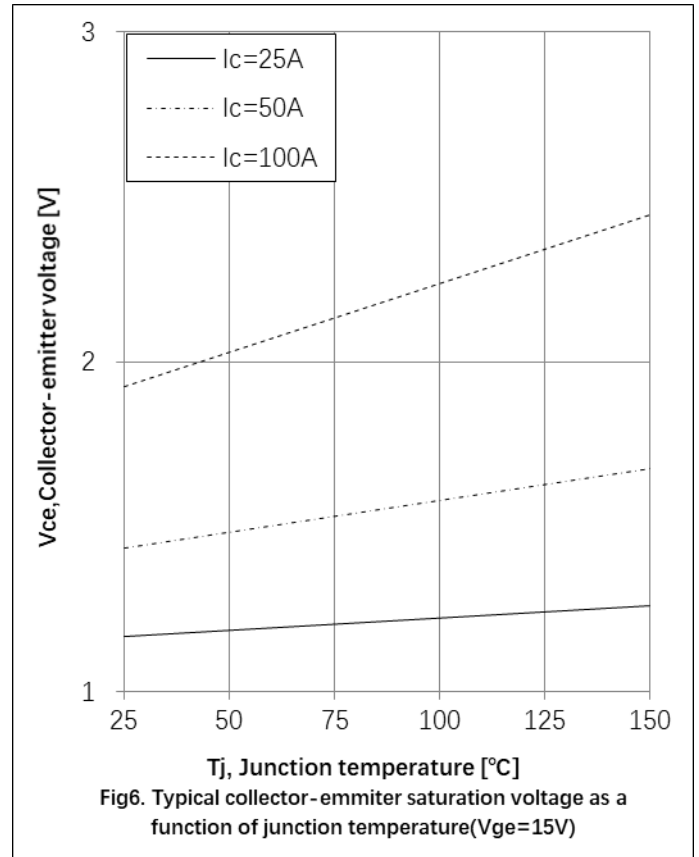
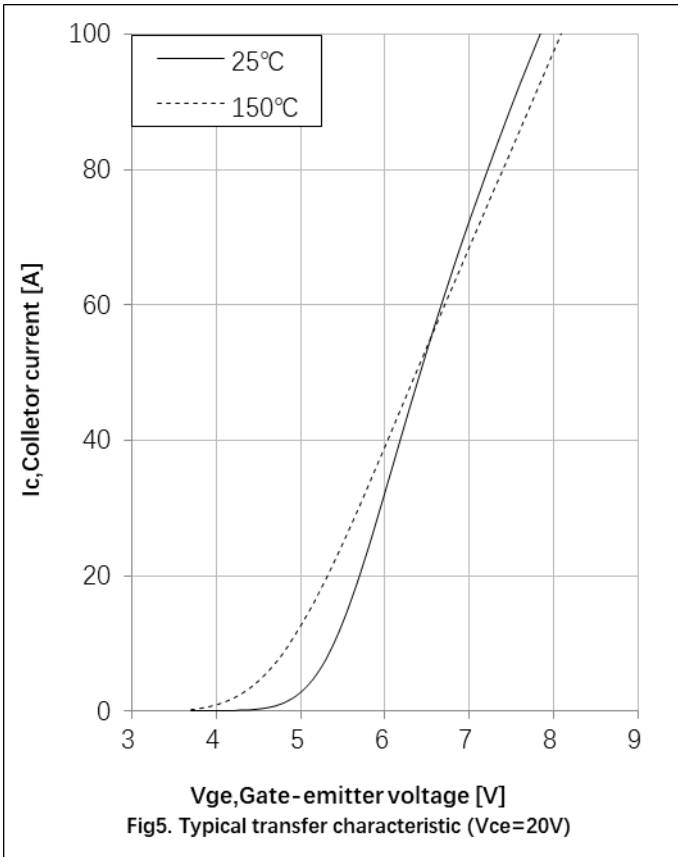
Electrical Characteristics of the DIODE

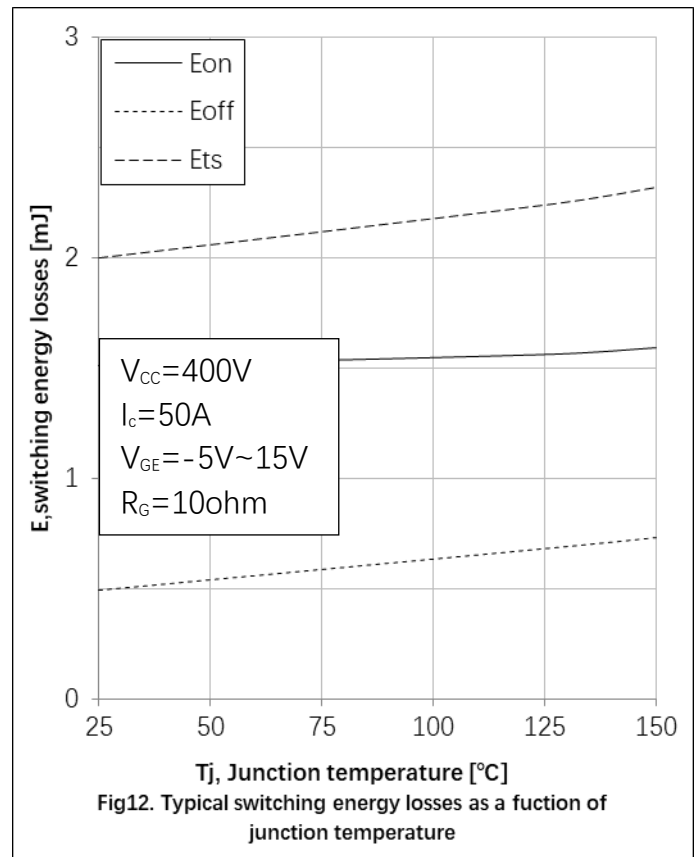
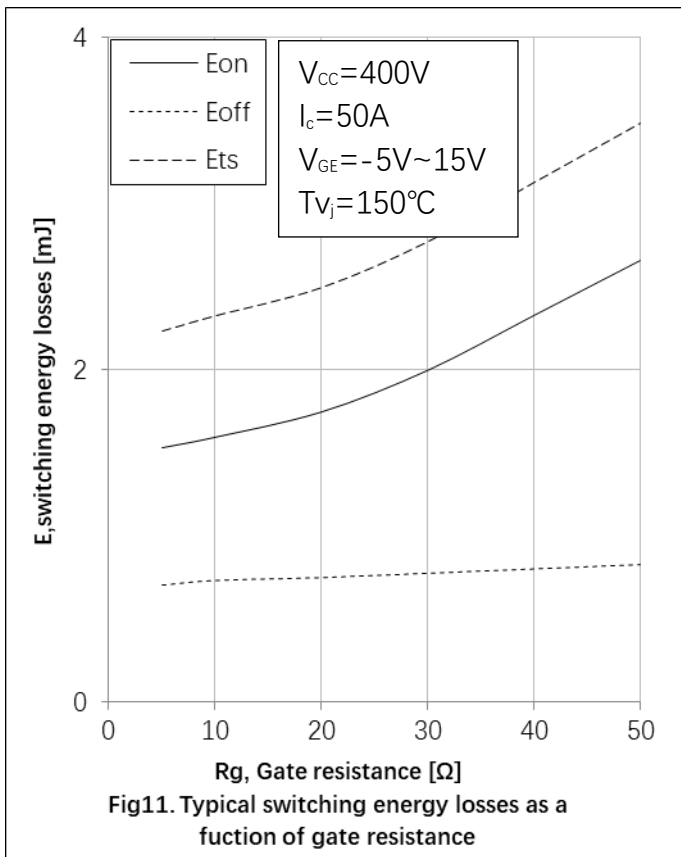
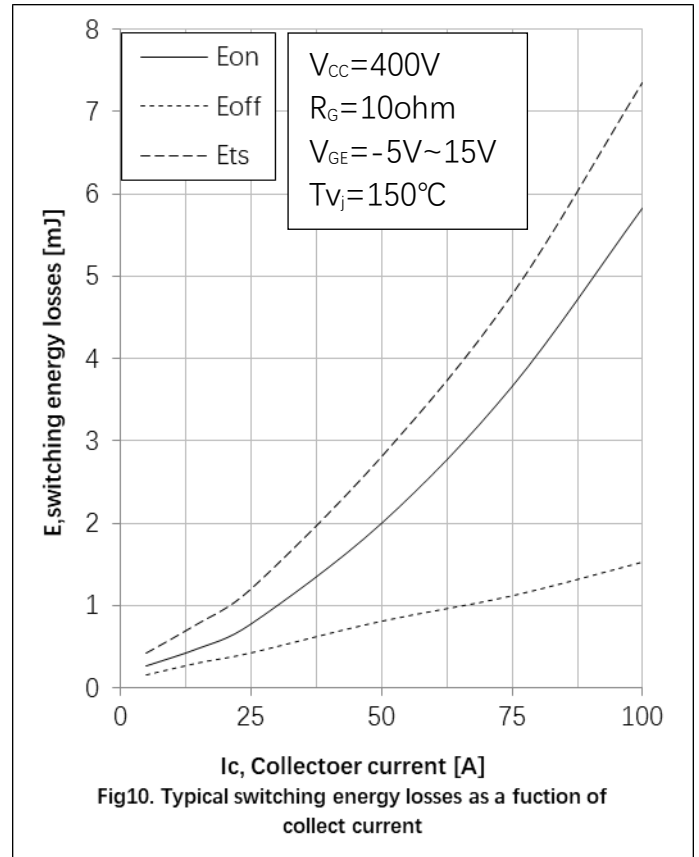
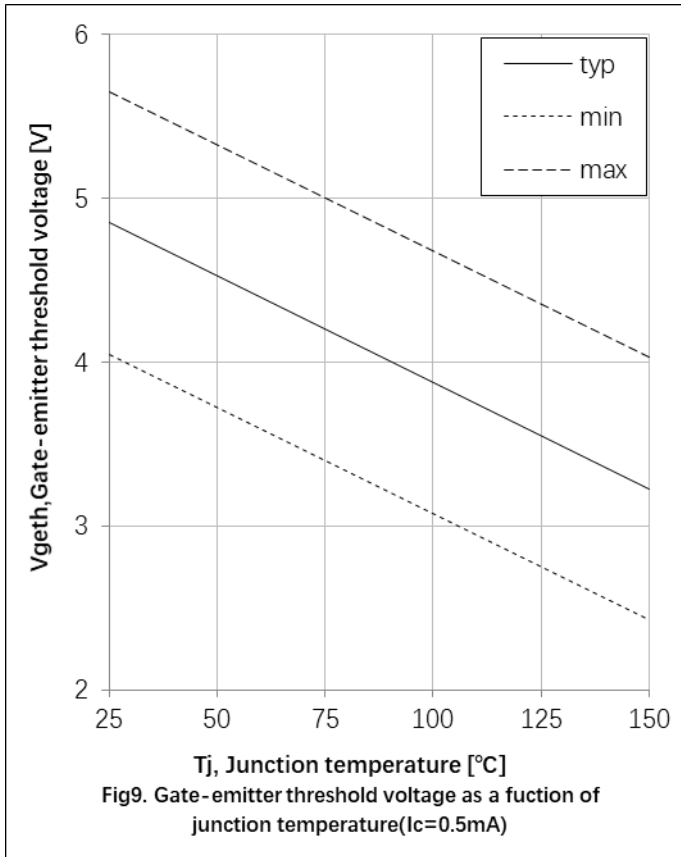
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25°C						
Reverse Recovery Current	I _{rr}	I _F =50A, V _R =400V -di/dt=450A/μs,	-	15	-	A
Reverse Recovery Charge	Q _{rr}		-	1.58	-	uC
Diode reverse recovery time	t _{rr}		-	148	-	ns
Reverse Recovery Energy	E _{rec}		-	0.29	-	mJ
Dynamic , at T_j= 125°C						
Reverse Recovery Current	I _{rr}	I _F =50A, V _R =400V -di/dt=450A/μs,	-	21	-	A
Reverse Recovery Charge	Q _{rr}		-	2.54	-	uC
Diode reverse recovery time	t _{rr}		-	183	-	ns
Reverse Recovery Energy	E _{rec}		-	0.65	-	mJ
Dynamic , at T_j= 150°C						
Reverse Recovery Current	I _{rr}	I _F =50A, V _R =400V -di/dt=450A/μs,	-	24	-	A
Reverse Recovery Charge	Q _{rr}		-	3.59	-	uC
Diode reverse recovery time	t _{rr}		-	218	-	ns
Reverse Recovery Energy	E _{rec}		-	0.79	-	mJ

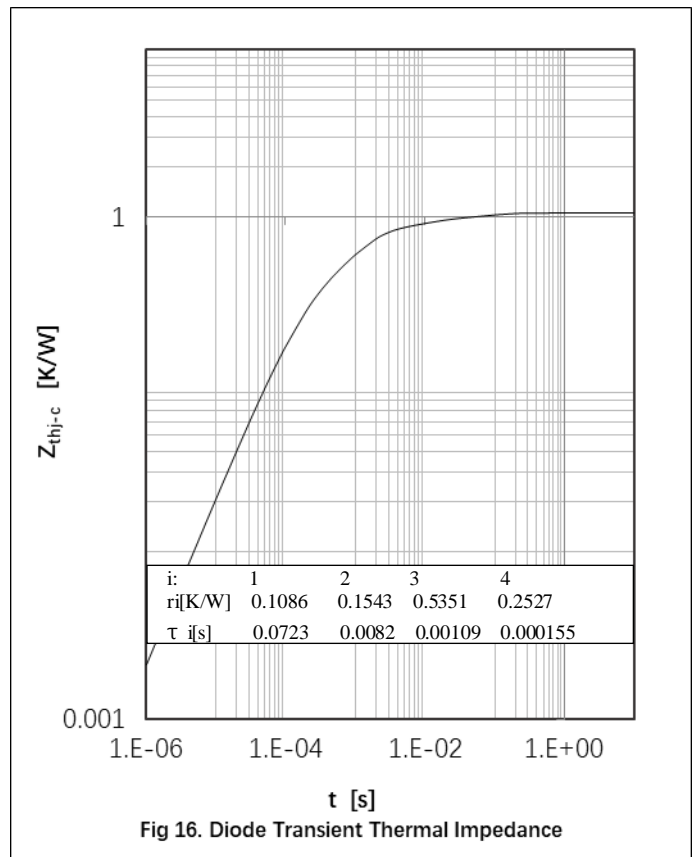
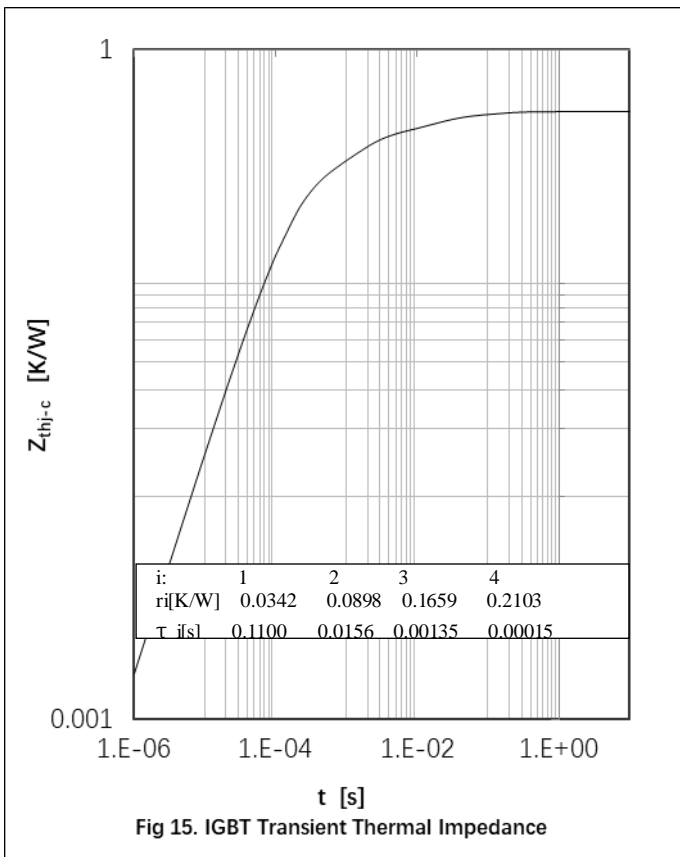
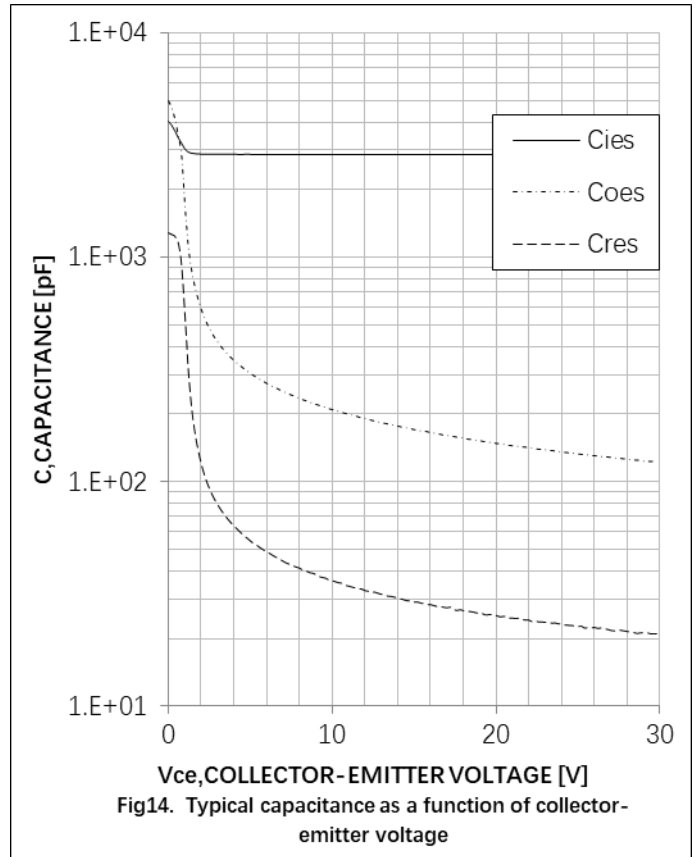
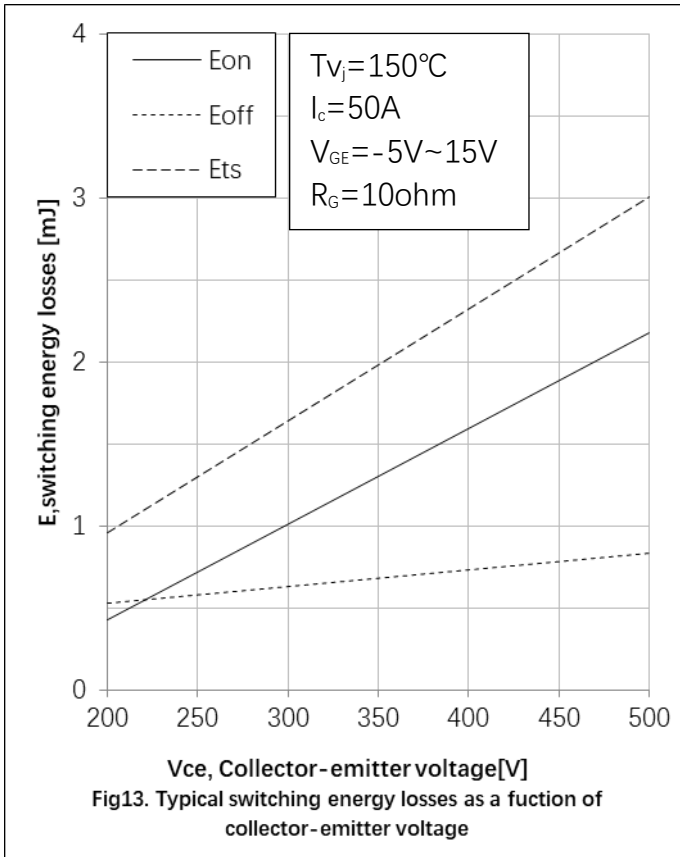
Thermal Resistance

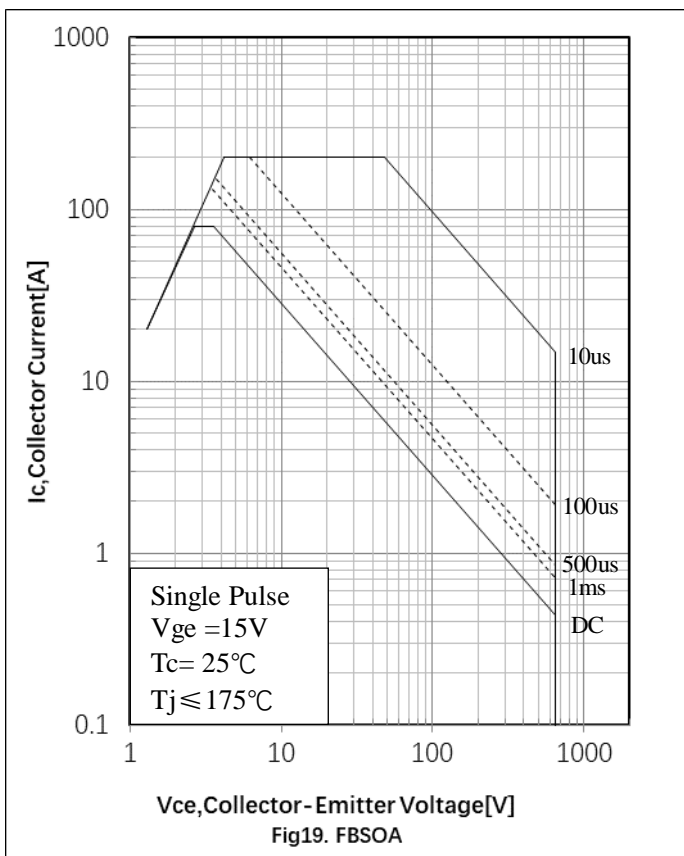
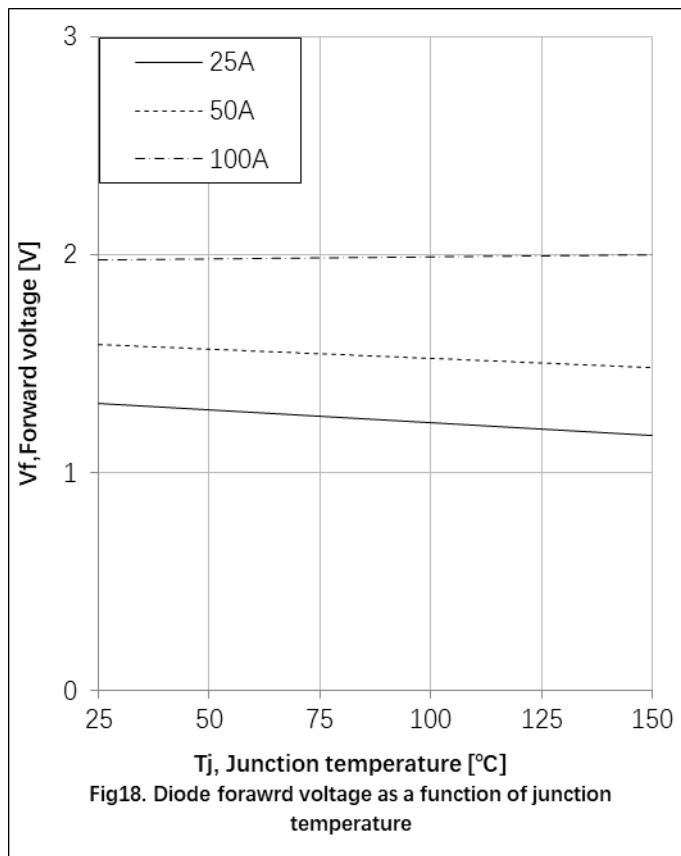
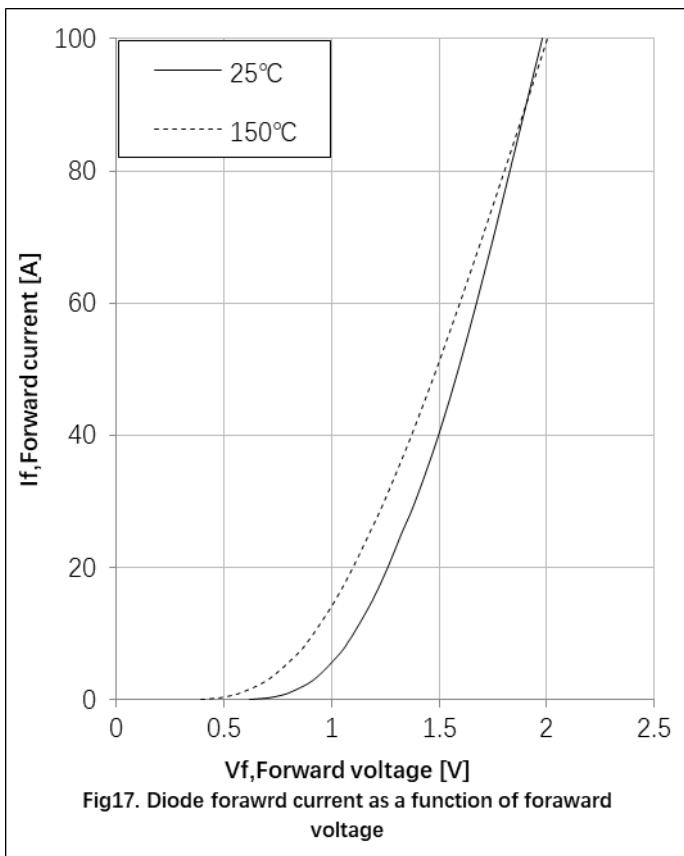
Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{th(j-c)}	0.53	K/W
Diode Thermal Resistance, Junction - Case	R _{th(j-c)}	1.05	K/W
Thermal Resistance, Junction - Ambient	R _{th(j-a)}	40	K/W



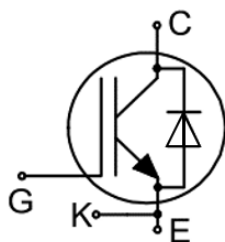






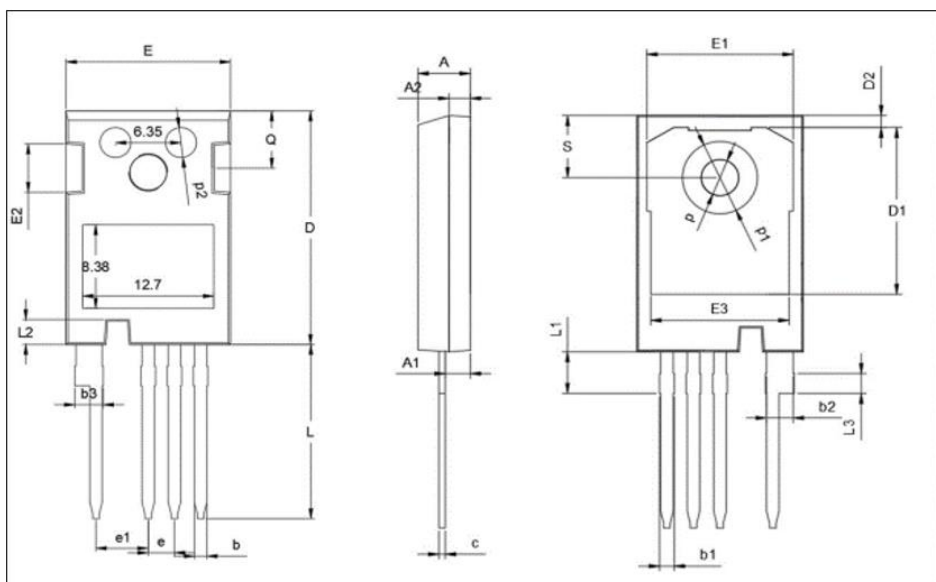


● Circuit Diagram



● Package Outline Information

CASE: TO 247-4L



TO247-4L			
Dim	Min	Norm	Max
A	4.80	5.00	5.20
A1	2.30	2.40	2.50
A2	1.88	1.98	2.08
b	1.10	1.20	1.30
b1	1.20	/	1.50
b2	2.35	2.55	2.75
b3	2.45	/	2.85
c	0.55	0.60	0.65
D	23.3	23.45	23.6
D1	16.25	16.55	16.85
D2	1.00	/	1.30
e	TYP2.54		
e1	TYP5.06		
E	15.75	15.90	16.05
E1	13.80	/	14.20
E2	4.40	4.75	5.10
E3	13.00	/	13.45
L	17.34	17.49	17.64
L1	4.00	/	4.30
L2	2.35	/	2.65
L3	TYP1.98		
Q	5.60	5.80	6.00
S	6.05	/	6.30
p	TYP3.58		
p1	TYP7.18		
p2	TYP3.00		



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