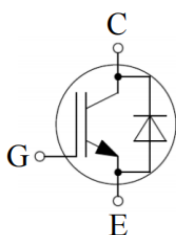


IGBT Discrete

V_{CE}	650	V
I_C	15	A
$V_{CE(SAT)} I_C=15A$	1.70	V

Circuit



Applications

- Inverter for motor drive
- Air conditioning
- Uninterruptible power supply

Features

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175°C
- Positive temperature coefficient
- High short circuit capability(5us)
- 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} $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	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}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10\mu s, D < 0.010$)	V_{GE}	± 30	V
Turn off Safe Operating Area $V_{CE} \leq 650V$, $T_j \leq 150^{\circ}C$		45	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	45	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	45	A
Short Circuit Withstand Time, $V_{GE}=15V, V_{CC}=400V, V_{CEM} \leq 650V$	T_{sc}	5	μs
Power Dissipation, $T_j=175^{\circ}C, T_C=25^{\circ}C$	P_{tot}	150	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}	$V_{GE}=0V, I_C=1mA$	650		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	4.6	5.6	6.2	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=15A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.70 2.10 2.20	2.20	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 5	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			± 200	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	0.99	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.03	-	
Gate Charge	Q_G	$V_{CC}=480V, I_C=15A,$ $V_{GE}=15V$	-	0.09	-	uC

Electrical Characteristics of the Diode (T_j= 25°C unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V _F	I _F = 15A T _j = 25°C T _j = 125°C T _j = 150°C		1.60 1.50 1.45	2.10	V

Switching Characteristic, Inductive Load

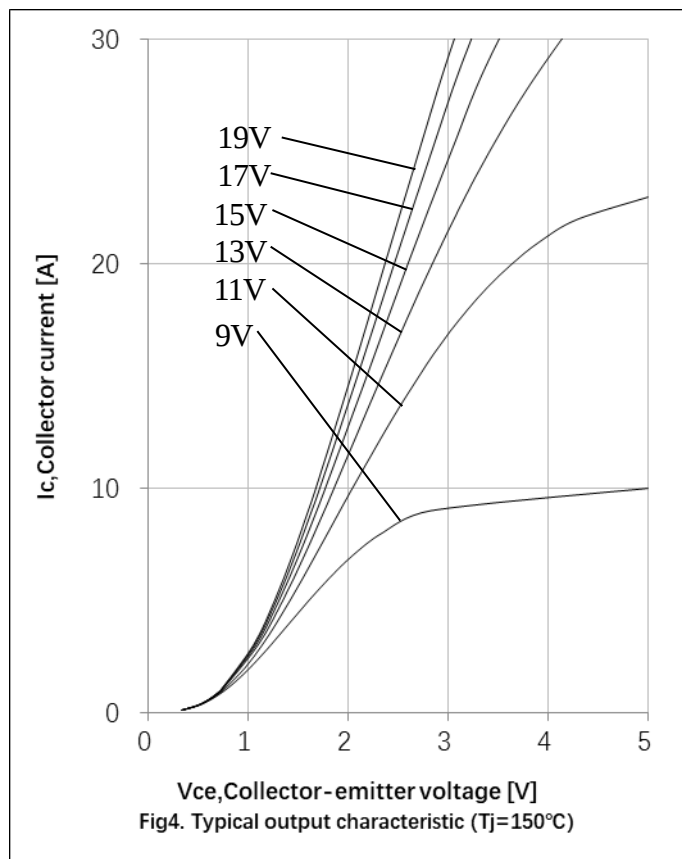
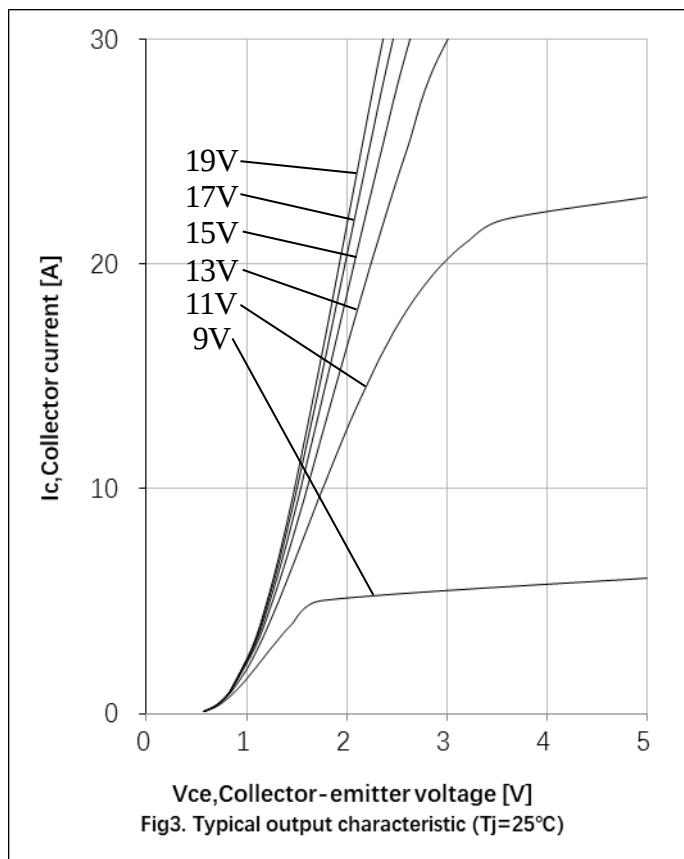
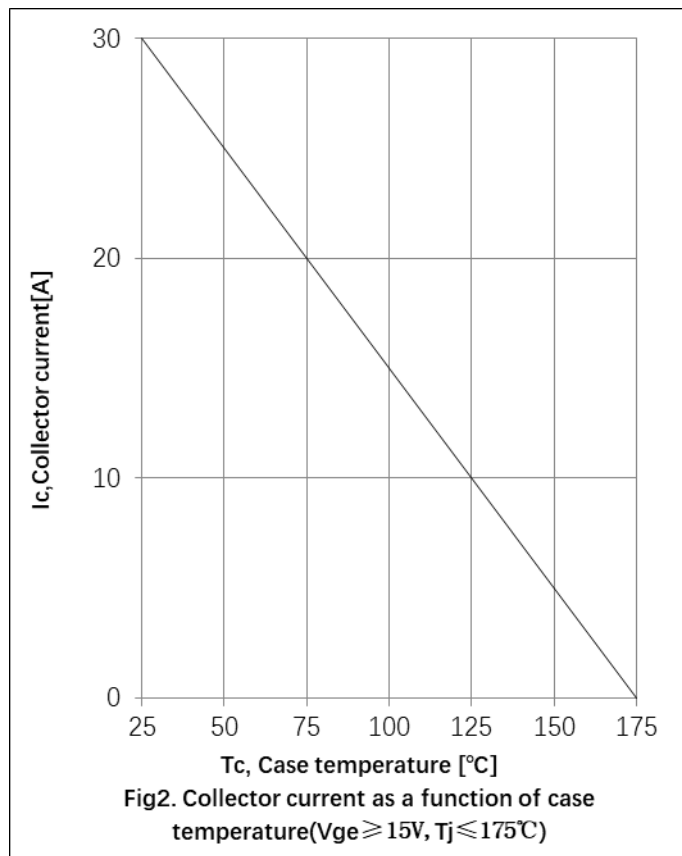
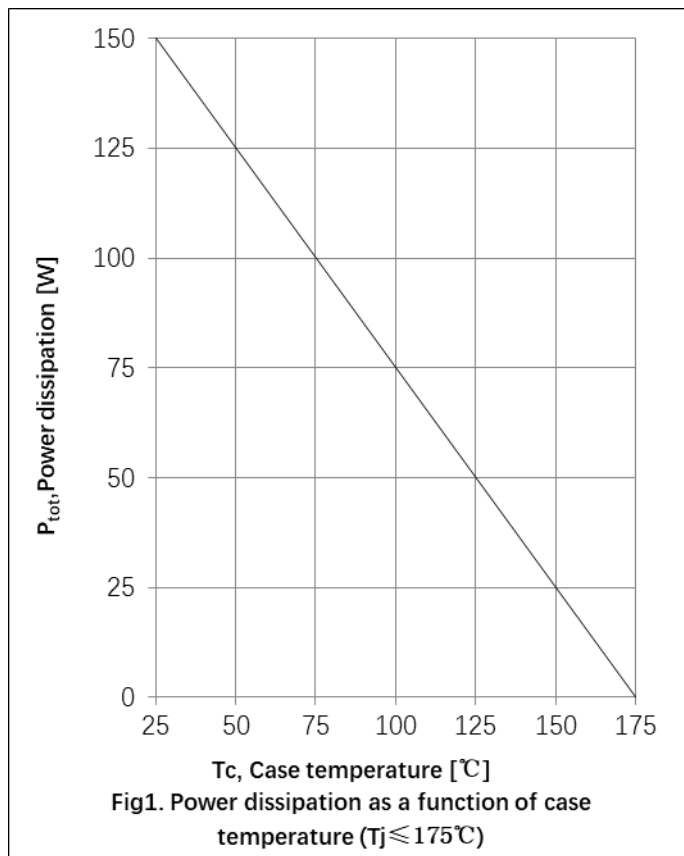
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T _j = 25℃						
Turn-on Delay Time	t _{d(on)}	T _j =25℃ V _{CC} = 300V, I _C =15A, V _{GE} =-5V~15V, R _g =20Ω	-	12	-	ns
Rise Time	t _r		-	16	-	ns
Turn-on Energy	E _{on}		-	0.29	-	mJ
Turn-off Delay Time	t _{d(off)}		-	41	-	ns
Fall Time	t _f		-	78	-	ns
Turn-off Energy	E _{off}		-	0.10	-	mJ
Dynamic , at T _j = 125℃						
Turn-on Delay Time	t _{d(on)}	T _j =125℃ V _{CC} = 300V, I _C =15A, V _{GE} =-5V~15V, R _g =20Ω	-	14	-	ns
Rise Time	t _r		-	18	-	ns
Turn-on Energy	E _{on}		-	0.37	-	mJ
Turn-off Delay Time	t _{d(off)}		-	43	-	ns
Fall Time	t _f		-	95	-	ns
Turn-off Energy	E _{off}		-	0.14	-	mJ
Dynamic , at T _j = 150℃						
Turn-on Delay Time	t _{d(on)}	T _j =150℃ V _{CC} = 300V, I _C =15A, V _{GE} =-5V~15V, R _g =20Ω	-	15	-	ns
Rise Time	t _r		-	19	-	ns
Turn-on Energy	E _{on}		-	0.41	-	mJ
Turn-off Delay Time	t _{d(off)}		-	44	-	ns
Fall Time	t _f		-	102	-	ns
Turn-off Energy	E _{off}		-	0.16	-	mJ

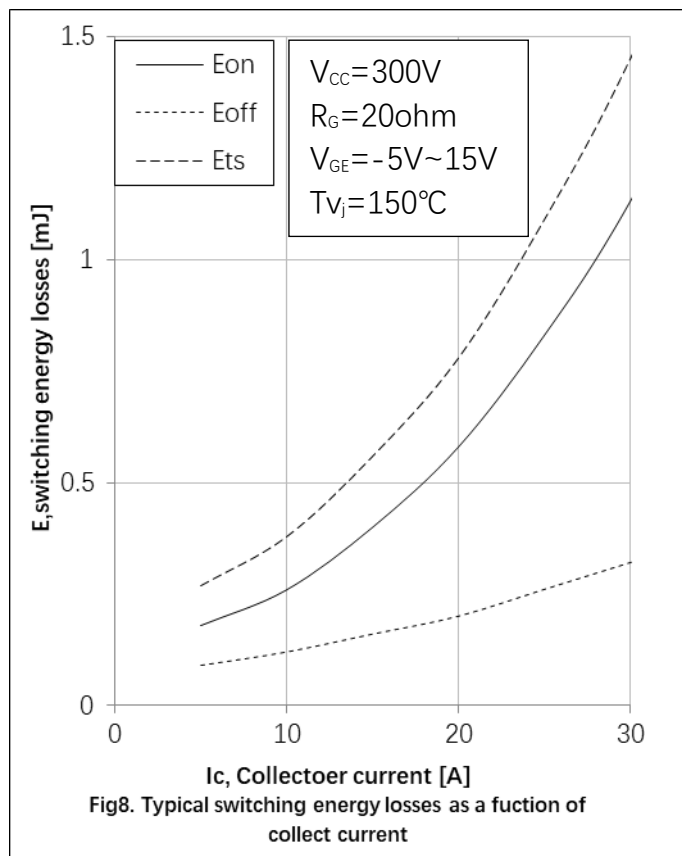
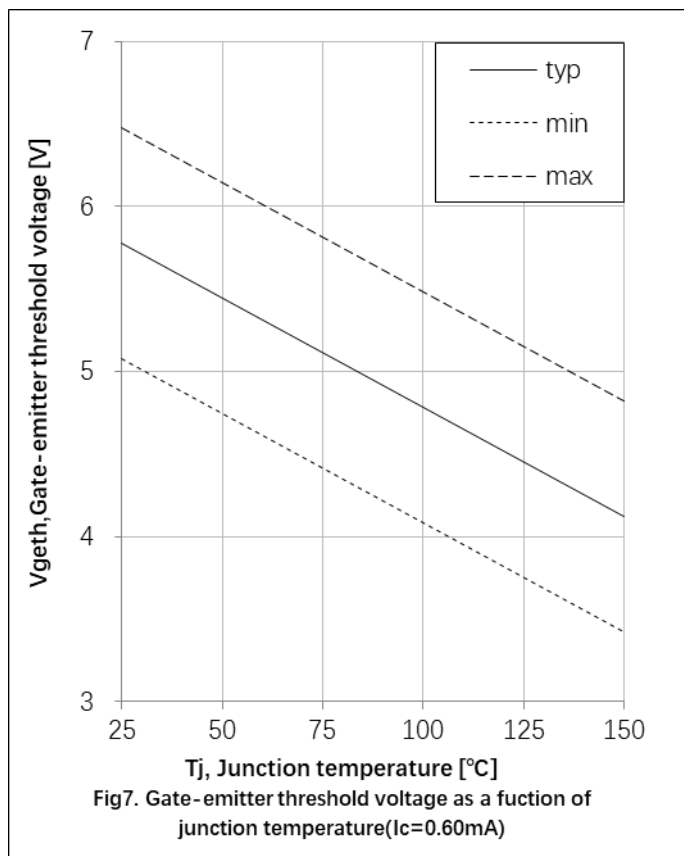
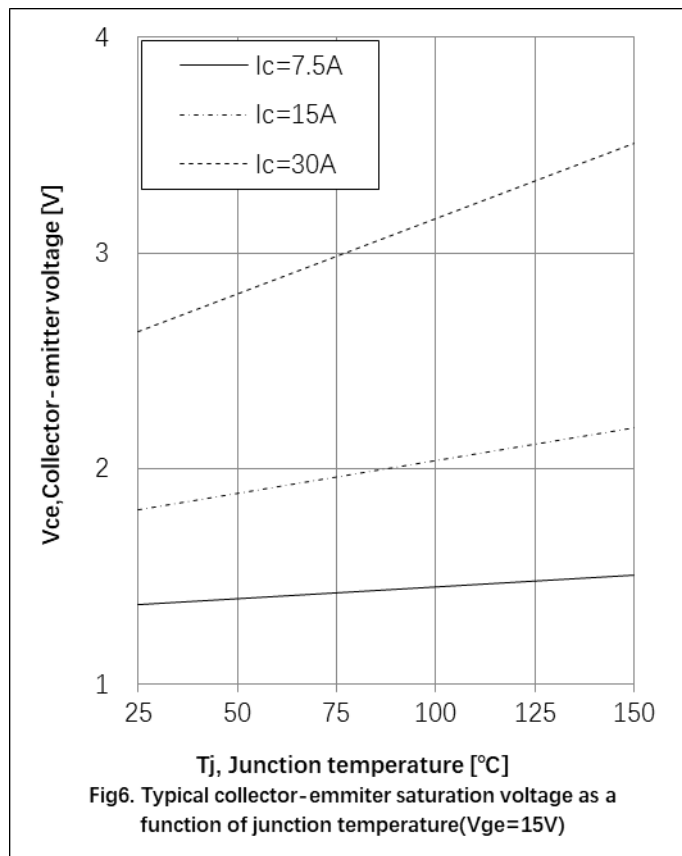
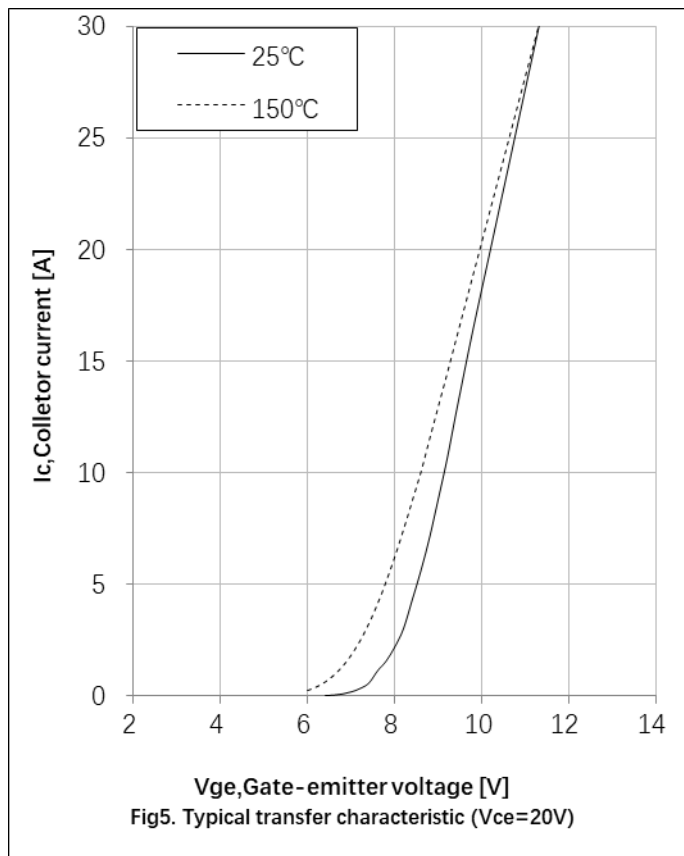
Electrical Characteristics of the DIODE

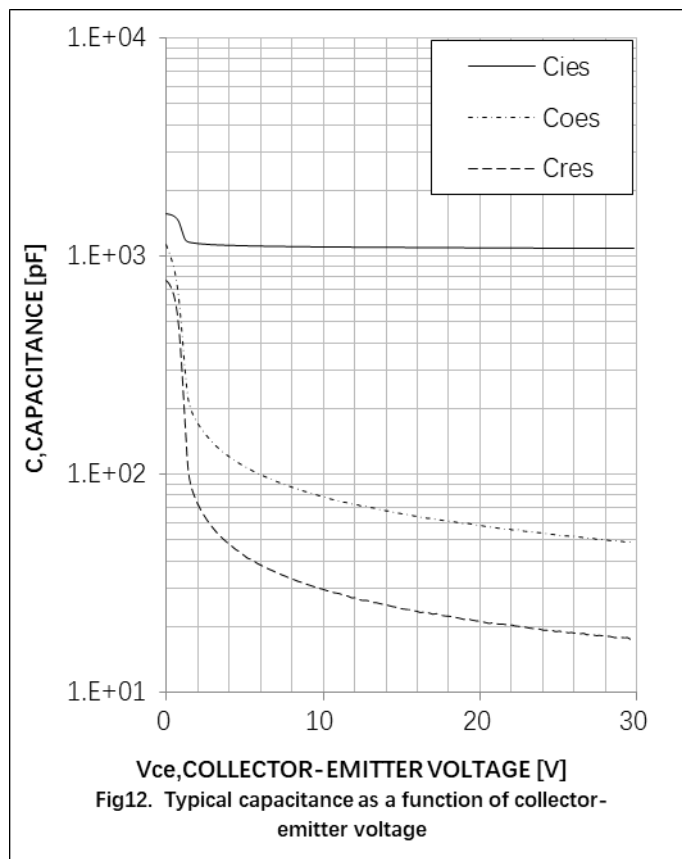
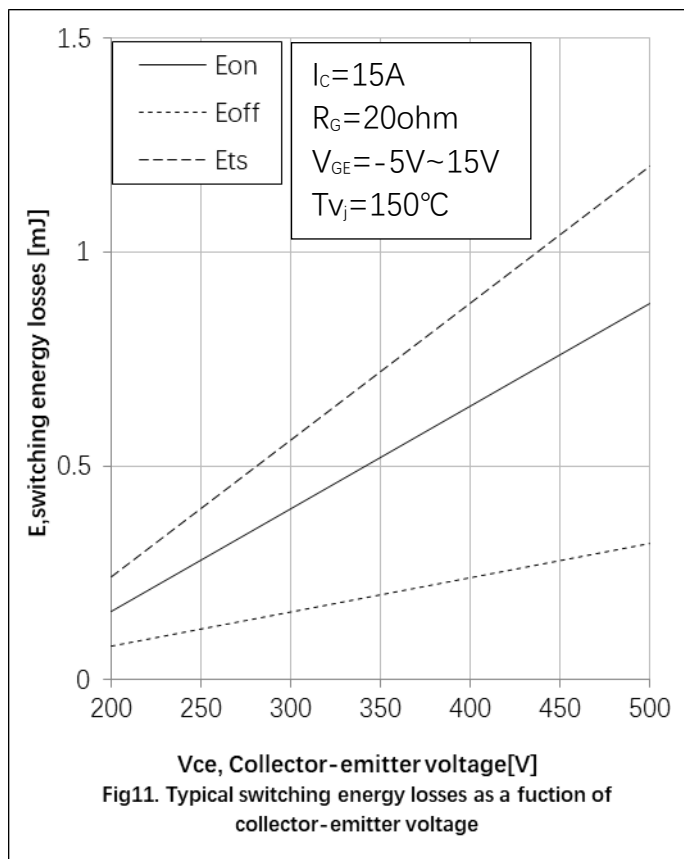
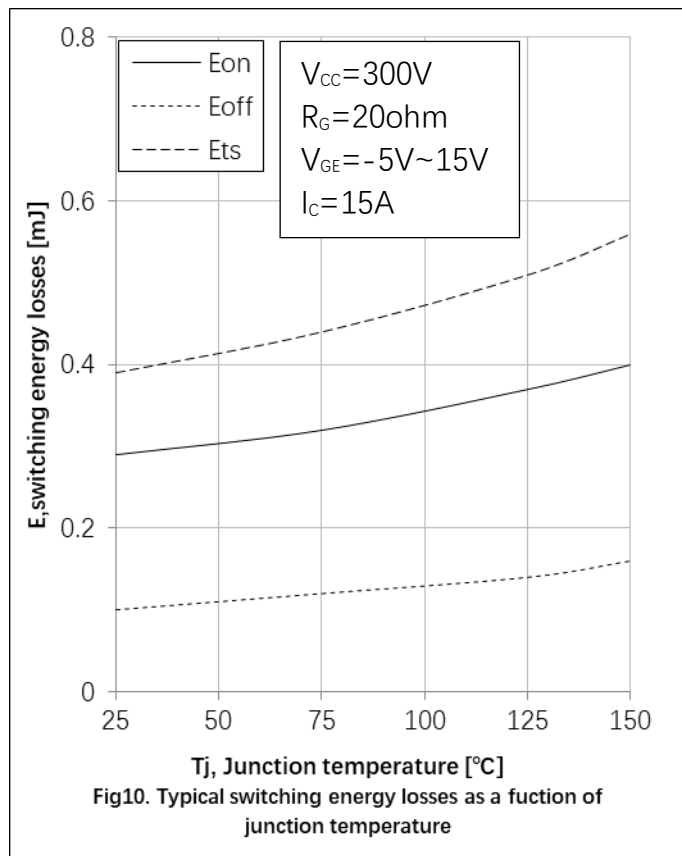
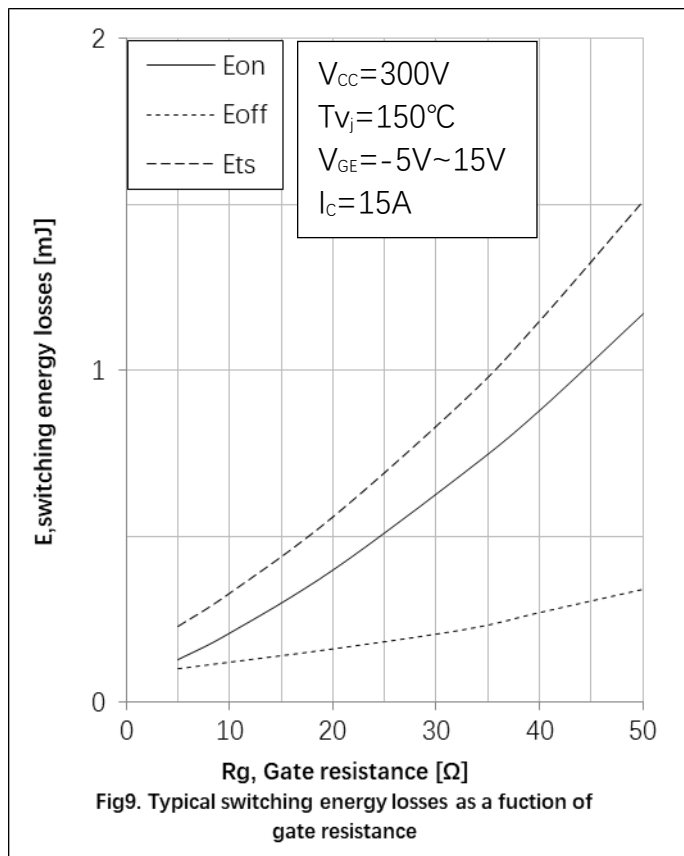
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T _j = 25°C						
Reverse Recovery Current	I _{rr}	I _F =15A, V _R =300V, -di/dt= 380A/μs,	-	6	-	A
Diode reverse recovery time	trr		-	197	-	ns
Reverse Recovery Charge	Q _{rr}		-	0.24	-	uC
Reverse Recovery Energy	E _{rec}		-	0.06	-	mJ
Dynamic , at T _j = 125°C						
Reverse Recovery Current	I _{rr}	I _F =15A, V _R =300V, -di/dt= 380A/μs,	-	7	-	A
Diode reverse recovery time	trr		-	213	-	ns
Reverse Recovery Charge	Q _{rr}		-	0.58	-	uC
Reverse Recovery Energy	E _{rec}		-	0.11	-	mJ
Dynamic , at T _j = 150°C						
Reverse Recovery Current	I _{rr}	I _F =15A, V _R =300V, -di/dt= 380A/μs,	-	8	-	A
Diode reverse recovery time	trr		-	221	-	ns
Reverse Recovery Charge	Q _{rr}		-	0.71	-	uC
Reverse Recovery Energy	E _{rec}		-	0.14	-	mJ

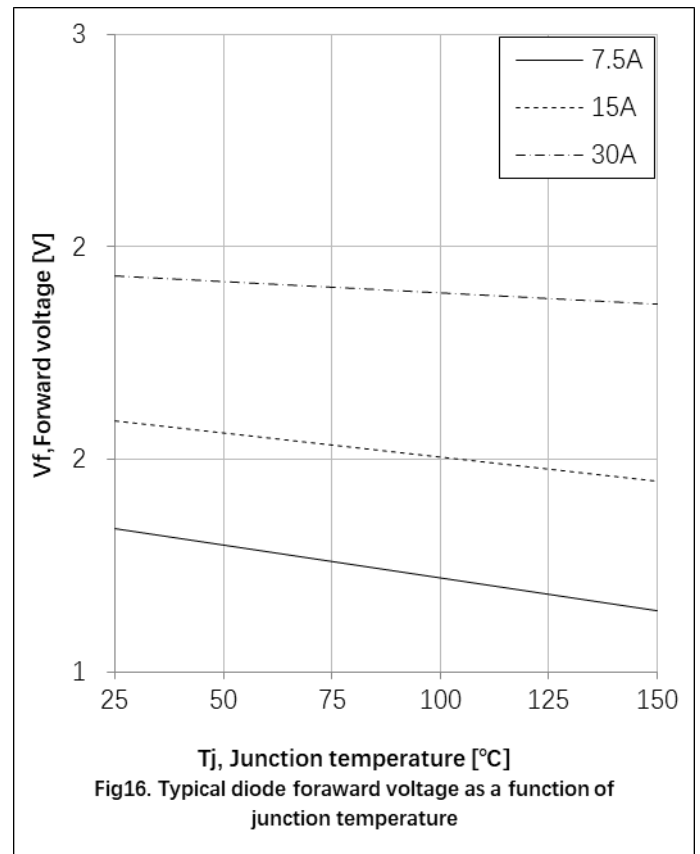
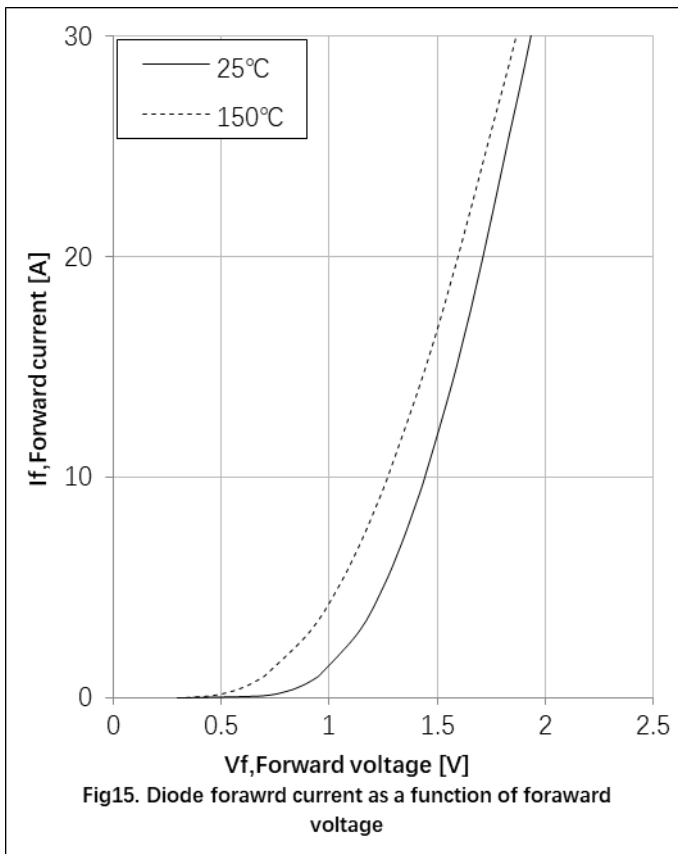
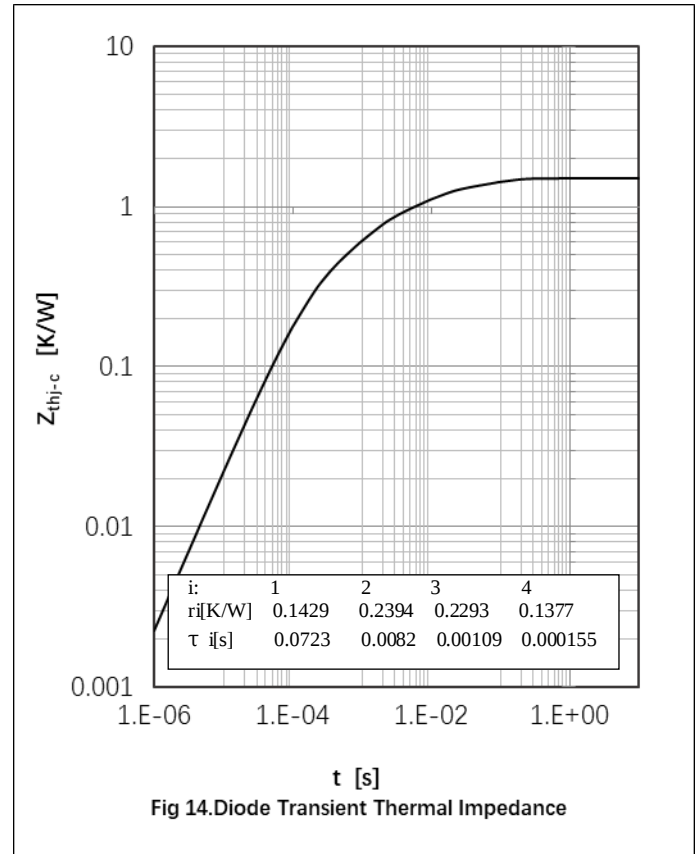
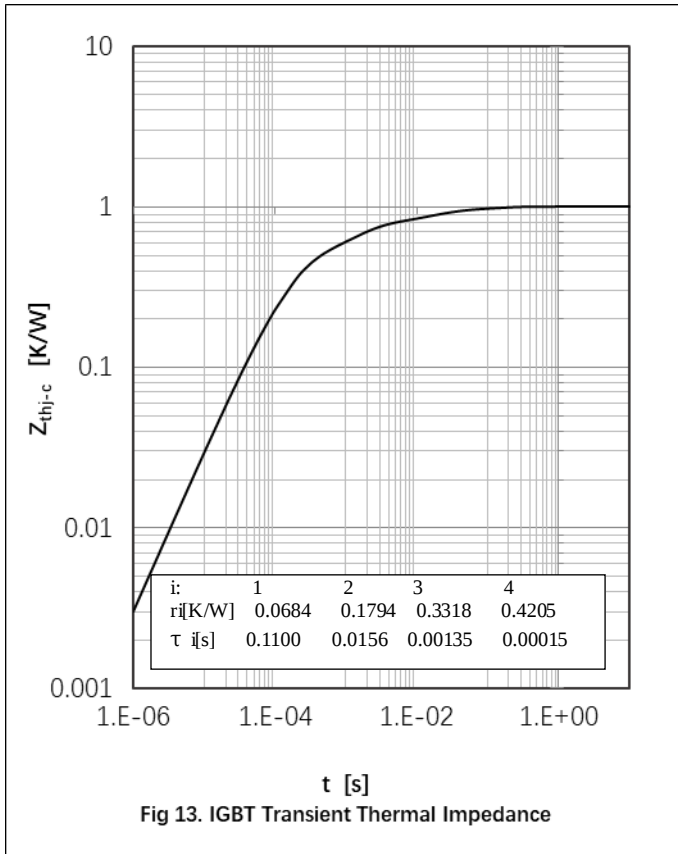
Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{th(j-c)}	1.0	K/W
Diode Thermal Resistance, Junction - Case	R _{th(j-c)}	1.5	K/W
Thermal Resistance, Junction - Ambient	R _{th(j-a)}	40	K/W

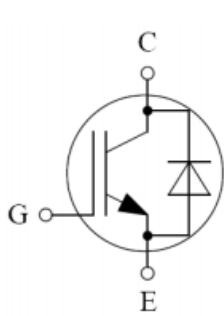






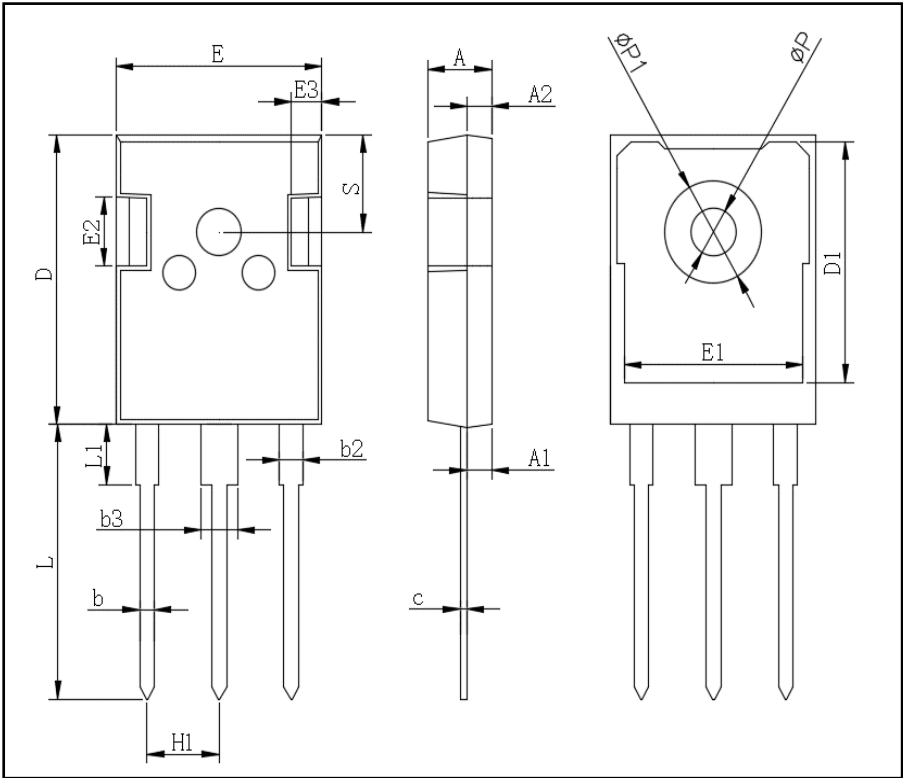


● Circuit Diagram



● 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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