

IGBT Discrete

V_{CE}	650	V
I_C	75	A
$V_{CE(SAT)} I_C=75A$	1.45	V

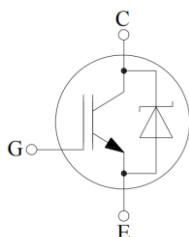
Applications

- Resonant 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
- Including SiC FWD

Circuit



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	85 80	A
Diode Forward Current, limited by T_{jmax} $T_C=25^\circ C$ value limited by bondwire $T_C=100^\circ C$	I_F	85 75	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 $V_{CE} \leq 650V$, $T_j \leq 150^\circ C$		300	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	300	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	300	A
Power Dissipation , $T_j=175^\circ C$, $T_C=25^\circ C$	P_{tot}	428	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	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=0.75mA$	3.2	4.0	4.8	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=75A$ $T_j=25^\circ\text{C},$ $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$	1.10	1.45 1.60 1.70	1.75	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}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	4.75	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.04	-	
Gate Charge	Q_G	$V_{CC}=520V, I_C=75A,$ $V_{GE}=15V$	-	0.18	-	uC

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 =75A, V _{GE} = -5v~15V, R _g =10Ω, Inductive Load	-	32	-	ns
Rise Time	t _r		-	83	-	ns
Turn-on Energy	E _{on}		-	2.18	-	mJ
Turn-off Delay Time	t _{d(off)}		-	121	-	ns
Fall Time	t _f		-	49	-	ns
Turn-off Energy	E _{off}		-	1.11	-	mJ
Total switching energy	E _{ts}		-	3.29	-	mJ
Dynamic , at T _j = 125℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} =400V, I _C =75A, V _{GE} = -5v~15V, R _g =10Ω, Inductive Load	-	30	-	ns
Rise Time	t _r		-	86	-	ns
Turn-on Energy	E _{on}		-	2.25	-	mJ
Turn-off Delay Time	t _{d(off)}		-	135	-	ns
Fall Time	t _f		-	68	-	ns
Turn-off Energy	E _{off}		-	1.43	-	mJ
Total switching energy	E _{ts}		-	3.68	-	mJ
Dynamic , at T _j = 150℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} =400V, I _C =75A, V _{GE} = -5v~15V, R _g =10Ω, Inductive Load	-	29	-	ns
Rise Time	t _r		-	88	-	ns
Turn-on Energy	E _{on}		-	2.28	-	mJ
Turn-off Delay Time	t _{d(off)}		-	142	-	ns
Fall Time	t _f		-	76	-	ns
Turn-off Energy	E _{off}		-	1.57	-	mJ
Total switching energy	E _{ts}		-	3.85	-	mJ

Electrical Characteristics of the DIODE

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	$I_F = 75A$ $T_j = 25^\circ C$, $T_j = 175^\circ C$		1.70 2.60	1.90	V
Diode Capacitive Charge	Q_C	$V_R = 400V$, $T_j = 25^\circ C$		135		nC
Diode Capacitance	C	$f = 1MHz$ $V_R = 0V$, $V_R = 200V$ $V_R = 400V$		2453 247 243		pF

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	$R_{th(j-c)}$	0.35	K/W
Diode Thermal Resistance, Junction - Case	$R_{th(j-c)}$	0.50	K/W
Thermal Resistance, Junction - Ambient	$R_{th(j-a)}$	40	K/W

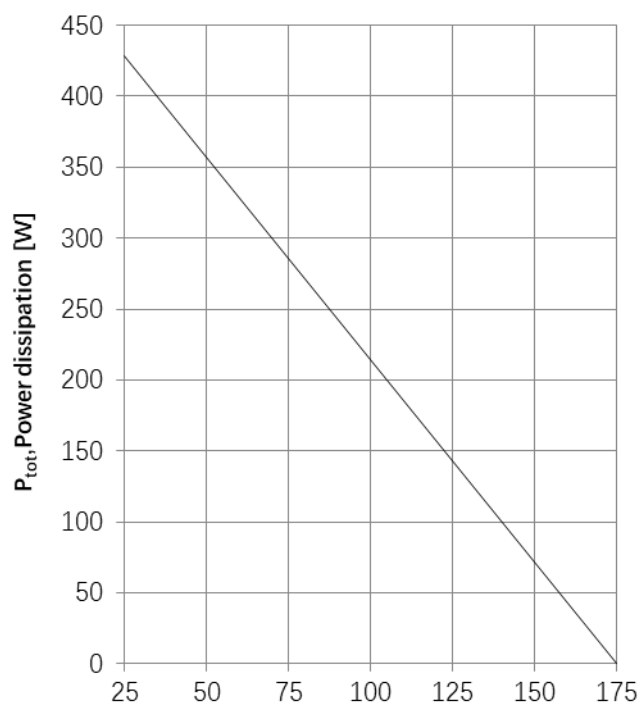


Fig1. Power dissipation as a function of case temperature ($T_j \leq 175^\circ\text{C}$)

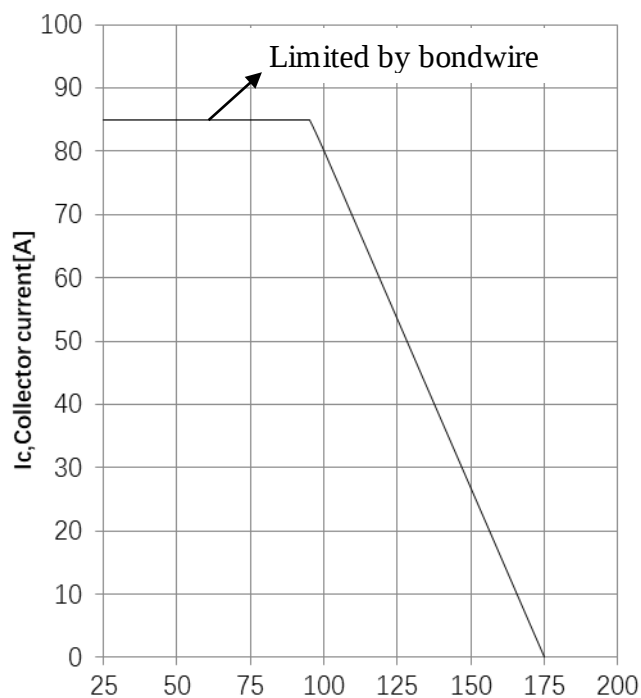


Fig2. Collector current as a function of case temperature ($V_{ge} \geq 15\text{V}$, $T_j \leq 175^\circ\text{C}$)

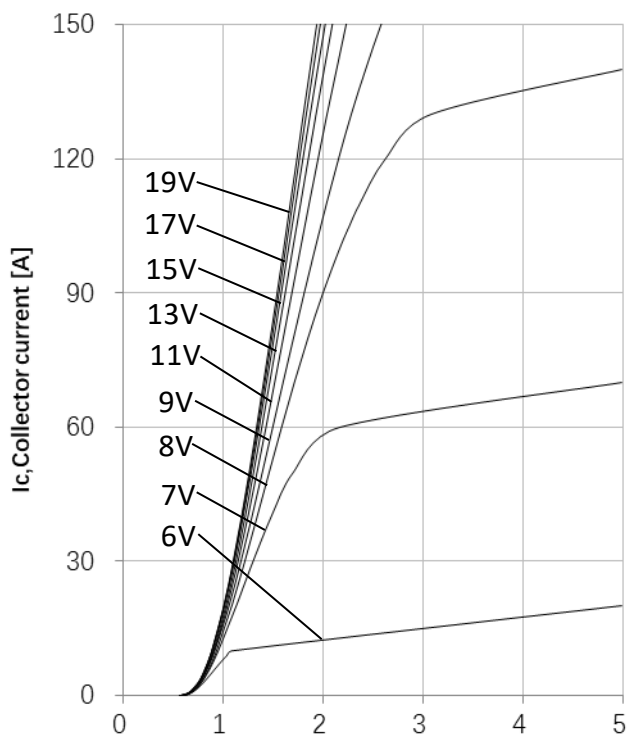


Fig3. Typical output characteristic ($T_j = 25^\circ\text{C}$)

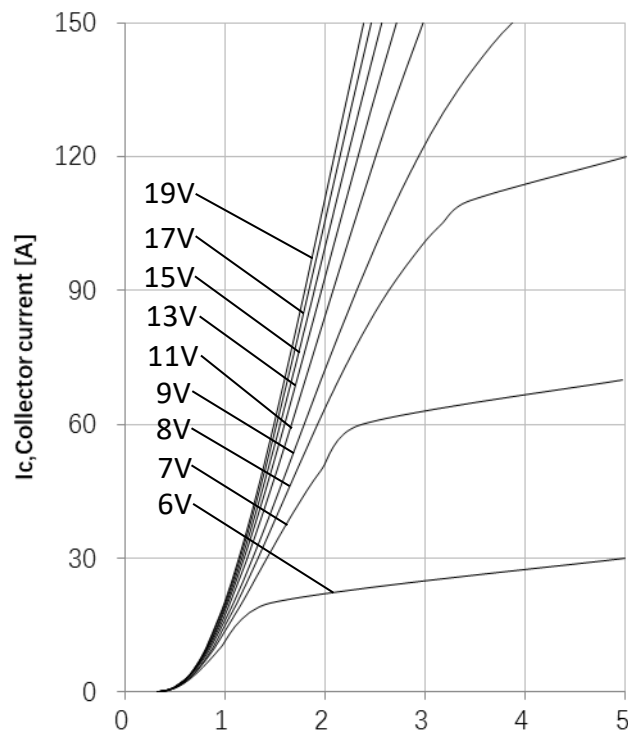
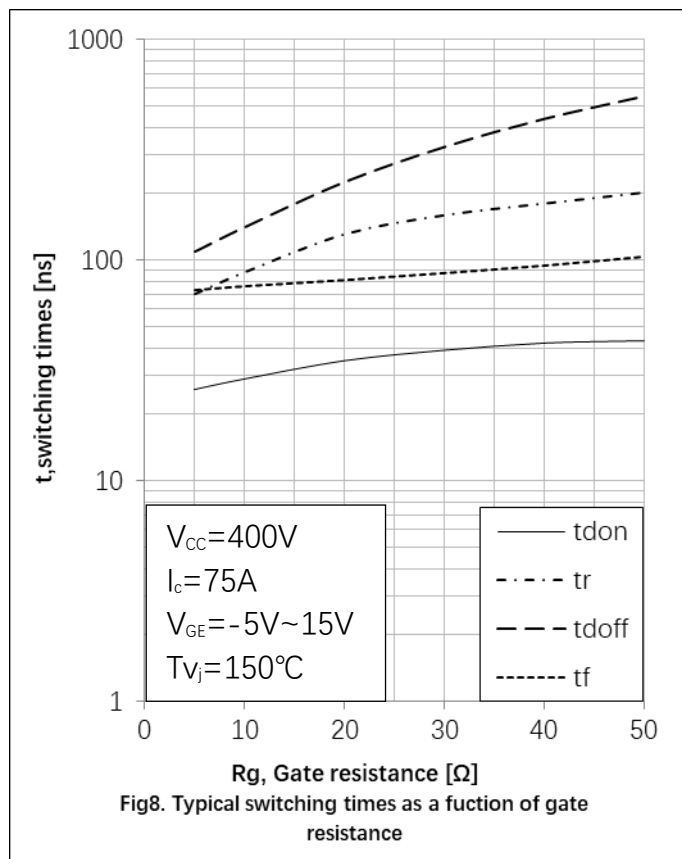
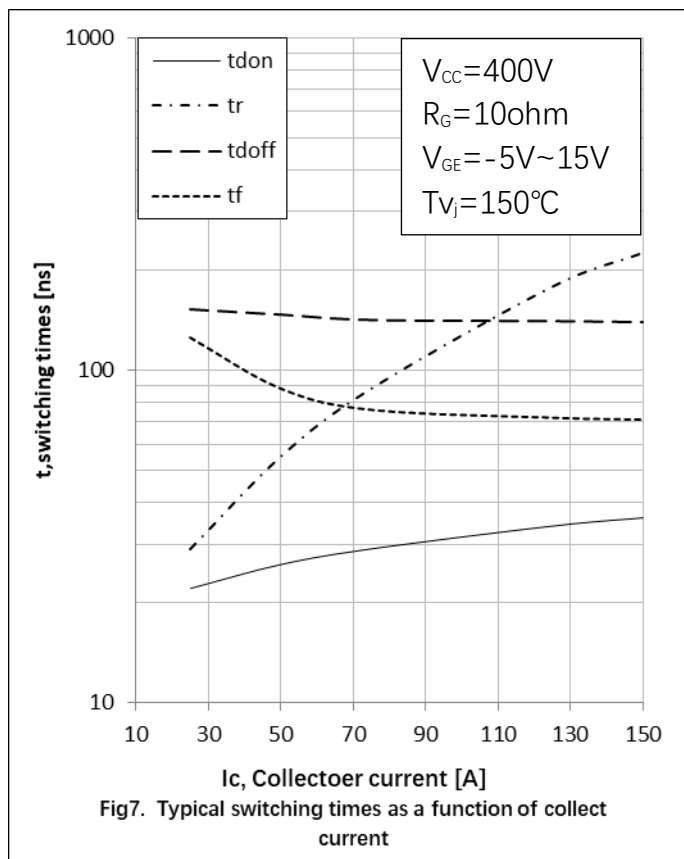
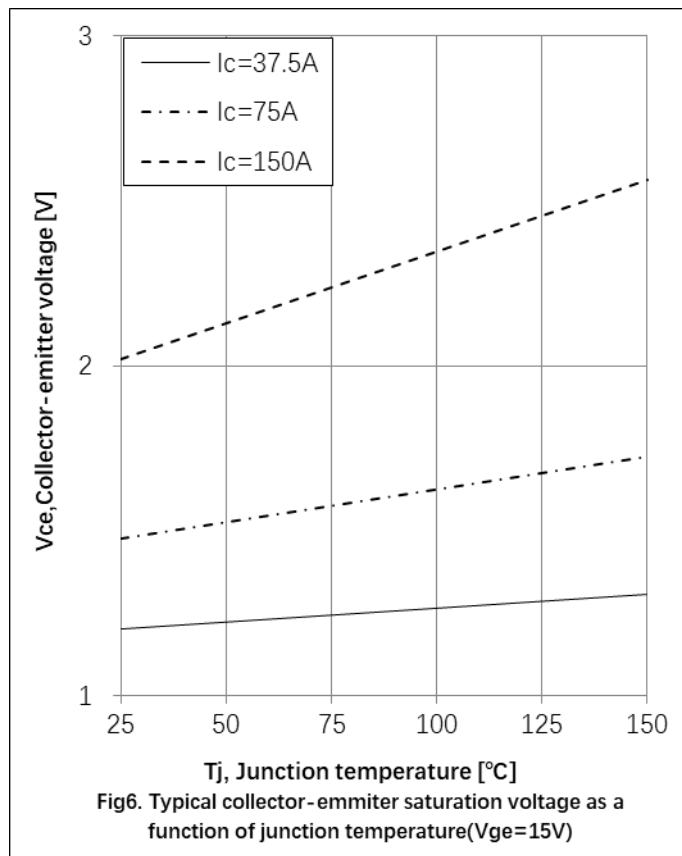
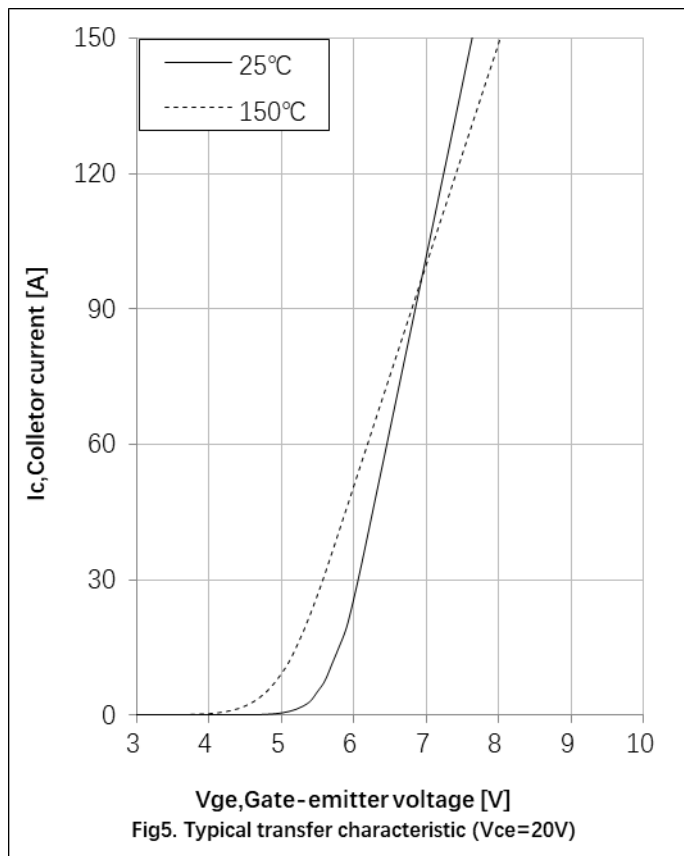
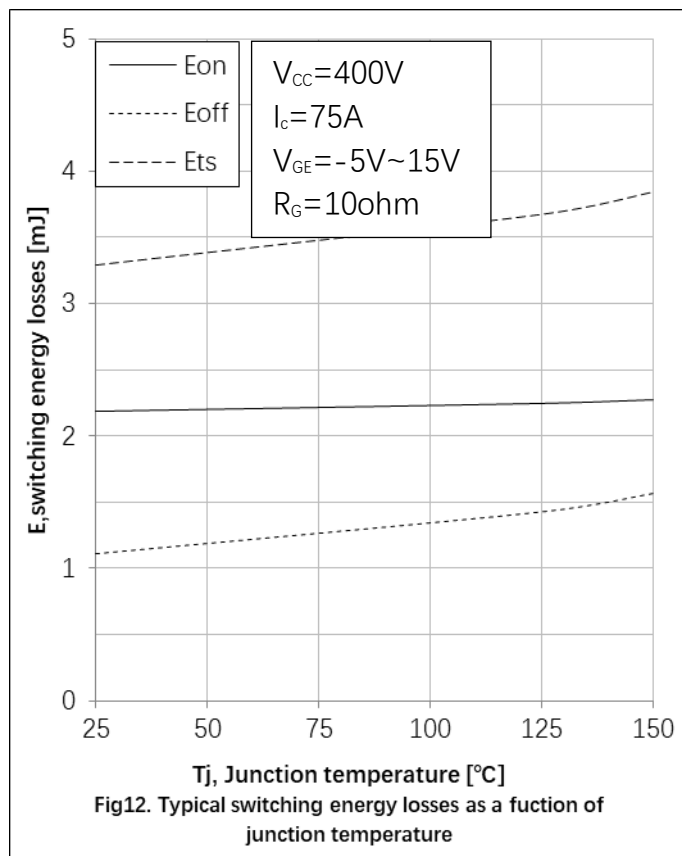
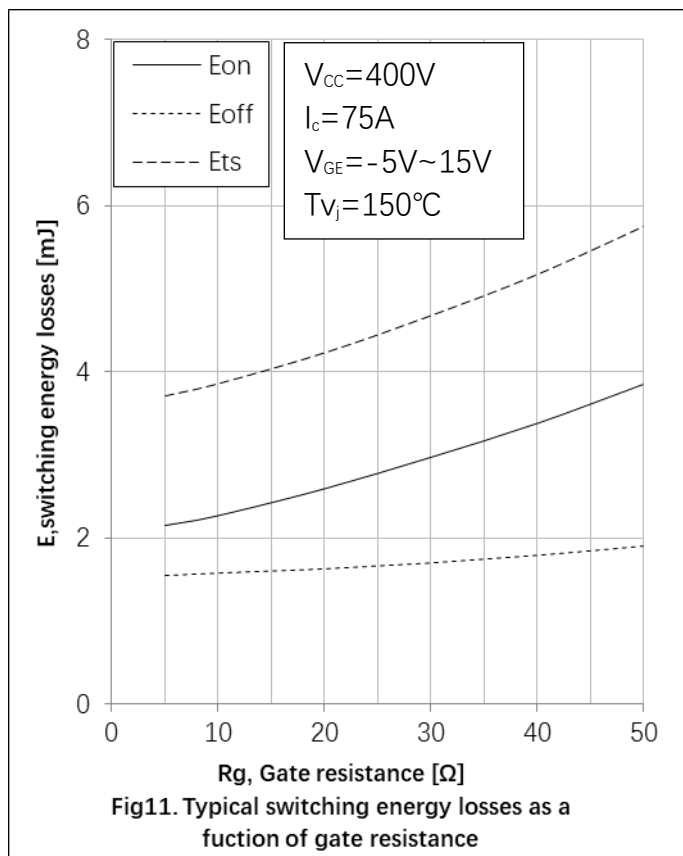
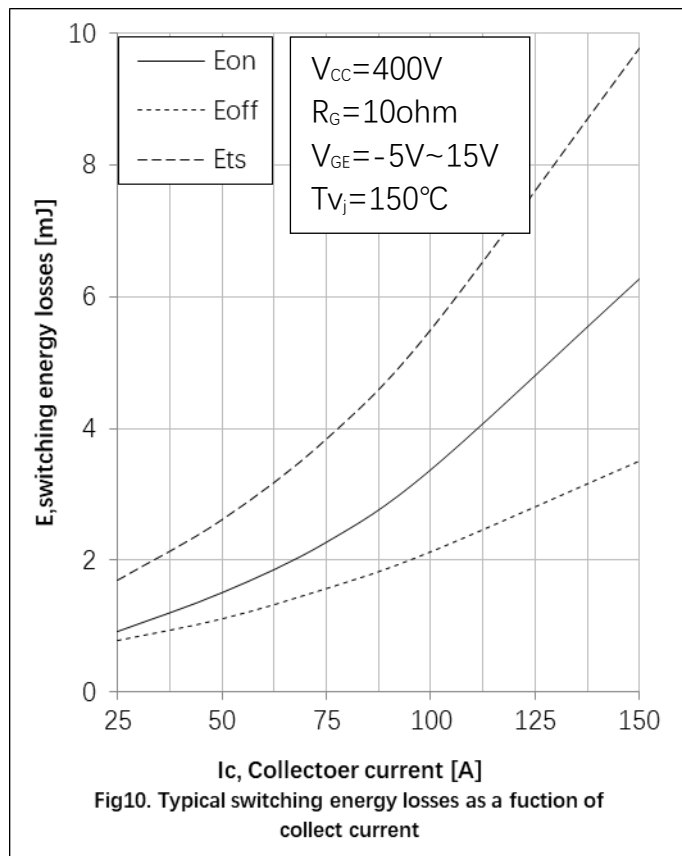
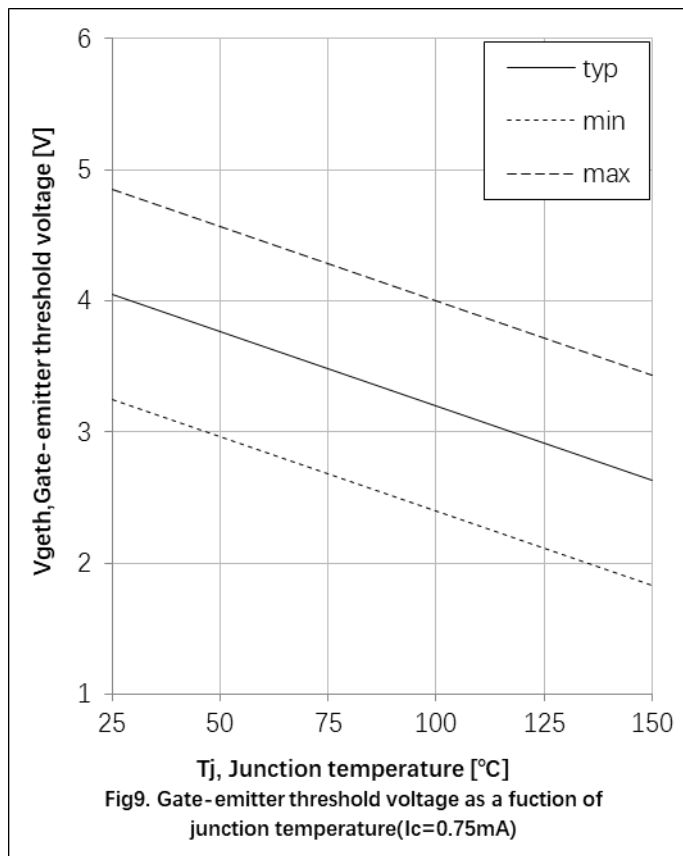
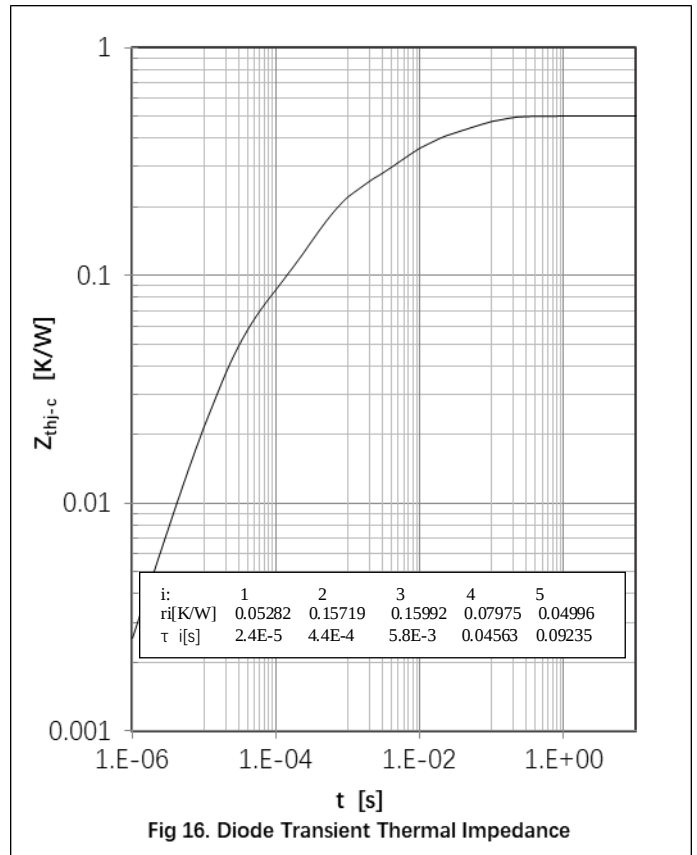
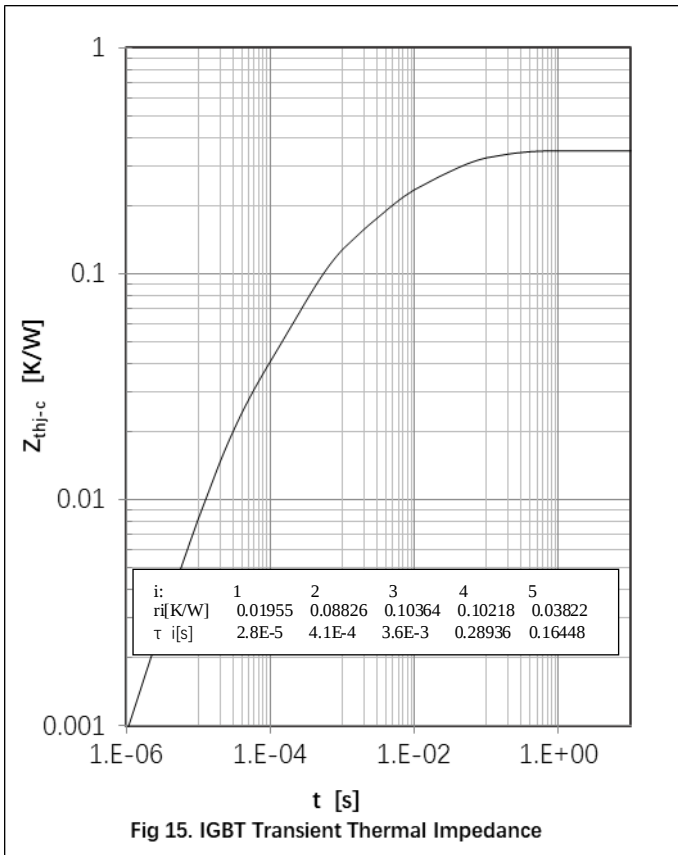
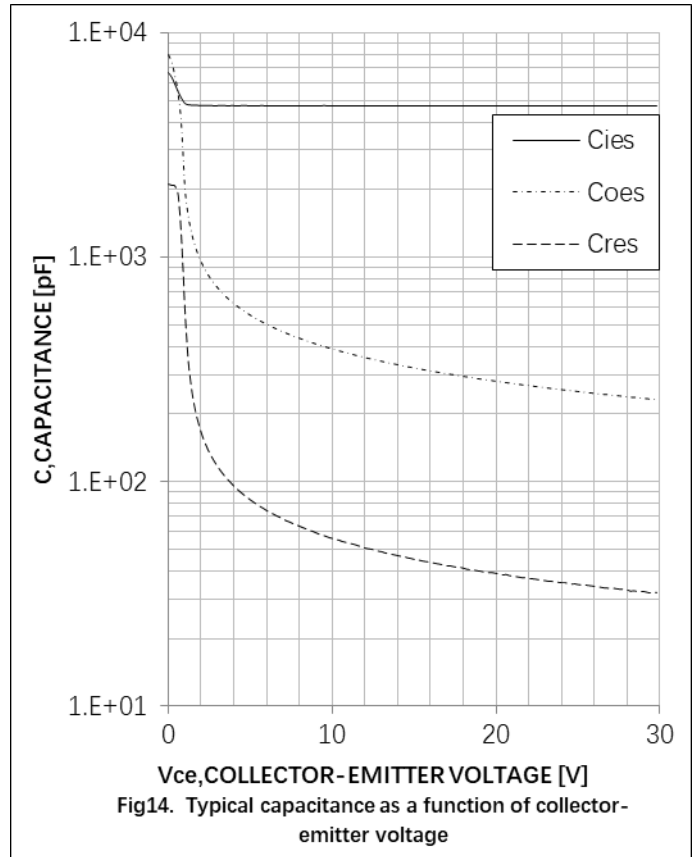
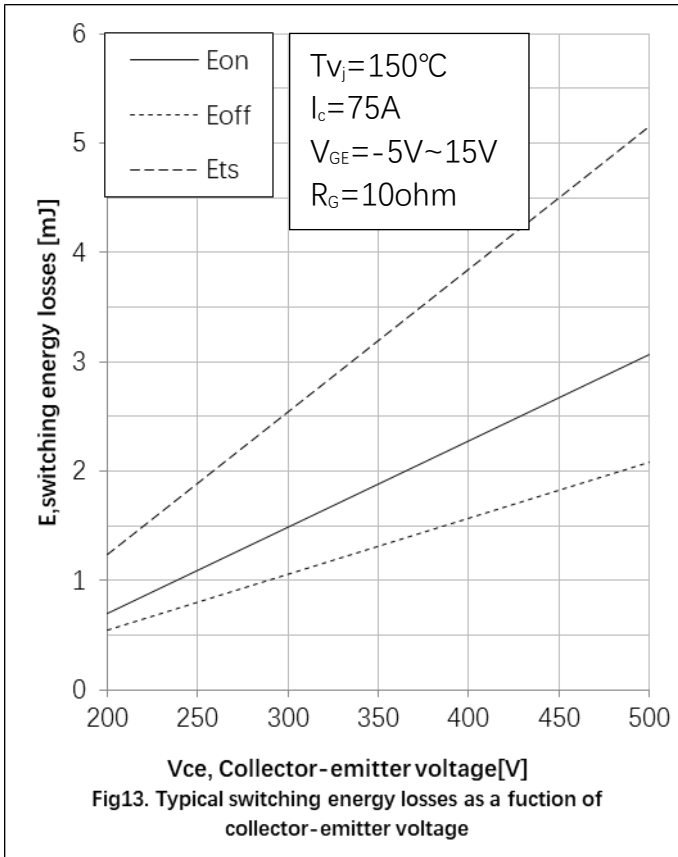
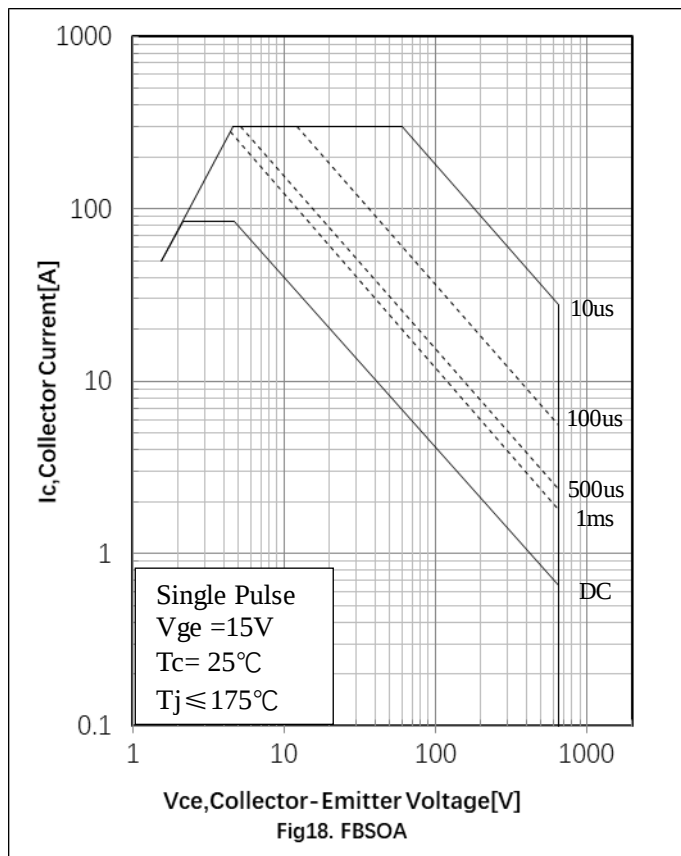
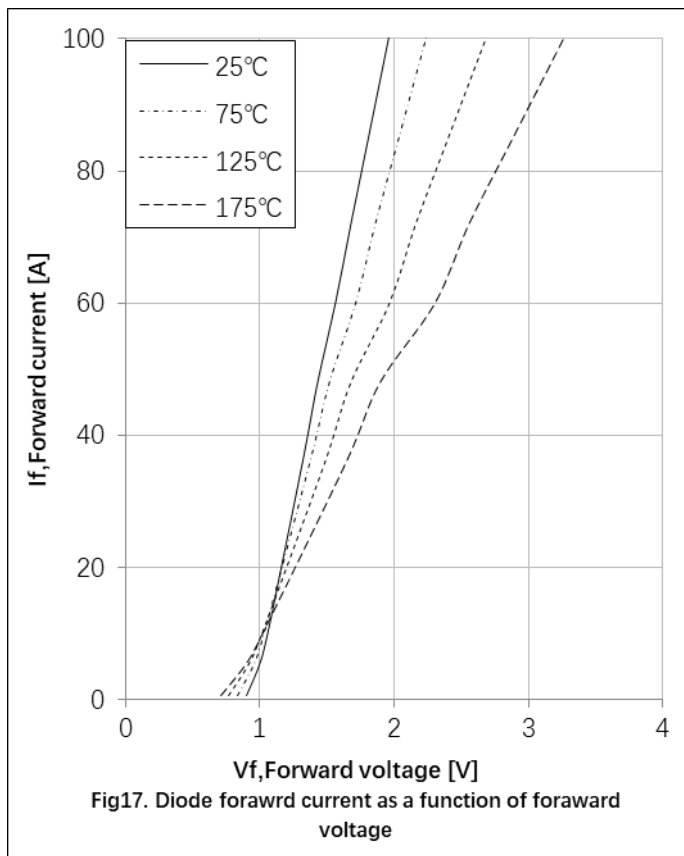


Fig4. Typical output characteristic ($T_j = 150^\circ\text{C}$)

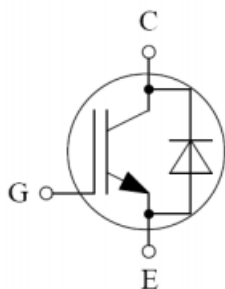




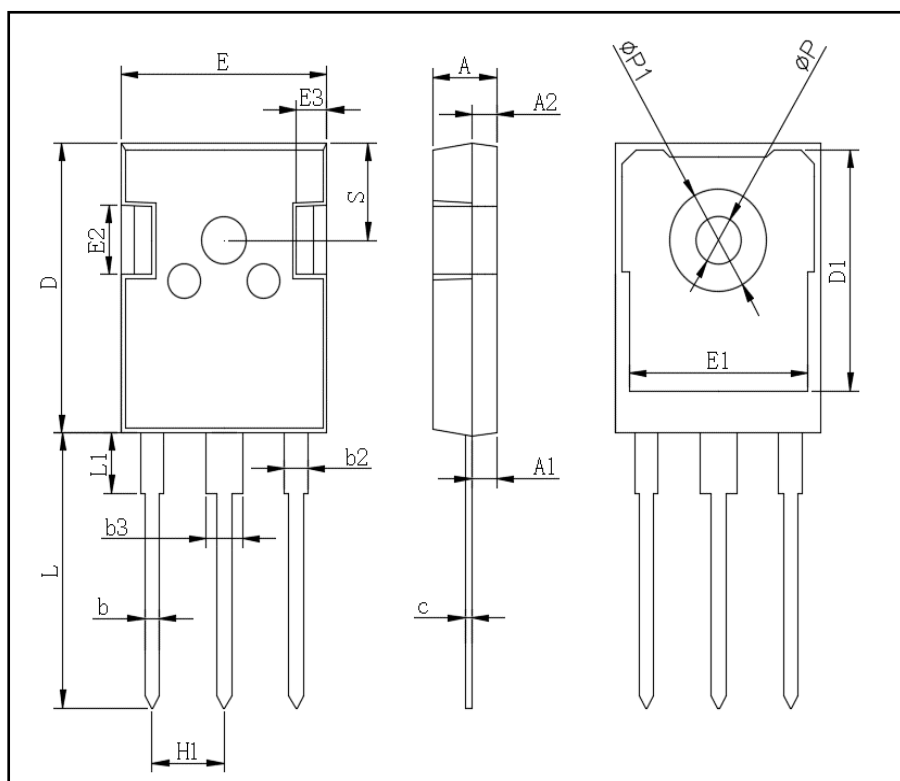




● Circuit Diagram



● Package Outline Information



TO-247AB		
Dim	Min	Max
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.0	1.4
b2	1.91	2.21
C	0.5	0.7
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.0	13.6
E2	4.80	5.20
E3	2.30	2.70
L	19.62	20.22
L1	-	4.30
Φ P	3.40	3.80
Φ P1	-	7.30
S	6.15TYP	
H1	5.44TYP	
b3	2.80	3.20

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