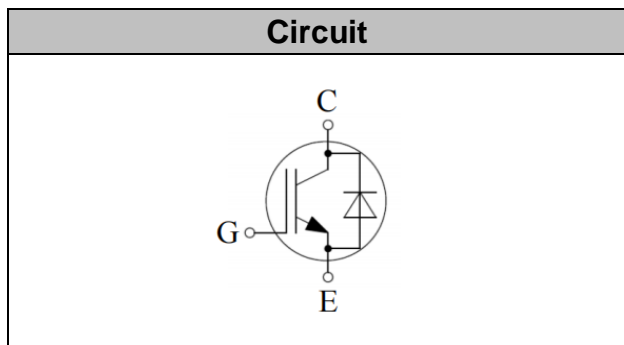


## IGBT Discrete

$V_{CE}$	1200	V
$I_C$	15	A
$V_{CE(SAT)} I_C=15A$	1.55	V



### Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

### Features

- Low  $V_{CE(sat)}$  Trench-FS IGBT technology
- Maximum junction temperature 175°C
- 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 $T_{jmax}$ $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	$I_C$	30 15	A
Diode Forward Current, limited by $T_{jmax}$ $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	$I_F$	30 15	A
Continuous Gate-Emitter Voltage	$V_{GE}$	$\pm 20$	V
Transient Gate-Emitter Voltage ( $t_p \leq 10\mu s, D < 0.010$ )	$V_{GE}$	$\pm 30$	V
Turn off Safe Operating Area $V_{CE} \leq 1200V,$ $T_j \leq 150^{\circ}C$		60	A
Pulsed Collector Current, $V_{GE}=15V,$ $t_p$ limited by $T_{jmax}$	$I_{CM}$	60	A
Diode Pulsed Current, $t_p$ limited by $T_{jmax}$	$I_{Fpuls}$	60	A
Short Circuit Withstand Time, $V_{GE}=15V, V_{CC}=600V, V_{CEM} \leq 1200V$	$T_{sc}$	10	$\mu s$
Power Dissipation , $T_j=175^{\circ}C, T_c=25^{\circ}C$	$P_{tot}$	153	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
<b>Static</b>						
Collector-Emitter Breakdown Voltage	$BV_{CES}$	$V_{GE}=0V, I_C=250\mu A$	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=0.5mA$	5.2	5.8	6.4	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=15A$ $T_j=25^\circ\text{C}$ , $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.55 1.80 1.90	2.05	V
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V$ $T_j=25^\circ\text{C}$ , $T_j=150^\circ\text{C}$			0.25 5.00	mA
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V, V_{GE}=\pm 20V$			100	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Dynamic</b>						
Input Capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	1.72	-	nF
Reverse Transfer Capacitance	$C_{res}$		-	0.02	-	
Gate Charge	$Q_G$	$V_{CC}=600V, I_C=15A,$ $V_{GE}=15V$	-	0.14	-	uC
Short Circuit Collector Current	$I_{SC}$	$V_{GE}=15V, t_{sc}\leq 10\mu s,$ $V_{CC}=600V, T_j\leq 150^\circ\text{C}$	-	75	-	A

## Electrical Characteristics of the Diode (T<sub>j</sub>= 25°C unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Diode Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 15A T <sub>j</sub> = 25°C, T <sub>j</sub> = 125°C T <sub>j</sub> = 150°C		2.20 2.05 2.00	2.60	V

## Switching Characteristic, Inductive Load

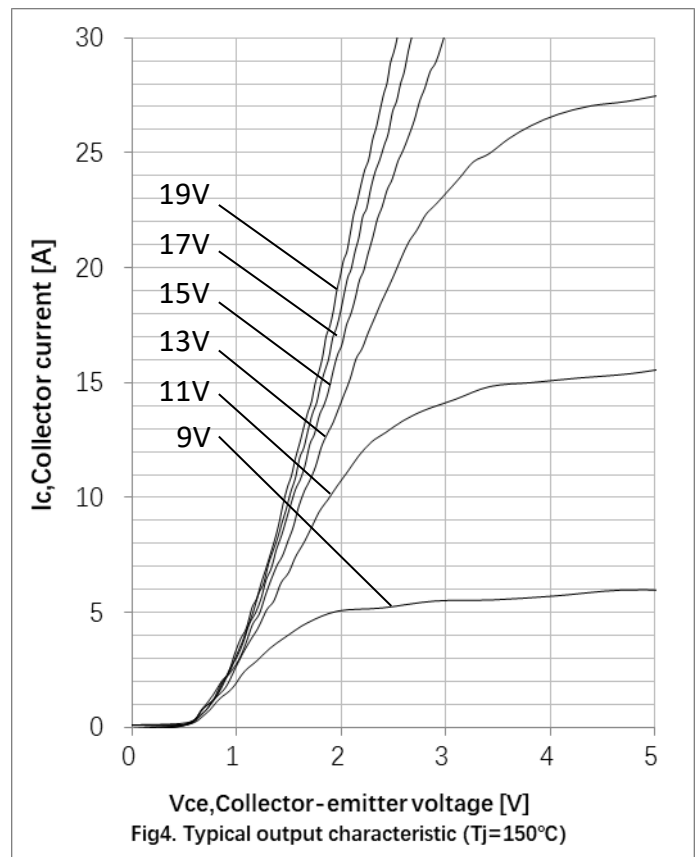
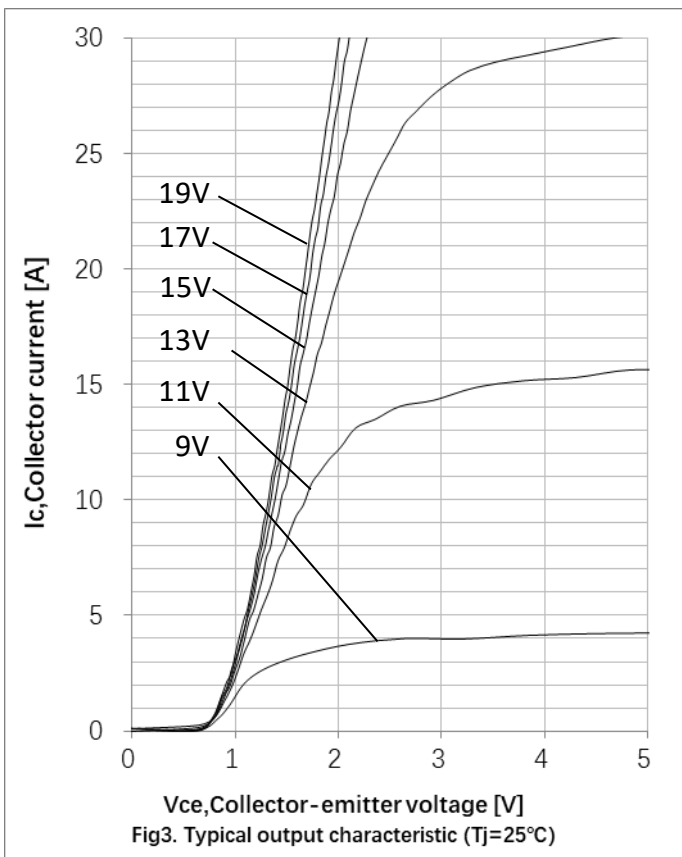
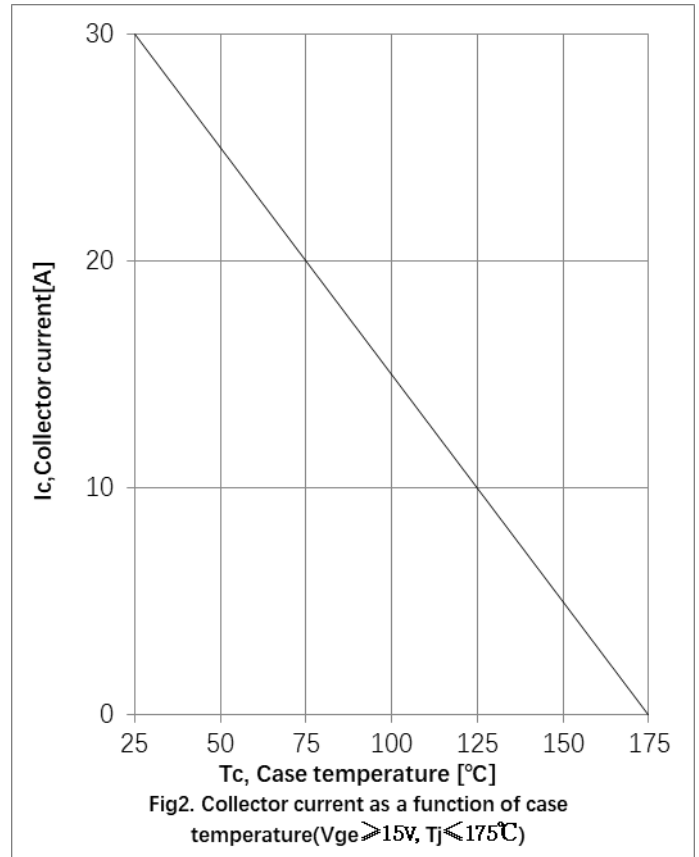
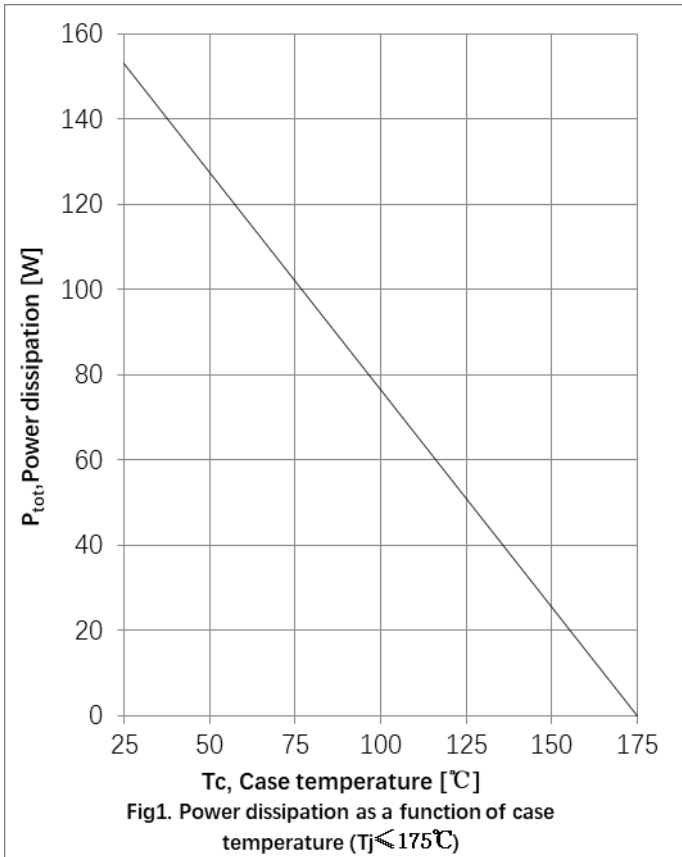
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Dynamic , at T<sub>j</sub>= 25°C</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>CC</sub> = 600V, I <sub>C</sub> =15A, V <sub>GE</sub> = -5V~15V, R <sub>g</sub> =20 Ω	-	54	-	ns
Rise Time	t <sub>r</sub>		-	47	-	ns
Turn-on Energy	E <sub>on</sub>		-	0.8	-	mJ
Turn-off Delay Time	t <sub>d(off)</sub>		-	184	-	ns
Fall Time	t <sub>f</sub>		-	230	-	ns
Turn-off Energy	E <sub>off</sub>		-	1.1	-	mJ
<b>Dynamic , at T<sub>j</sub>= 125°C</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>CC</sub> = 600V, I <sub>C</sub> =15A, V <sub>GE</sub> = -5V~15V, R <sub>g</sub> =20 Ω	-	51	-	ns
Rise Time	t <sub>r</sub>		-	47	-	ns
Turn-on Energy	E <sub>on</sub>		-	0.9	-	mJ
Turn-off Delay Time	t <sub>d(off)</sub>		-	204	-	ns
Fall Time	t <sub>f</sub>		-	331	-	ns
Turn-off Energy	E <sub>off</sub>		-	1.5	-	mJ
<b>Dynamic , at T<sub>j</sub>= 150°C</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>CC</sub> = 600V, I <sub>C</sub> =15A, V <sub>GE</sub> = -5V~15V, R <sub>g</sub> =20 Ω	-	50	-	ns
Rise Time	t <sub>r</sub>		-	48	-	ns
Turn-on Energy	E <sub>on</sub>		-	0.9	-	mJ
Turn-off Delay Time	t <sub>d(off)</sub>		-	219	-	ns
Fall Time	t <sub>f</sub>		-	403	-	ns
Turn-off Energy	E <sub>off</sub>		-	1.6	-	mJ

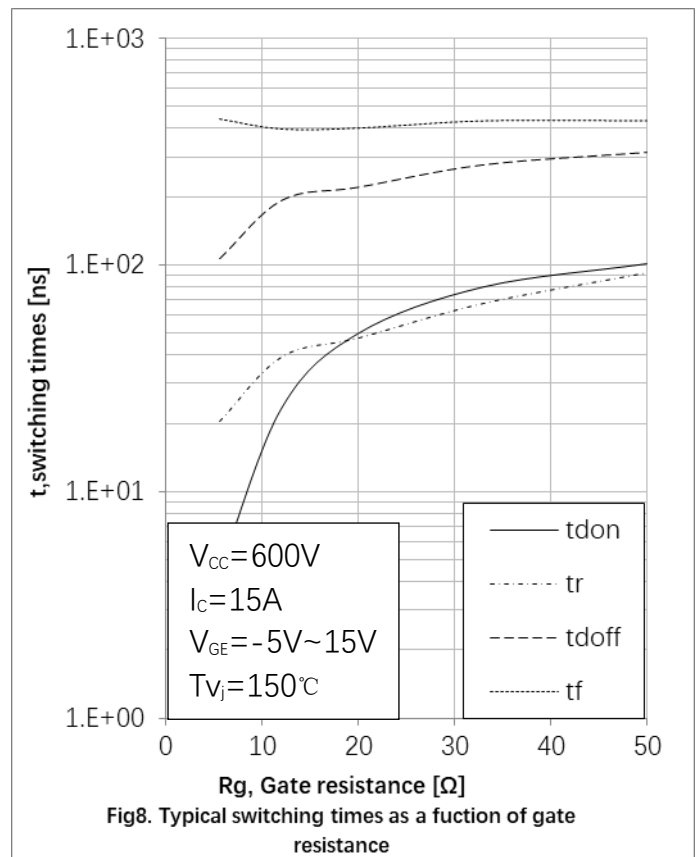
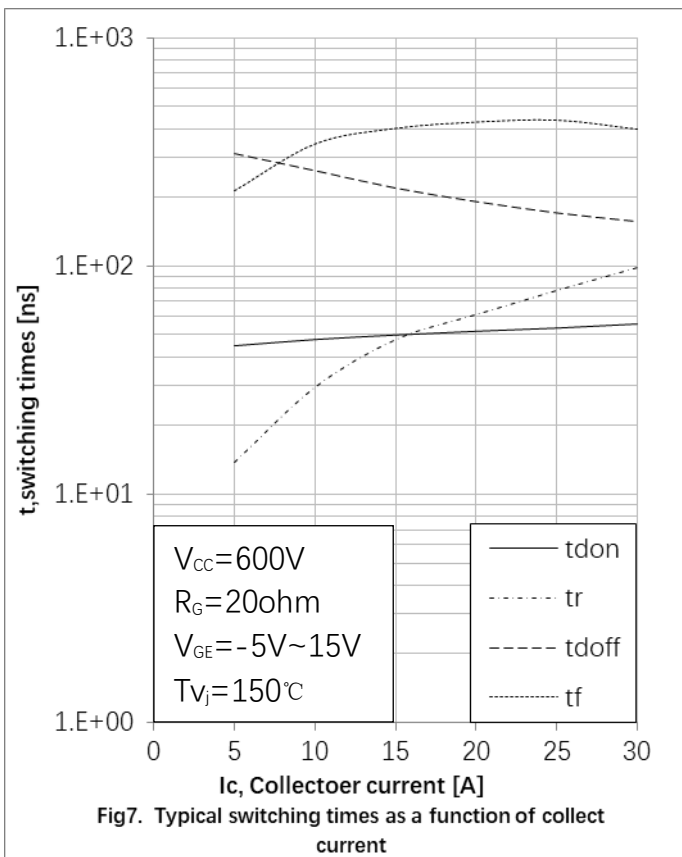
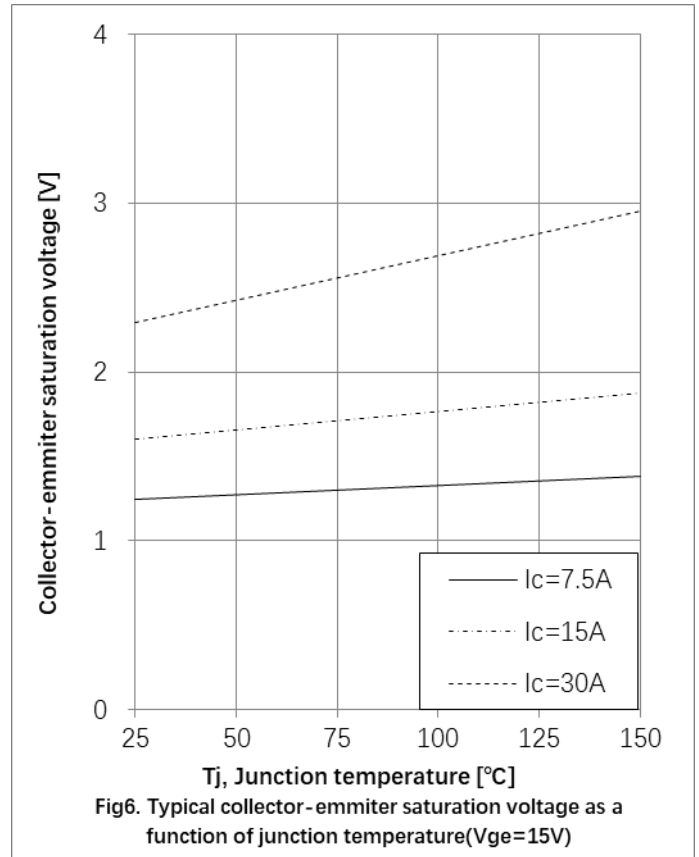
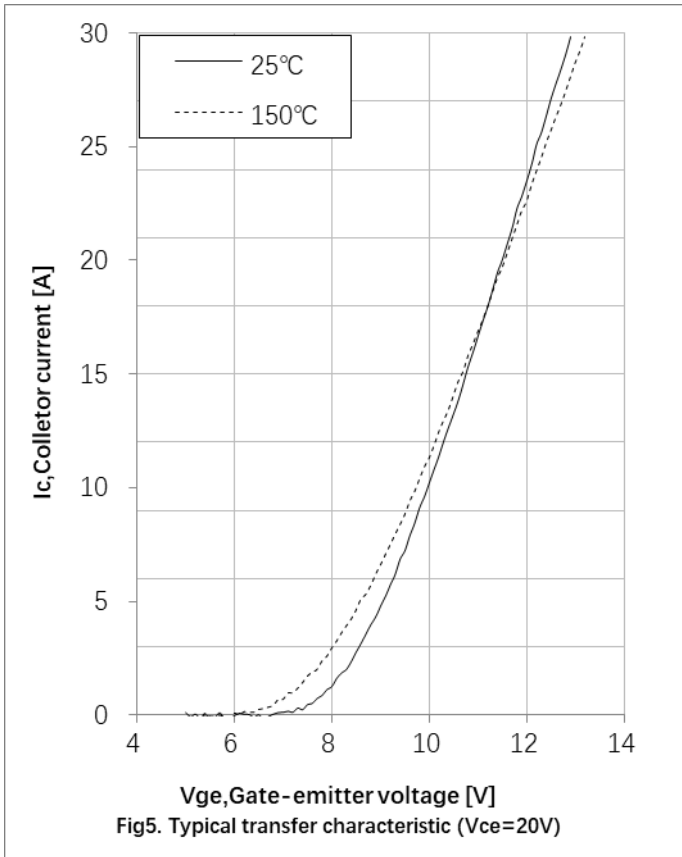
## Electrical Characteristics of the DIODE

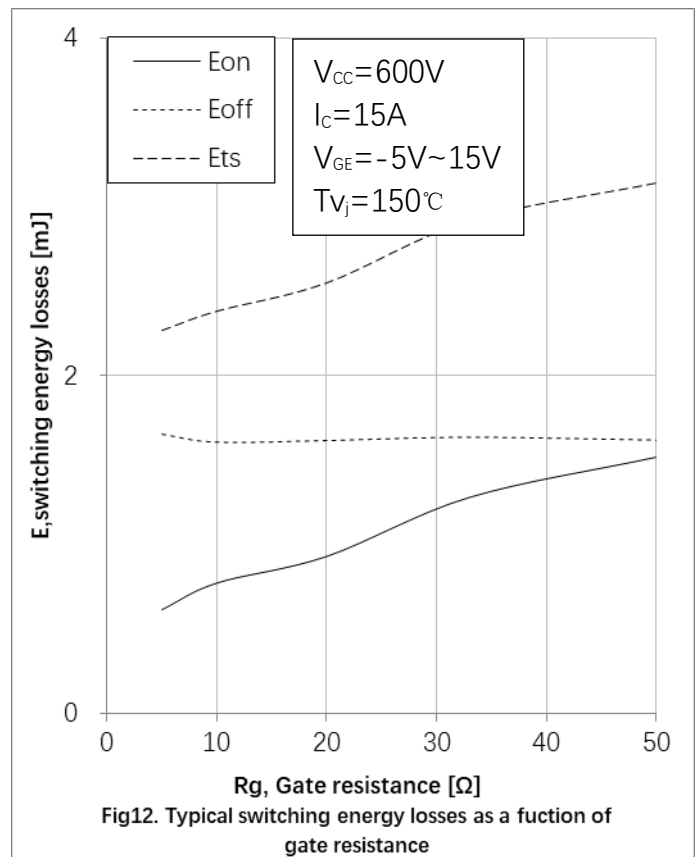
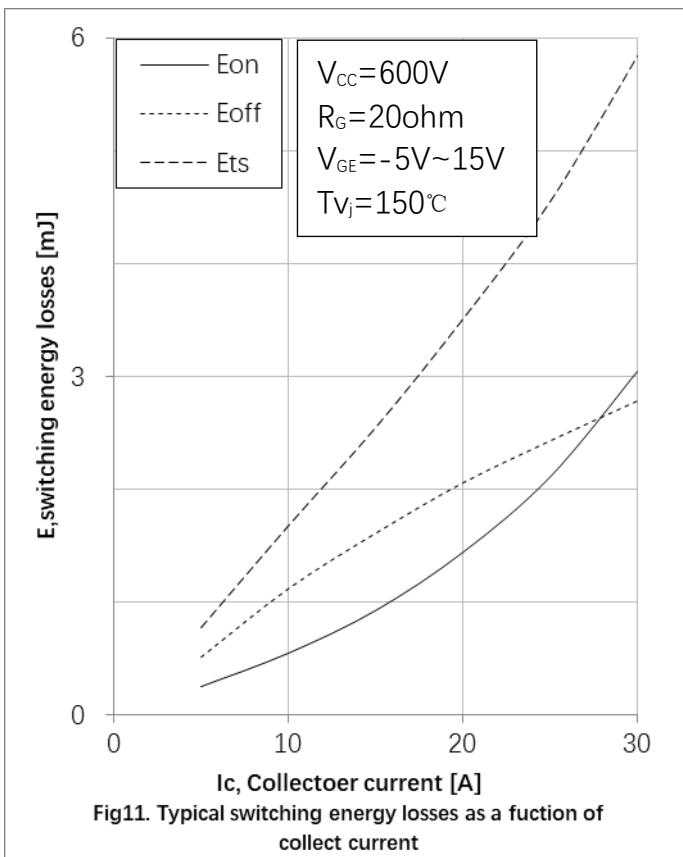
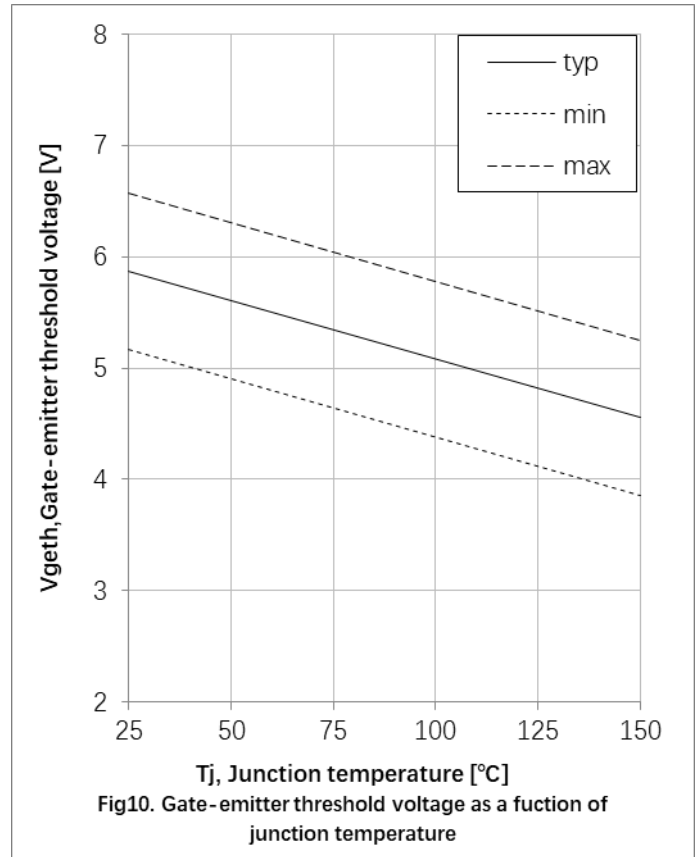
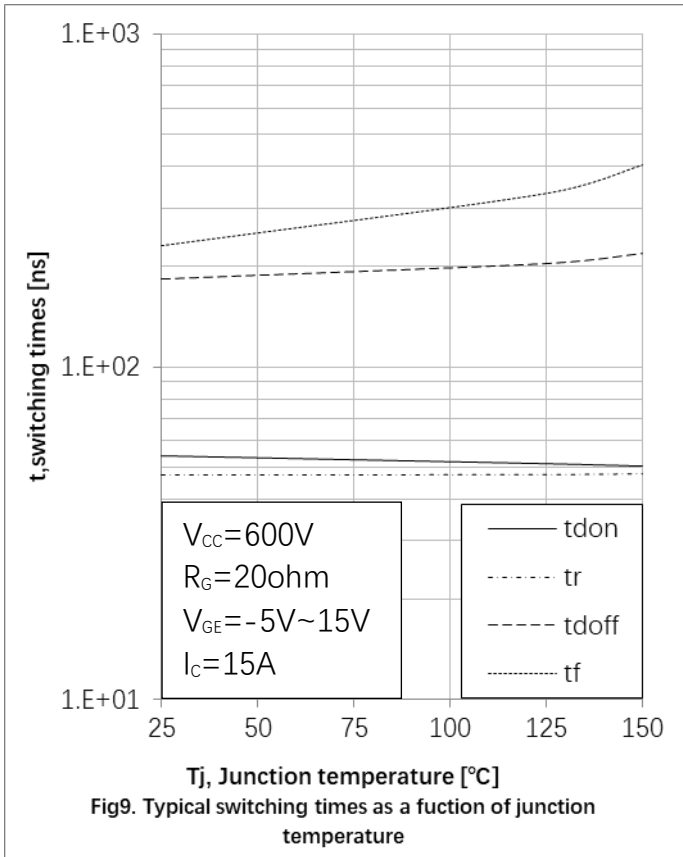
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Dynamic , at T<sub>j</sub>= 25°C</b>						
Reverse Recovery Current	I <sub>rr</sub>	I <sub>F</sub> =15A, V <sub>R</sub> =600V, -di/dt=270A/μs,	-	7.6	-	A
Reverse Recovery Time	T <sub>rr</sub>		-	190	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	0.7	-	uC
Reverse Recovery Energy	E <sub>rec</sub>		-	0.24	-	mJ
<b>Dynamic , at T<sub>j</sub>= 125°C</b>						
Reverse Recovery Current	I <sub>rr</sub>	I <sub>F</sub> =15A, V <sub>R</sub> =600V, -di/dt=270A/μs,	-	10.4	-	A
Reverse Recovery Time	T <sub>rr</sub>		-	270	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	1.3	-	uC
Reverse Recovery Energy	E <sub>rec</sub>		-	0.50	-	mJ
<b>Dynamic , at T<sub>j</sub>= 150°C</b>						
Reverse Recovery Current	I <sub>rr</sub>	I <sub>F</sub> =15A, V <sub>R</sub> =600V, -di/dt=270A/μs,	-	11.6	-	A
Reverse Recovery Time	T <sub>rr</sub>		-	300	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	1.6	-	uC
Reverse Recovery Energy	E <sub>rec</sub>		-	0.60	-	mJ

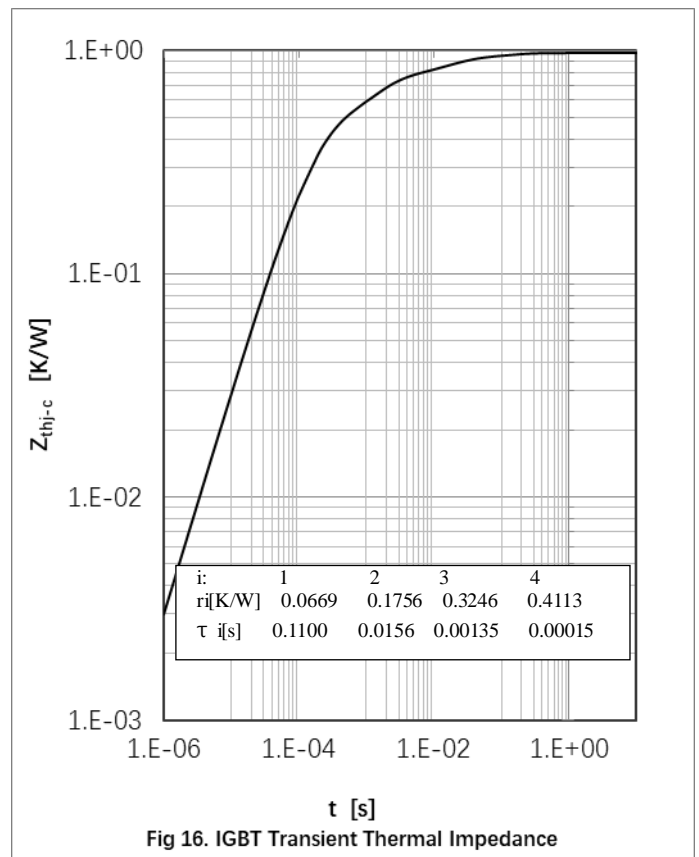
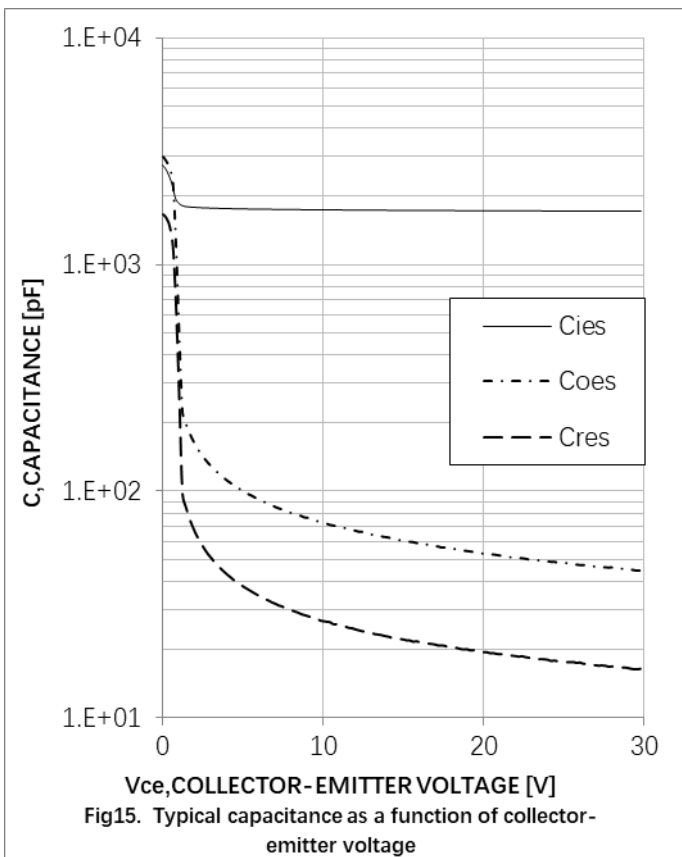
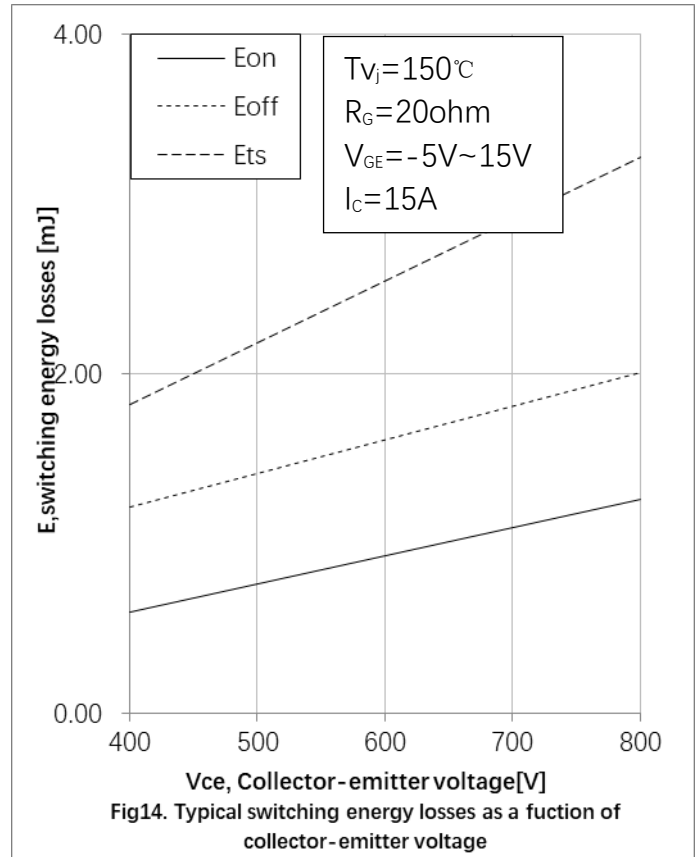
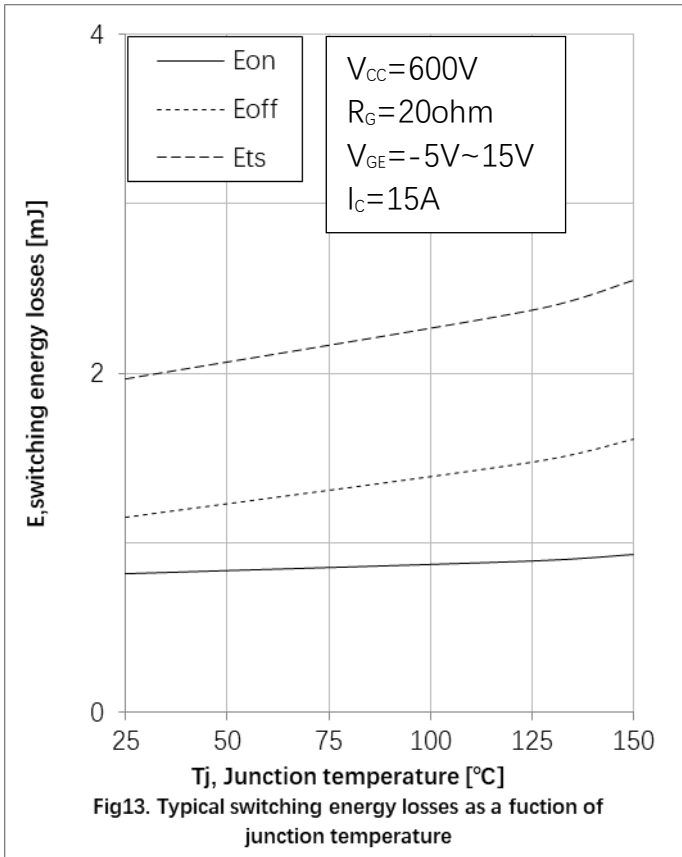
## Thermal Resistance

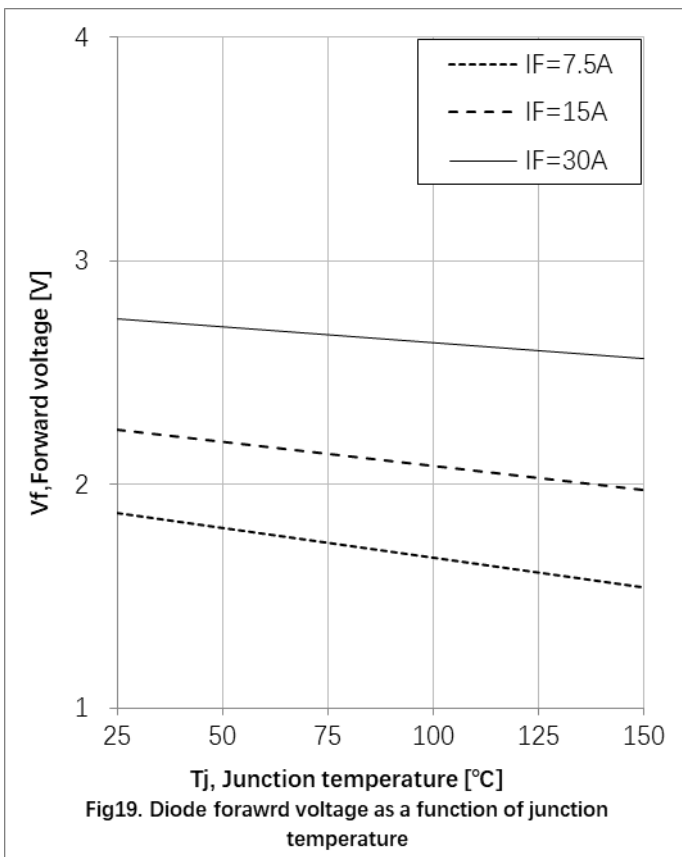
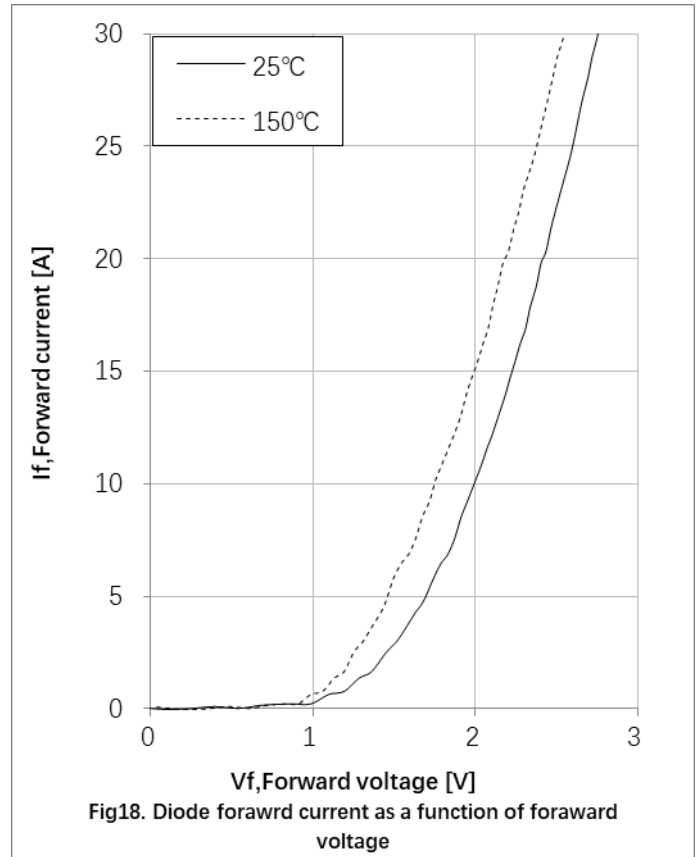
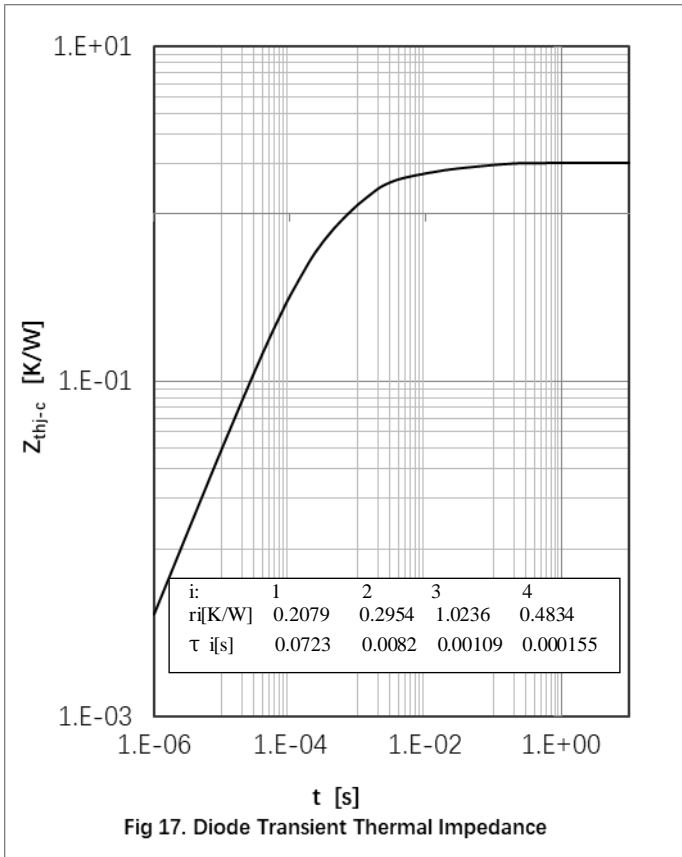
Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R <sub>th(j-c)</sub>	1.00	K/W
Diode Thermal Resistance, Junction - Case	R <sub>th(j-c)</sub>	2.00	K/W
Thermal Resistance, Junction - Ambient	R <sub>th(j-a)</sub>	40	K/W



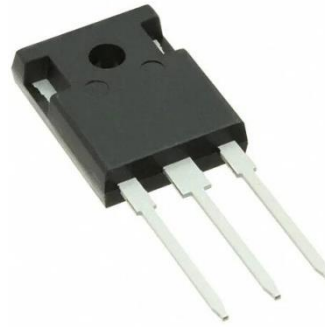
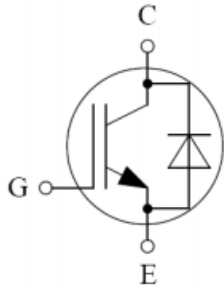






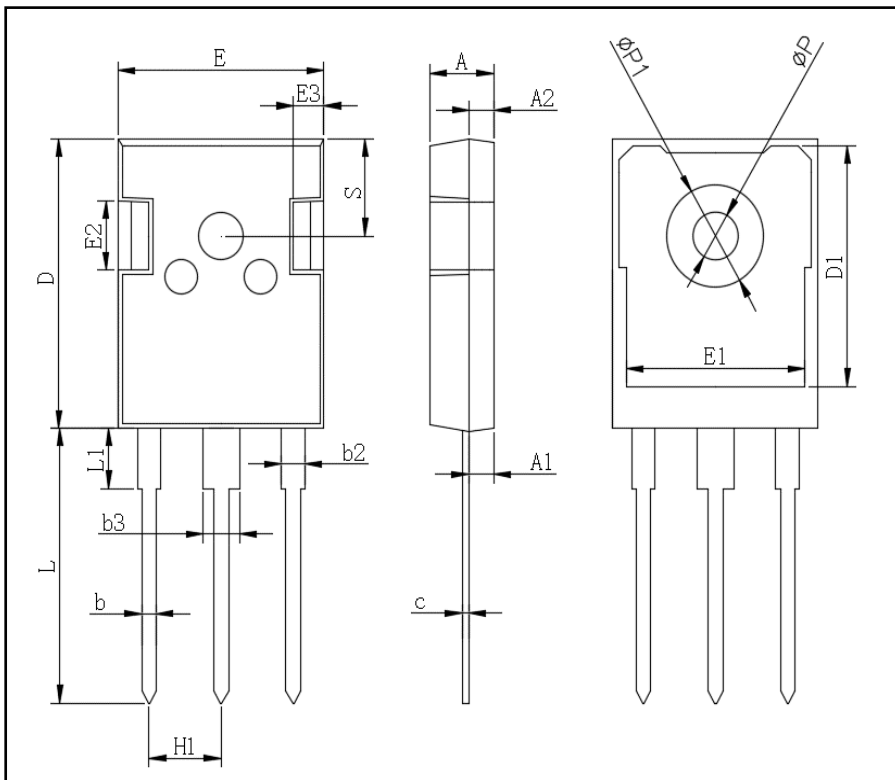


● Circuit Diagram



● Package Outline Information

CASE: TO 247



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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