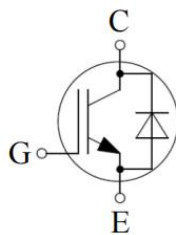


IGBT Discrete

V_{CE}	650	V
I_C	160	A
$V_{CE(SAT)} I_C=160A$	1.55	V

Circuit



Applications

- Energy storage inverter
- Uninterruptible power supplies
- Solar inverters

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	180 160	A
Diode Forward Current, limited by T_{jmax} $T_C=25^{\circ}C$ value limited by bondwire $T_C=100^{\circ}C$	I_F	180 160	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 $V_{CE} \leq 650V$, $T_j \leq 150^{\circ}C$		360	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	360	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	360	A
Power Dissipation, $T_j=175^{\circ}C$, $T_C=25^{\circ}C$	P_{tot}	714	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	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=1mA$	3.2	4.0	4.8	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=160A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.55 1.75 1.85	1.85	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}	$V_{CE}=25V, V_{GE}=0V$, $f=1MHz$	-	6.93	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.07	-	
Gate Charge	Q_G	$V_{CC}=400V, I_C=160A$, $V_{GE}=-5V\sim+15V$	-	0.35	-	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	$I_F = 160\text{A}$ $T_j = 25^\circ\text{C}$, $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$		2.10 1.95 1.90	2.60	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 =160A, V _{GE} = -5v~15V, R _g =10Ω Inductive Load	-	47	-	ns
Rise Time	t _r		-	103	-	ns
Turn-on Energy	E _{on}		-	5.75	-	mJ
Turn-off Delay Time	t _{d(off)}		-	210	-	ns
Fall Time	t _f		-	74	-	ns
Turn-off Energy	E _{off}		-	3.69	-	mJ
Dynamic , at T _j = 125℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} =400V, I _C =160A, V _{GE} = -5v~15V, R _g =10Ω Inductive Load	-	42	-	ns
Rise Time	t _r		-	109	-	ns
Turn-on Energy	E _{on}		-	8.36	-	mJ
Turn-off Delay Time	t _{d(off)}		-	214	-	ns
Fall Time	t _f		-	75	-	ns
Turn-off Energy	E _{off}		-	4.42	-	mJ
Dynamic , at T _j = 150℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} =400V, I _C =160A, V _{GE} = -5v~15V, R _g =10Ω Inductive Load	-	41	-	ns
Rise Time	t _r		-	113	-	ns
Turn-on Energy	E _{on}		-	9.08	-	mJ
Turn-off Delay Time	t _{d(off)}		-	217	-	ns
Fall Time	t _f		-	76	-	ns
Turn-off Energy	E _{off}		-	4.67	-	mJ

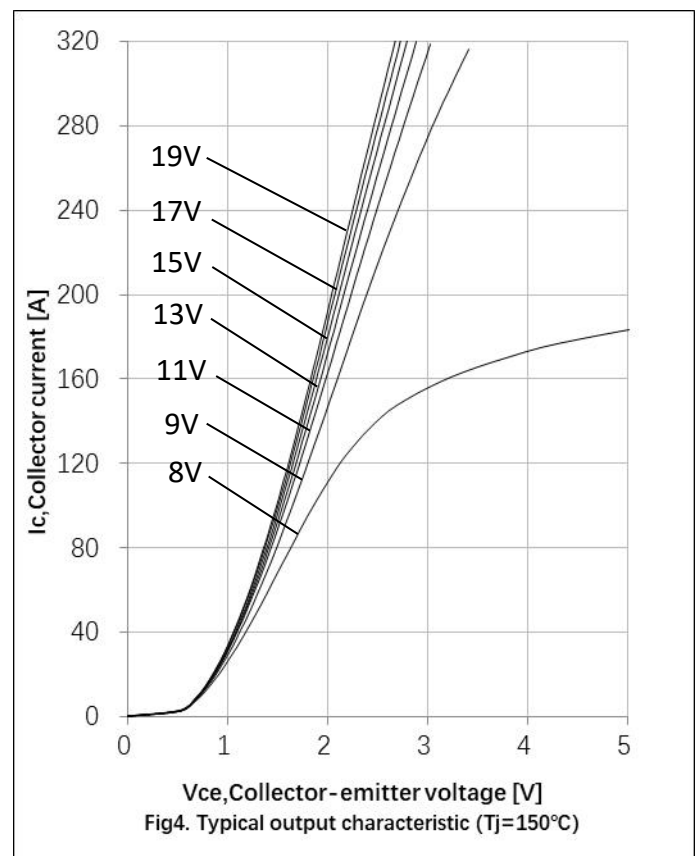
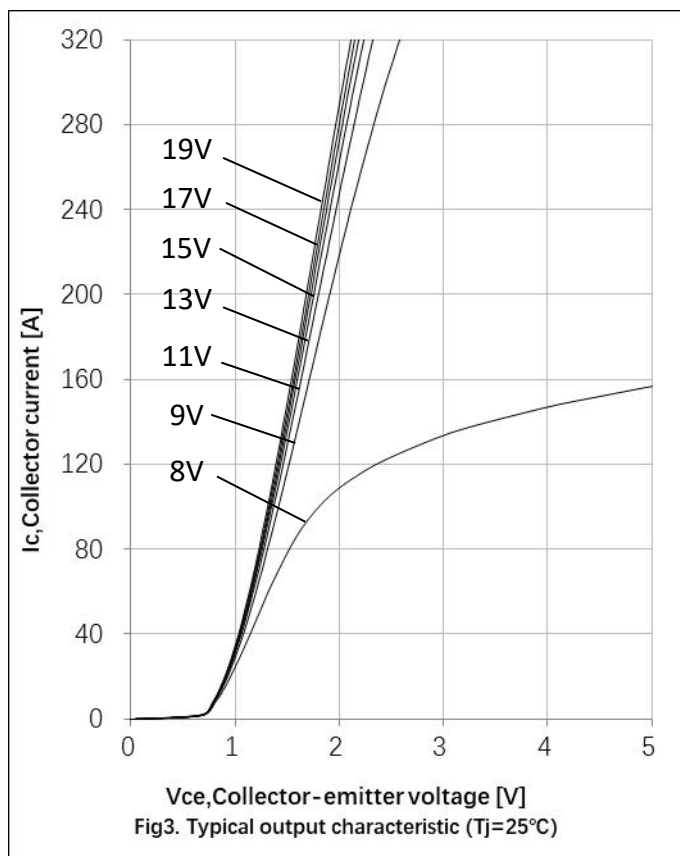
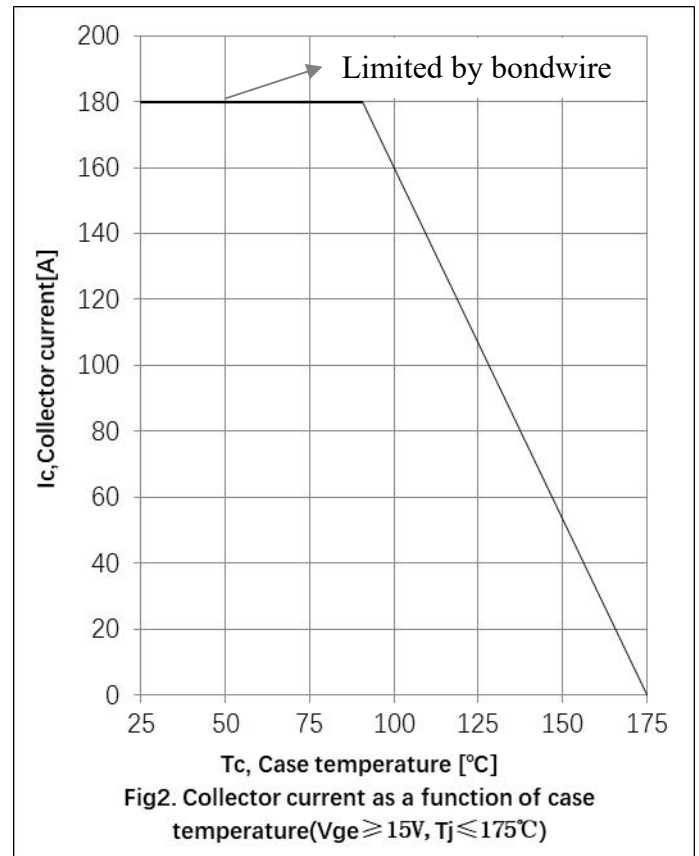
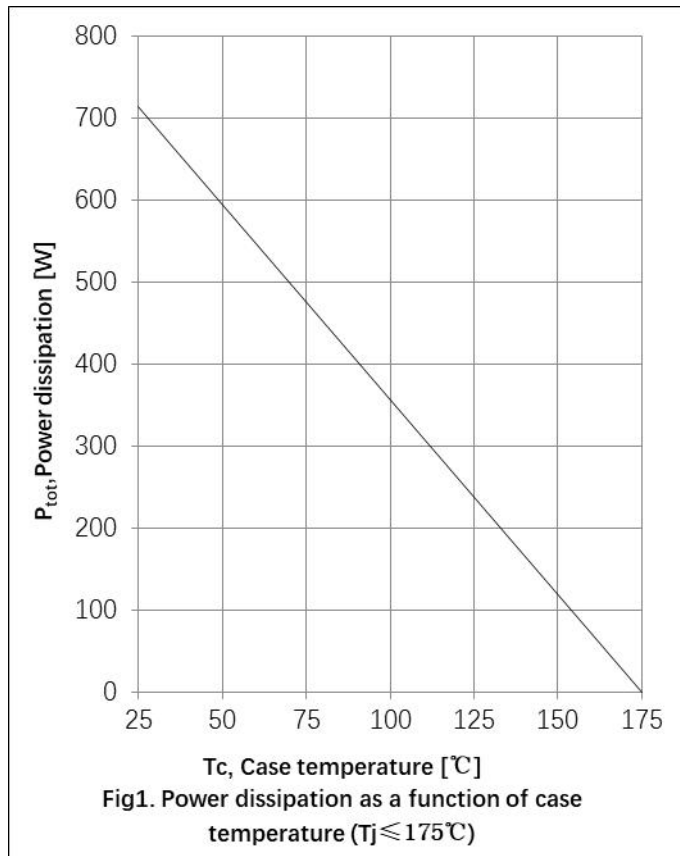


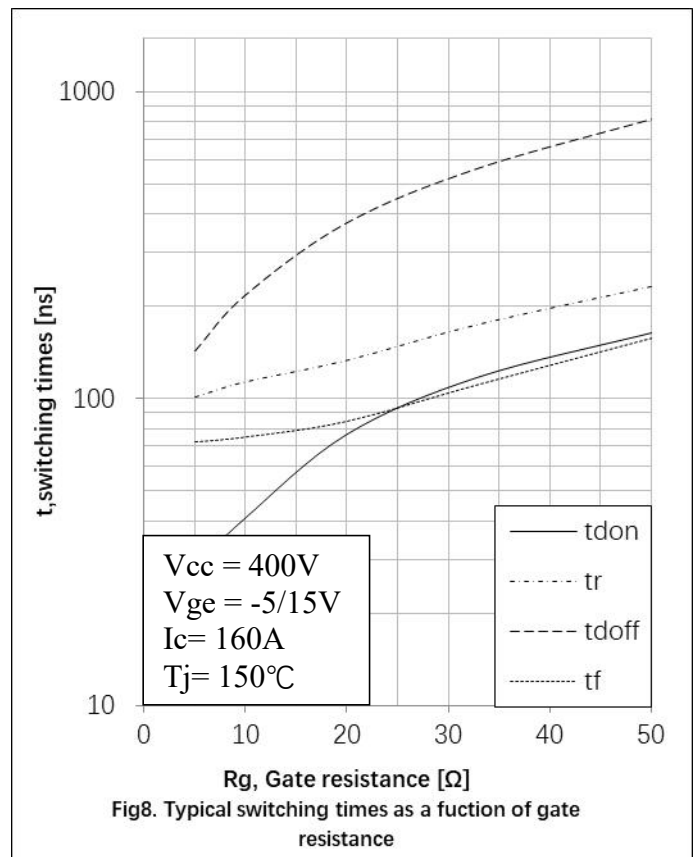
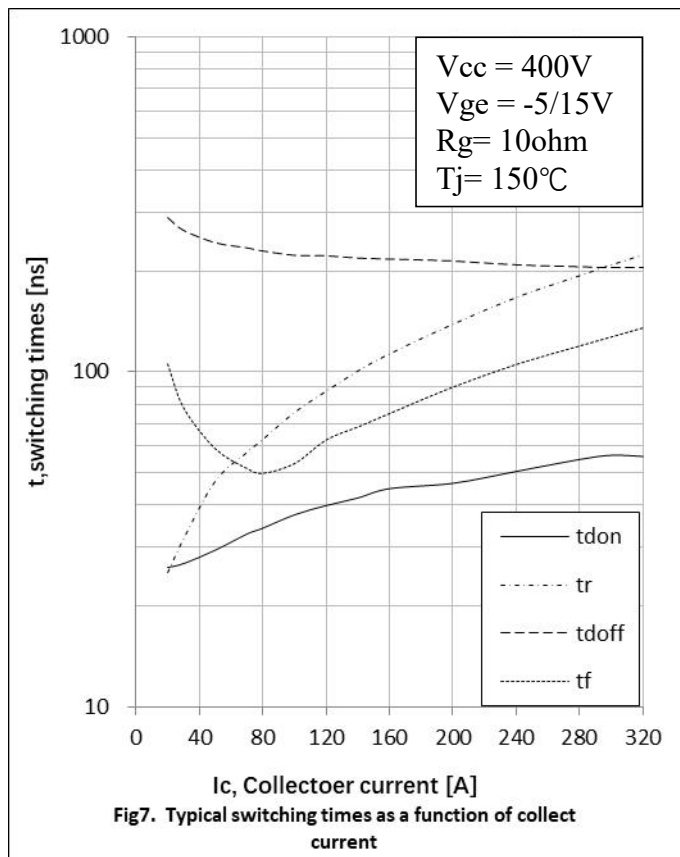
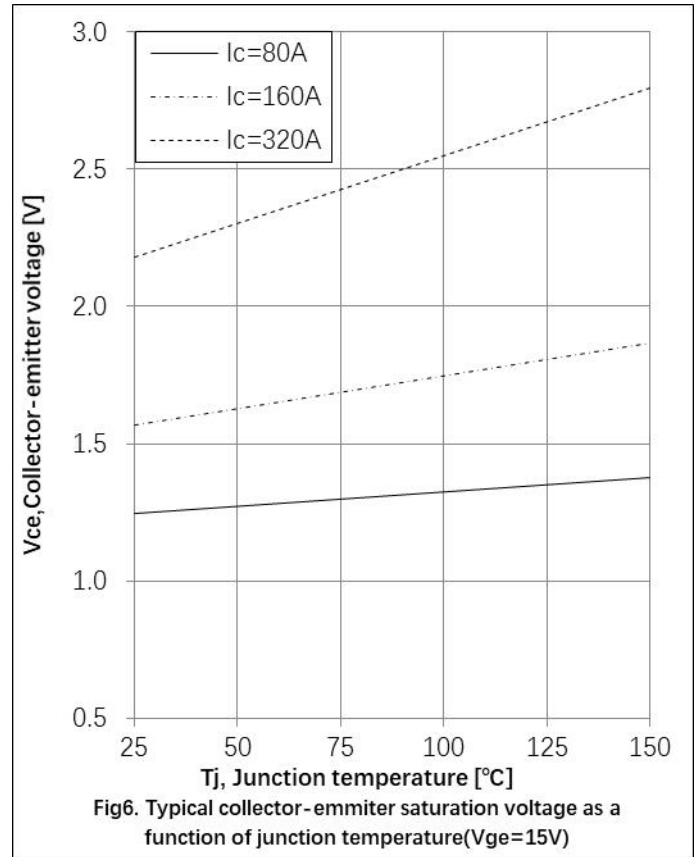
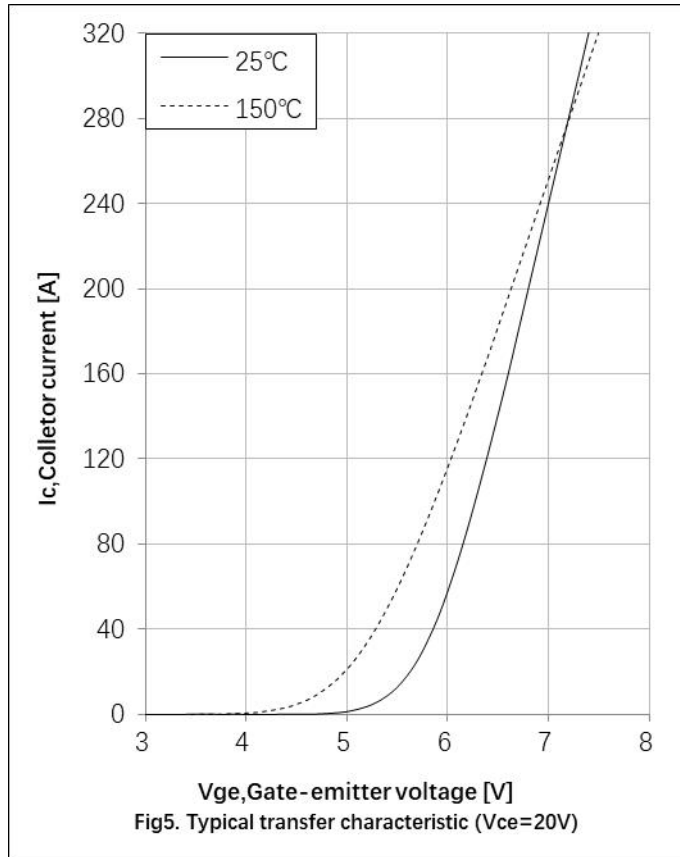
Electrical Characteristics of the DIODE

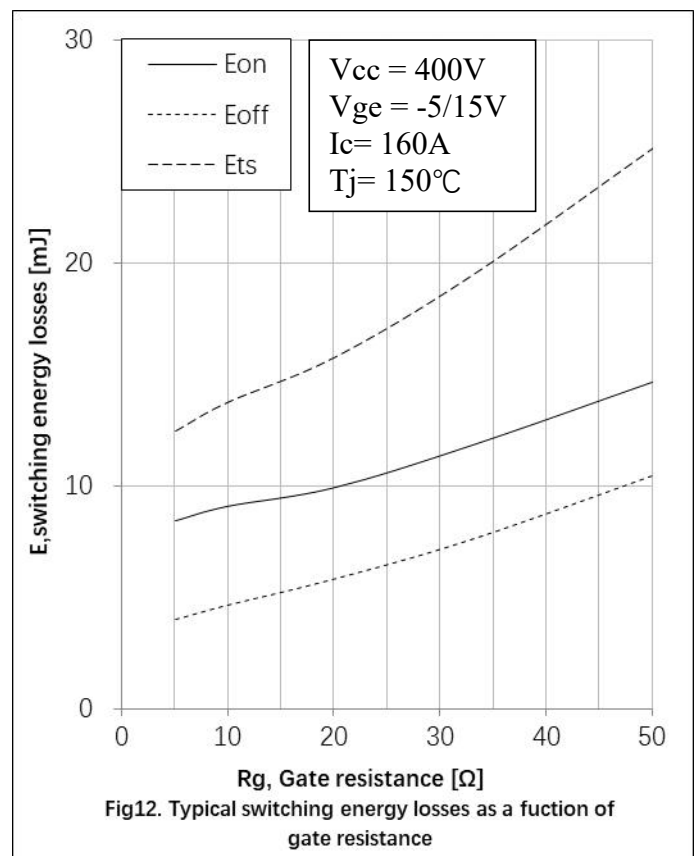
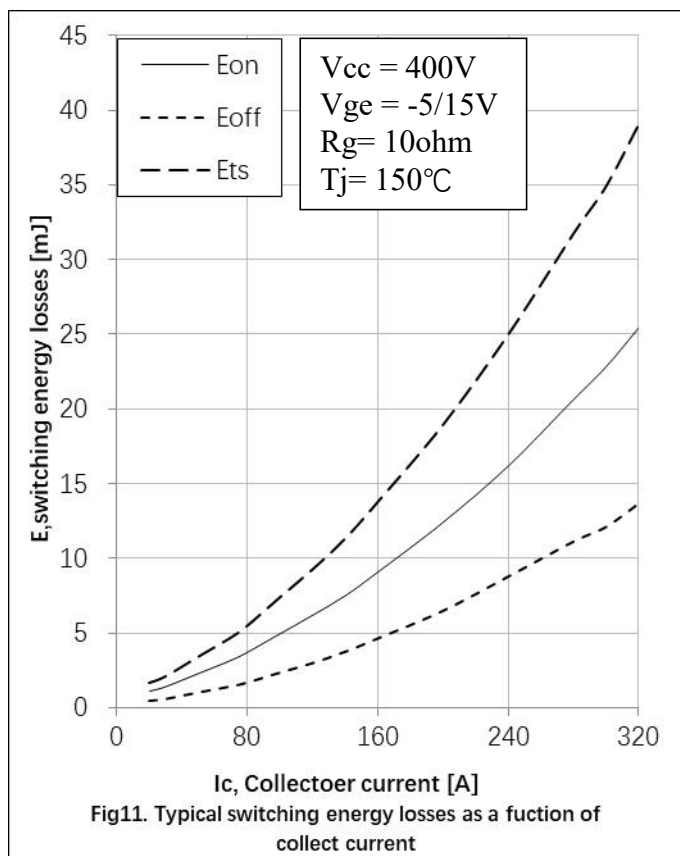
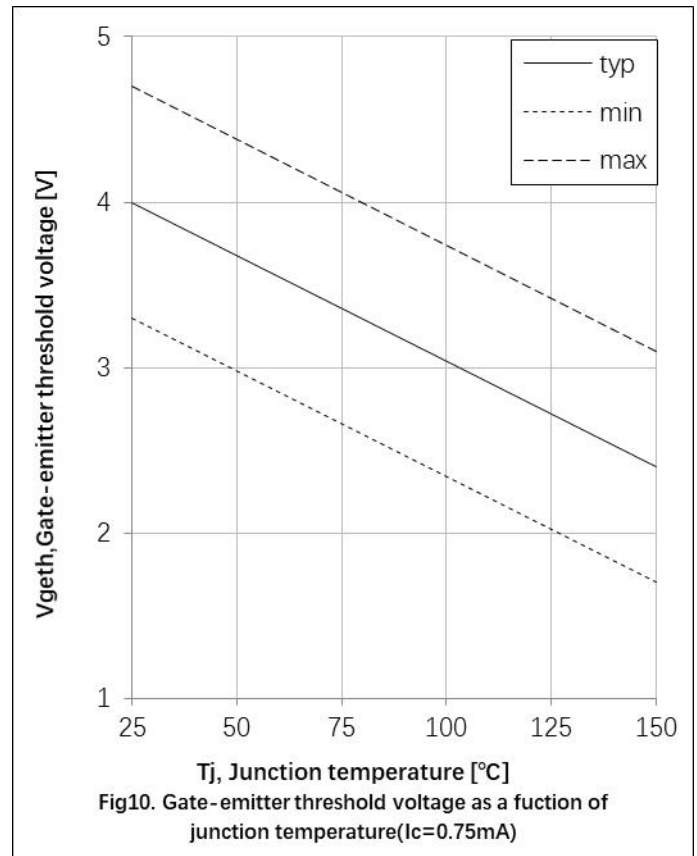
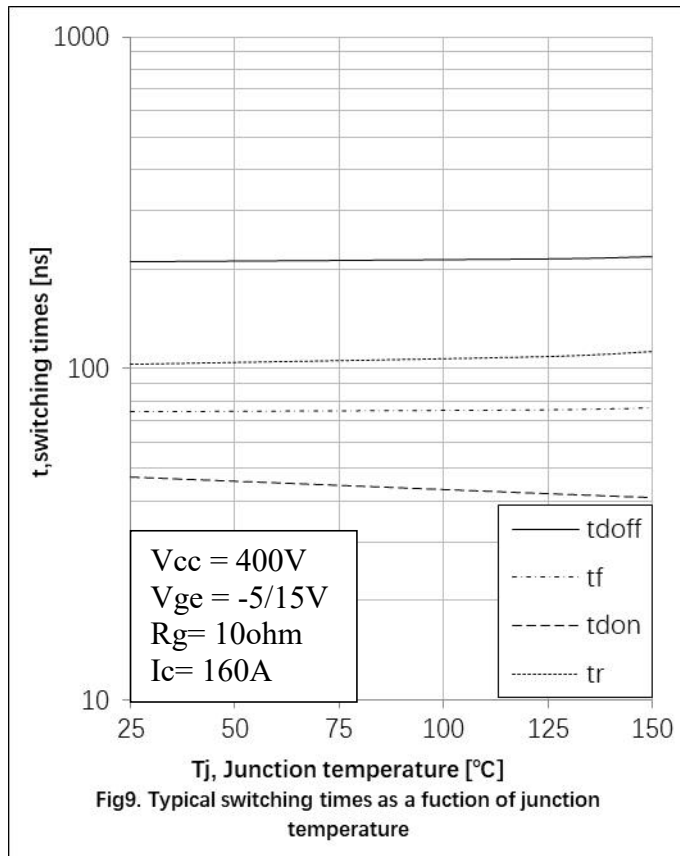
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T _j = 25°C						
Reverse Recovery Current	I _{rr}	I _F =160A, V _R =400V -di/dt=1200A/μs,	-	30	-	A
Reverse Recovery Charge	Q _{rr}		-	1.05	-	uC
Diode reverse recovery time	trr		-	55	-	ns
Reverse Recovery Energy	E _{rec}		-	0.15	-	mJ
Dynamic , at T _j = 125°C						
Reverse Recovery Current	I _{rr}	I _F =160A, V _R =400V -di/dt=1200A/μs,	-	69	-	A
Reverse Recovery Charge	Q _{rr}		-	4.97	-	uC
Diode reverse recovery time	trr		-	104	-	ns
Reverse Recovery Energy	E _{rec}		-	0.88	-	mJ
Dynamic , at T _j = 150°C						
Reverse Recovery Current	I _{rr}	I _F =160A, V _R =400V -di/dt=1200A/μs,	-	89	-	A
Reverse Recovery Charge	Q _{rr}		-	6.93	-	uC
Diode reverse recovery time	trr		-	131	-	ns
Reverse Recovery Energy	E _{rec}		-	1.27	-	mJ

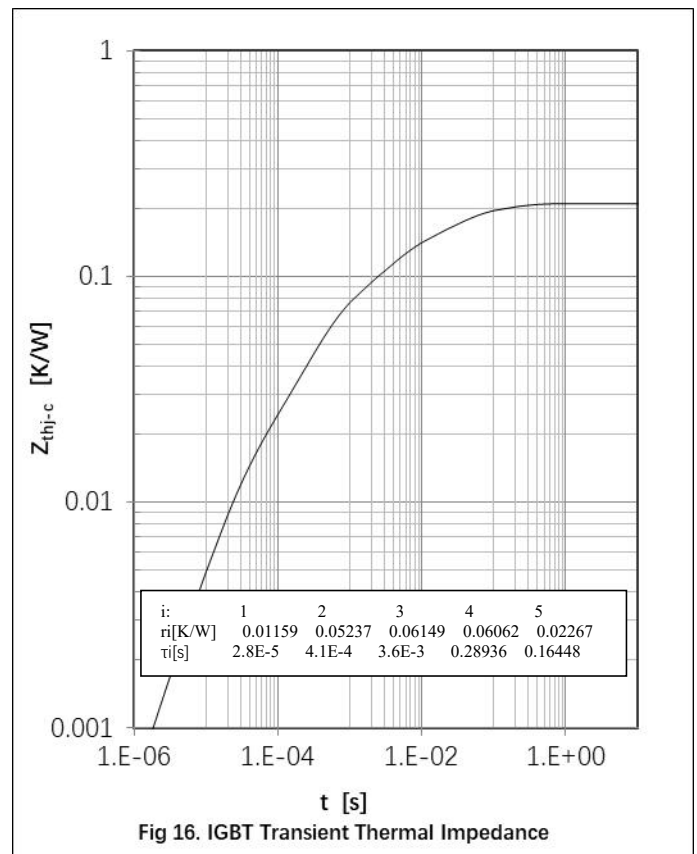
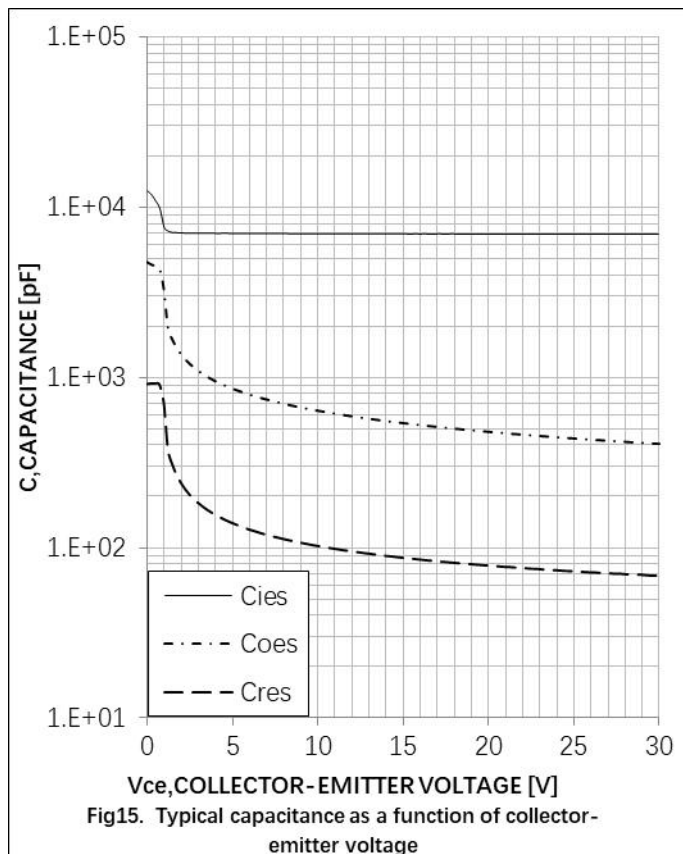
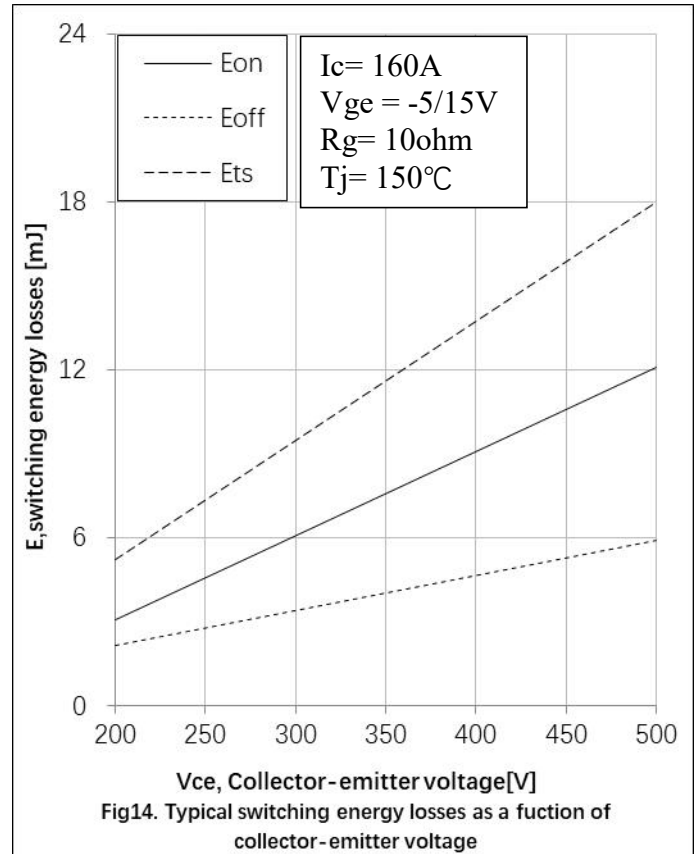
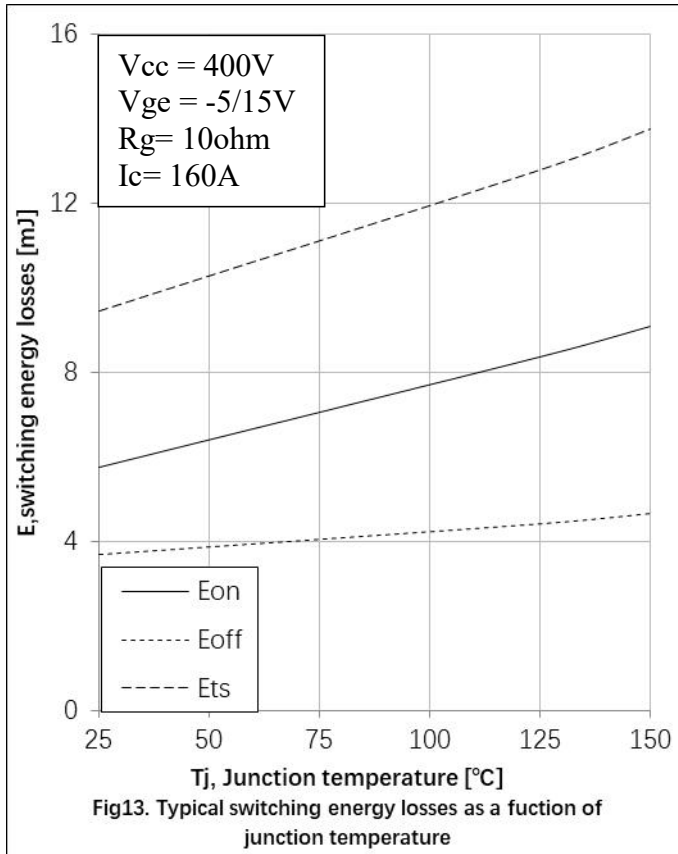
Thermal Resistance

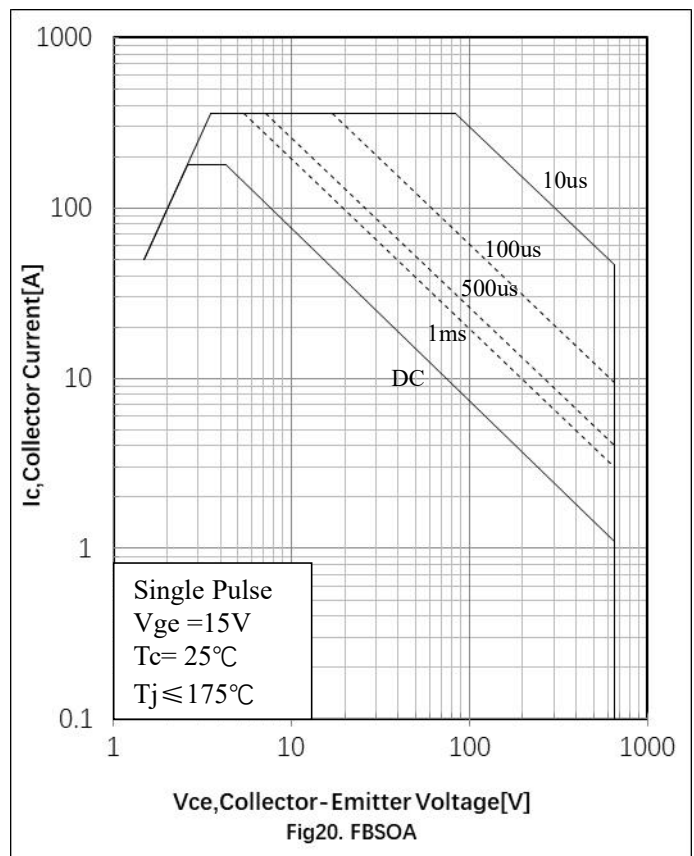
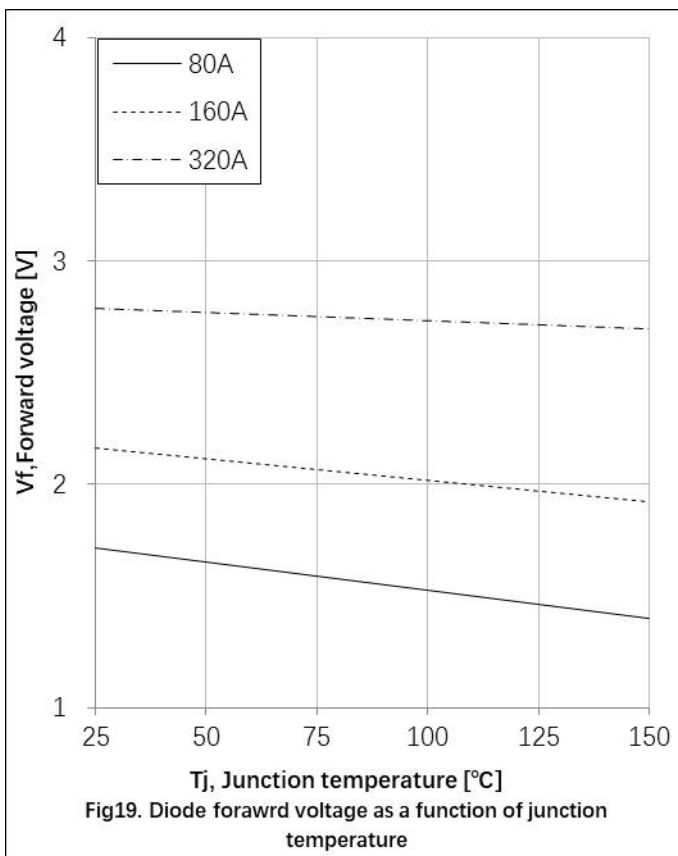
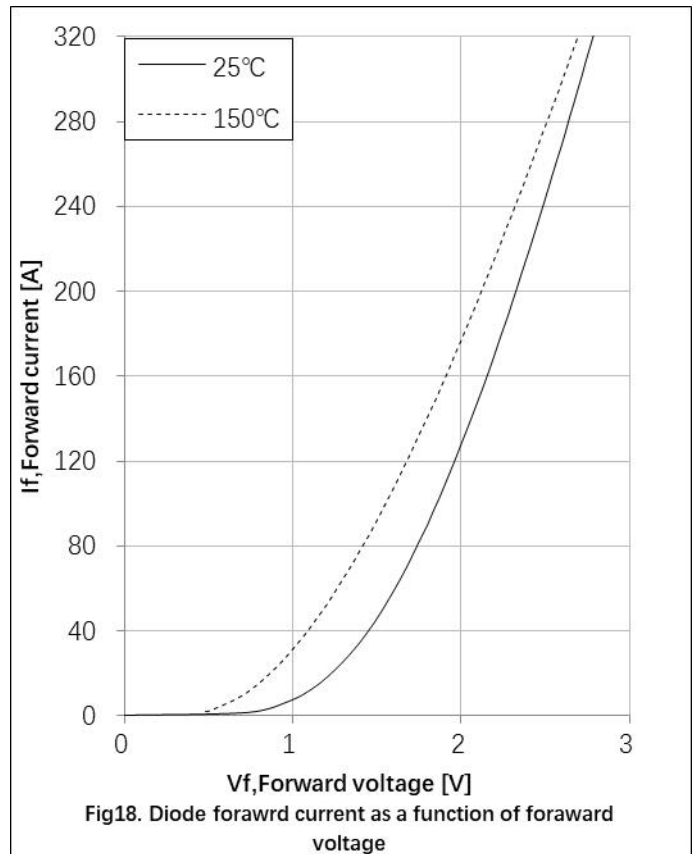
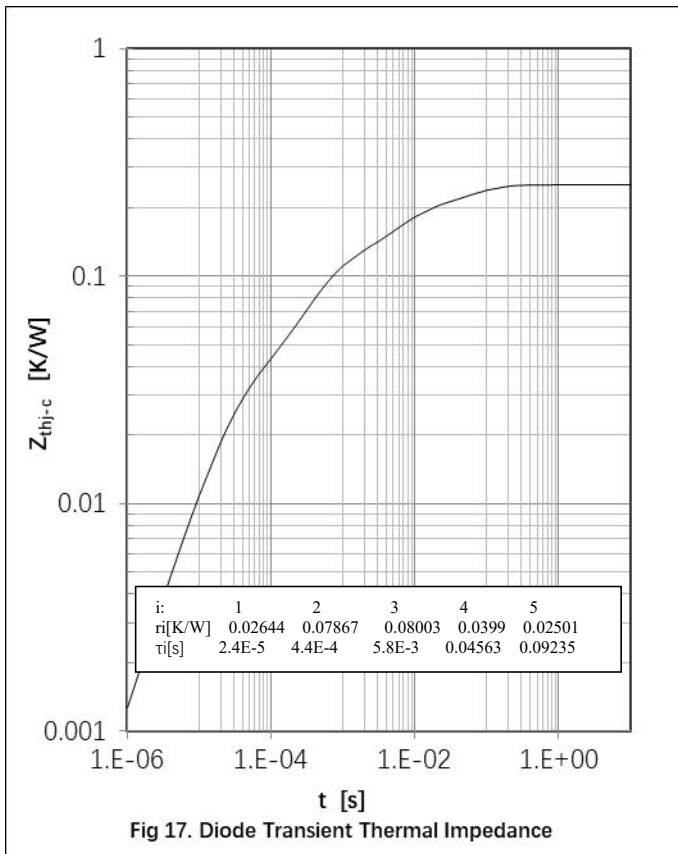
Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{th(j-c)}	0.21	K/W
Diode Thermal Resistance, Junction - Case	R _{th(j-c)}	0.25	K/W
Thermal Resistance, Junction - Ambient	R _{th(j-a)}	40	K/W



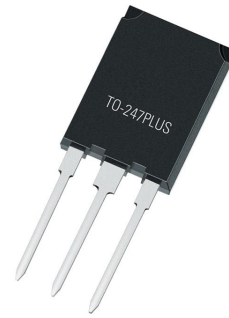
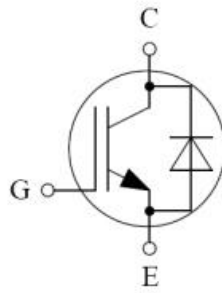






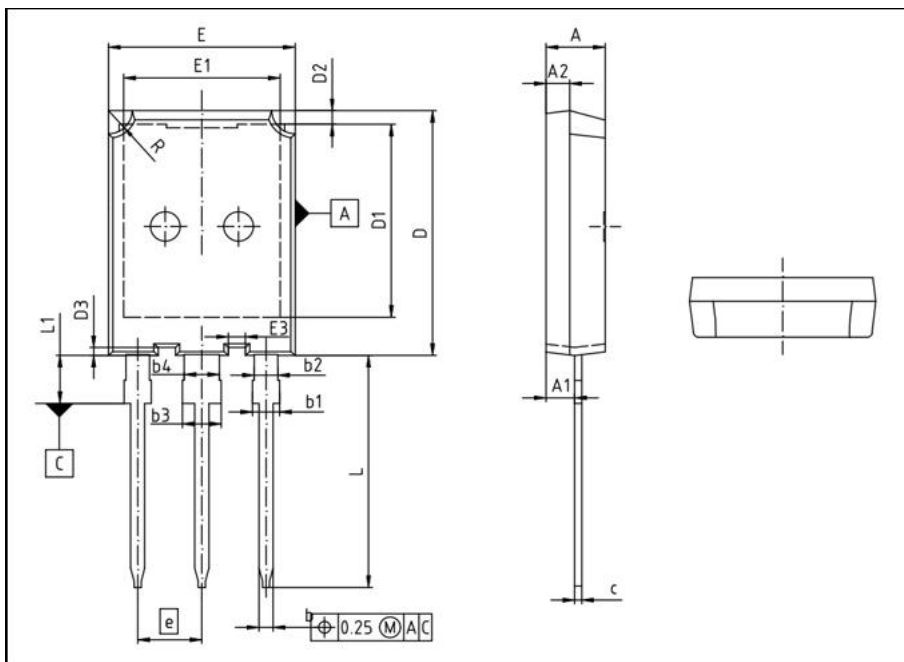


Circuit Diagram



● Package Outline Information

CASE: TO 247plus



DIM	MILLIMETERS	
	MIN	MAX
A	4.90	5.10
A1	2.31	2.51
A2	1.90	2.10
b	1.16	1.26
b1	1.86	2.16
b2	1.96	2.06
c	0.58	0.64
D	20.90	21.10
D1	16.25	16.85
D2	1.05	1.35
D3	0.58	0.78
E	15.70	15.90
E1	13.10	13.50
E3	1.35	1.55
e	5.44(BSC)	
L	19.78	20.08
L1	4.03	4.23
R	1.90	2.10



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