

IGBT Discrete

V_{CE}	1200	V
I_C	140	A
$V_{CE(SAT)} I_C=140A$	1.75	V

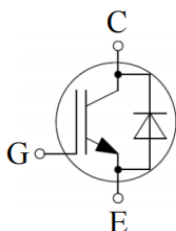
Applications

- Energy storage inverter
- Uninterruptible power supplies
- Solar inverters

Features

- High breakdown voltage to 1200V for improved reliability
- Maximum junction temperature 175°C
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD

Circuit



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	180 140	A
Diode Forward Current, limited by T_{jmax} $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	I_F	180 140	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 $V_{CE} \leq 1200V$, $T_j \leq 150^{\circ}C$		280	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	280	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	280	A
Power Dissipation, $T_j=175^{\circ}C$, $T_C=25^{\circ}C$	P_{tot}	937	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}	$V_{GE}=0V, I_C=250\mu A$	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=1mA$	5.4	5.9	6.4	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=140A$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.75 2.20 2.30	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	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}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	11.8	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.13	-	
Gate Charge	Q_G	$V_{CC}=600V, I_C=140A,$ $V_{GE}=15V$	-	0.75	-	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 = 140A T _j = 25°C, T _j = 125°C T _j = 150°C		2.10 2.25 2.30	2.50	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} = 600V, I _C =140A, V _{GE} = -5V~15V, R _g =5.1Ω	-	66	-	ns
Rise Time	t _r		-	132	-	ns
Turn-on Energy	E _{on}		-	13.3	-	mJ
Turn-off Delay Time	t _{d(off)}		-	167	-	ns
Fall Time	t _f		-	58	-	ns
Turn-off Energy	E _{off}		-	4.9	-	mJ
Dynamic , at T _j = 125℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} = 600V, I _C =140A, V _{GE} = -5V~15V, R _g =5.1Ω	-	64	-	ns
Rise Time	t _r		-	124	-	ns
Turn-on Energy	E _{on}		-	13.5	-	mJ
Turn-off Delay Time	t _{d(off)}		-	173	-	ns
Fall Time	t _f		-	83	-	ns
Turn-off Energy	E _{off}		-	5.7	-	mJ
Dynamic , at T _j = 150℃						
Turn-on Delay Time	t _{d(on)}	V _{CC} = 600V, I _C =140A, V _{GE} = -5V~15V, R _g =5.1Ω	-	63	-	ns
Rise Time	t _r		-	120	-	ns
Turn-on Energy	E _{on}		-	13.6	-	mJ
Turn-off Delay Time	t _{d(off)}		-	180	-	ns
Fall Time	t _f		-	96	-	ns
Turn-off Energy	E _{off}		-	6.1	-	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 =140A, V _R =600V, -di/dt= 850A/μs	-	48	-	A
Diode reverse recovery time	trr		-	288	-	ns
Reverse Recovery Charge	Q _{rr}		-	5.9	-	uC
Reverse Recovery Energy	E _{rec}		-	2.3	-	mJ
Dynamic , at T _j = 125°C						
Reverse Recovery Current	I _{rr}	I _F =140A, V _R =600V, -di/dt= 850A/μs	-	61	-	A
Diode reverse recovery time	trr		-	371	-	ns
Reverse Recovery Charge	Q _{rr}		-	10.7	-	uC
Reverse Recovery Energy	E _{rec}		-	4.4	-	mJ
Dynamic , at T _j = 150°C						
Reverse Recovery Current	I _{rr}	I _F =140A, V _R =600V, -di/dt= 850A/μs	-	67	-	A
Diode reverse recovery time	trr		-	413	-	ns
Reverse Recovery Charge	Q _{rr}		-	13.1	-	uC
Reverse Recovery Energy	E _{rec}		-	5.5	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{th(j-c)}	0.16	K/W
Diode Thermal Resistance, Junction - Case	R _{th(j-c)}	0.26	K/W
Thermal Resistance, Junction - Ambient	R _{th(j-a)}	40	K/W

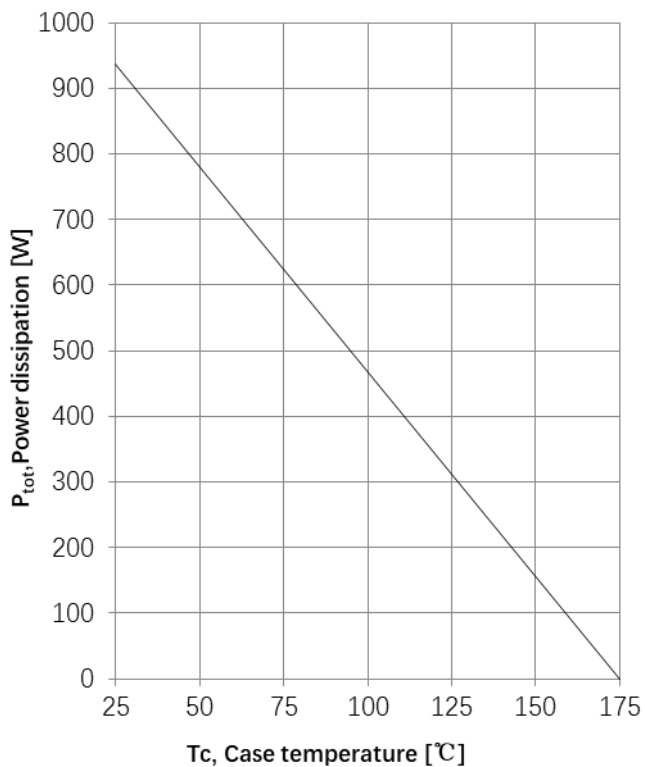


Fig1. Power dissipation as a function of case temperature ($T_j \leq 175^\circ\text{C}$)

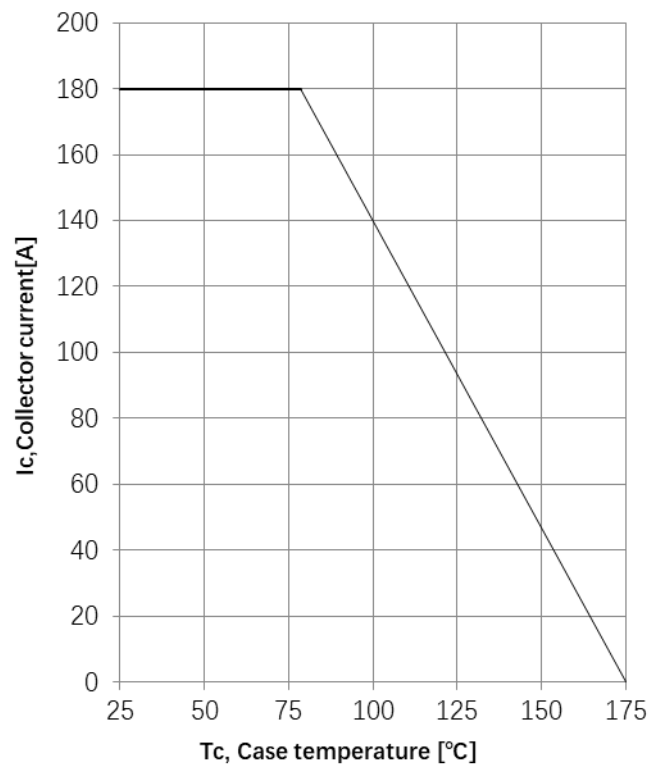


Fig2. Collector current as a function of case temperature ($V_{ge} \geq 15\text{V}$, $T_j \leq 175^\circ\text{C}$)

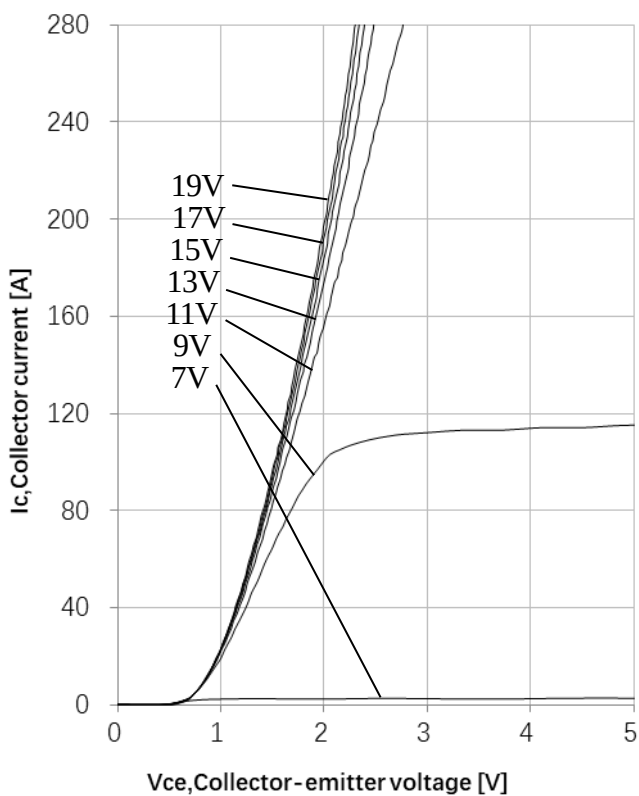


Fig3. Typical output characteristic ($T_j = 25^\circ\text{C}$)

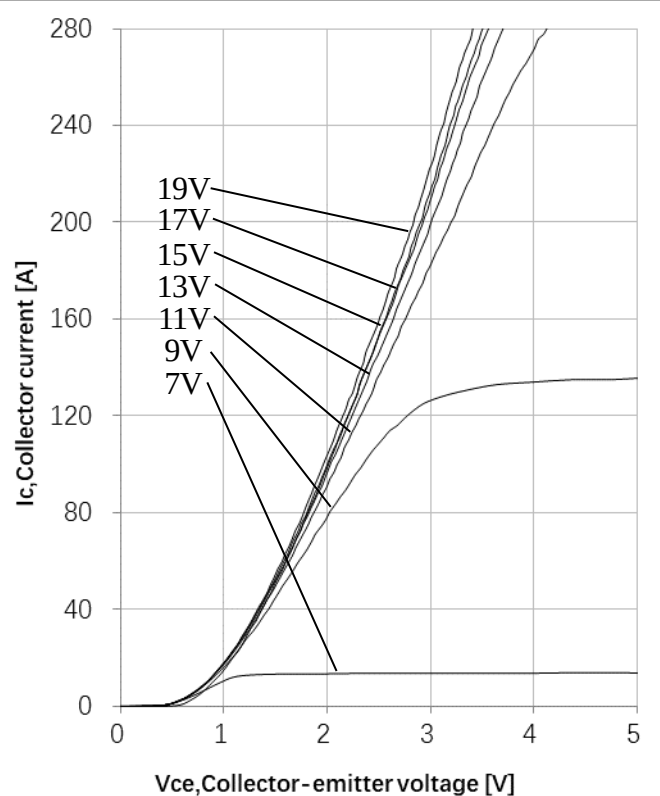
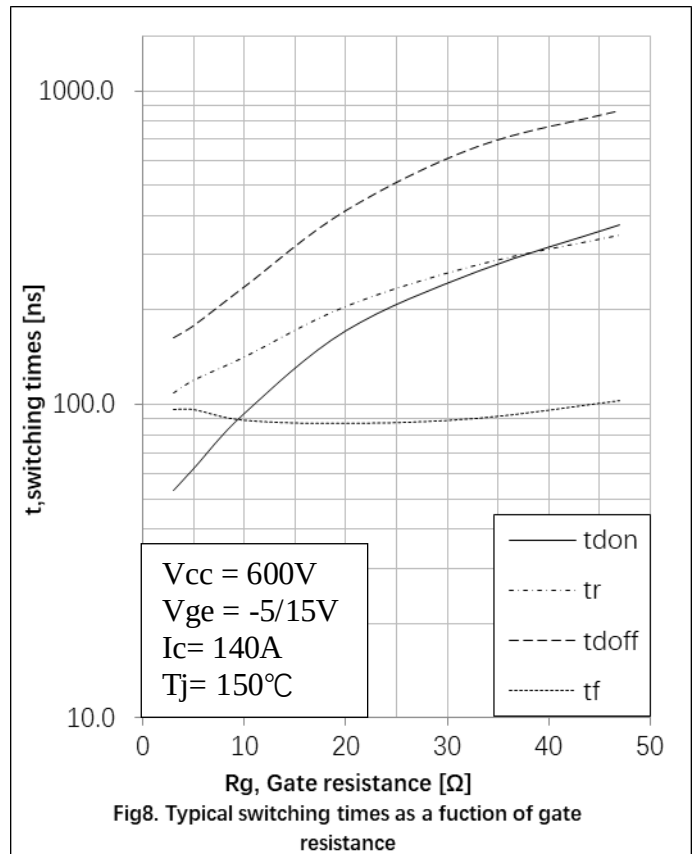
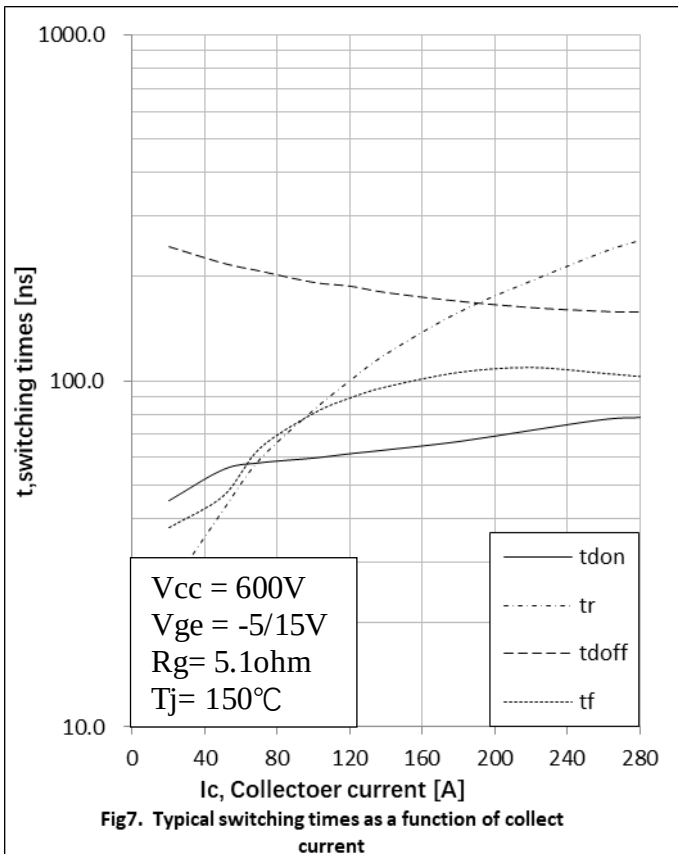
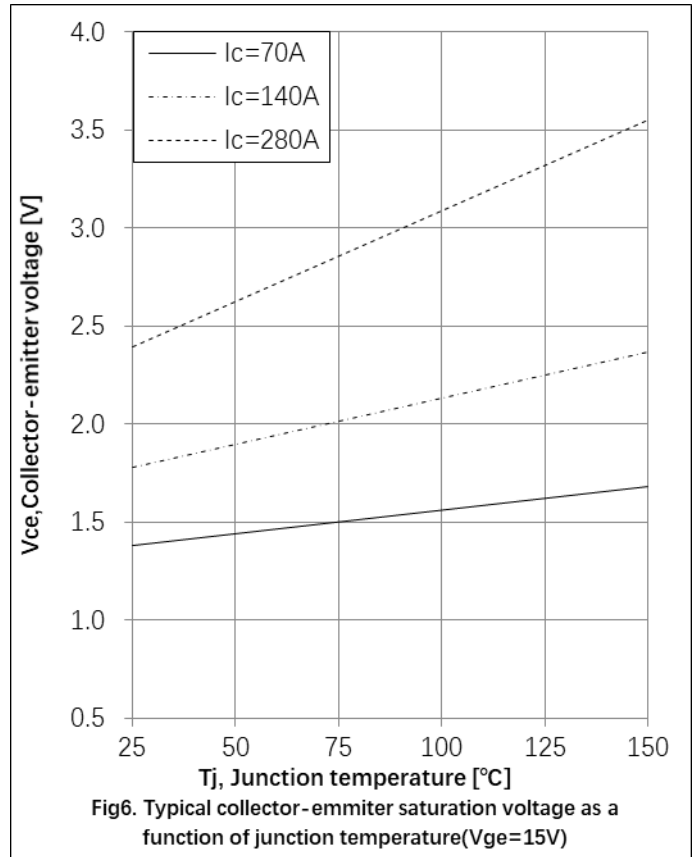
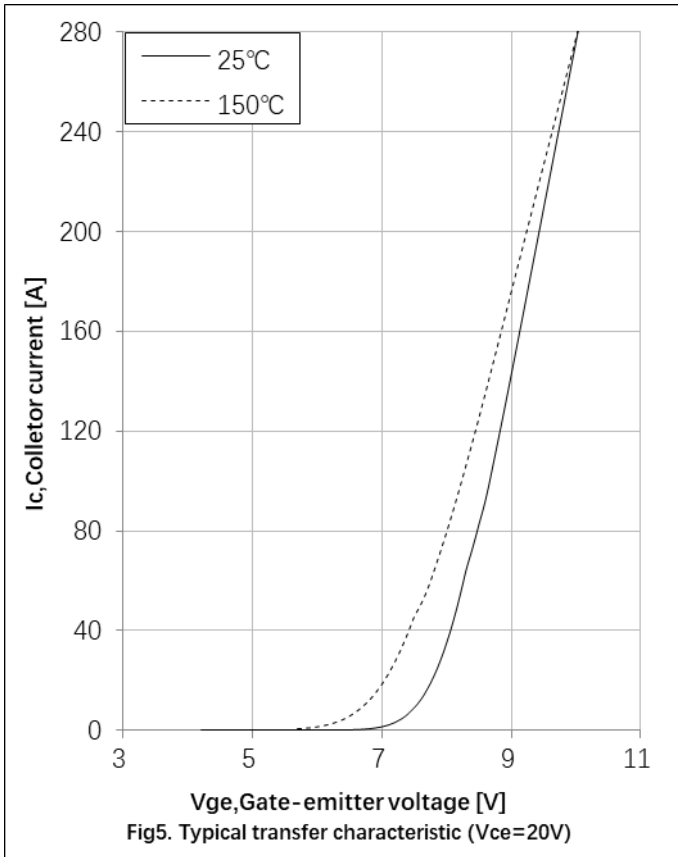
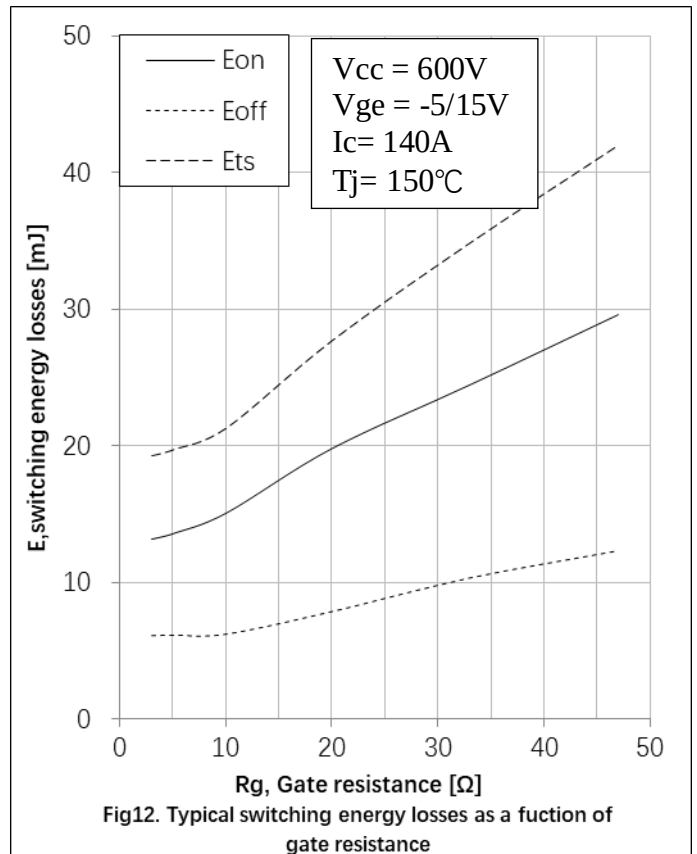
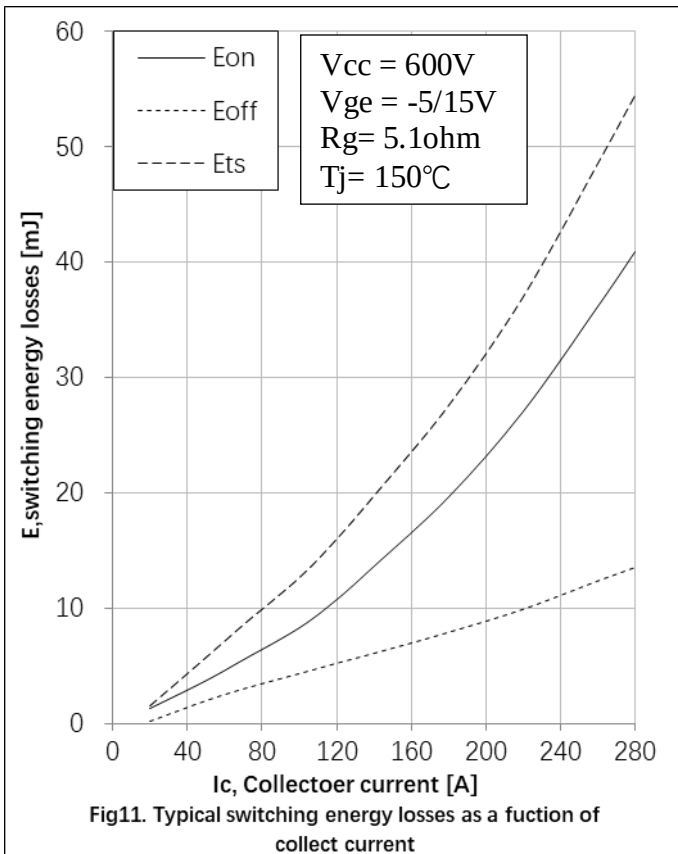
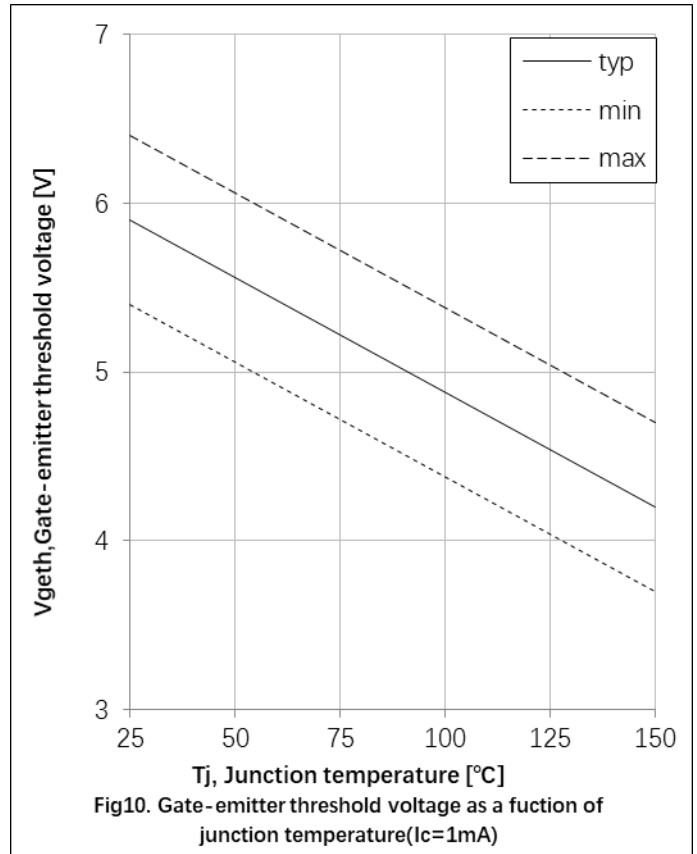
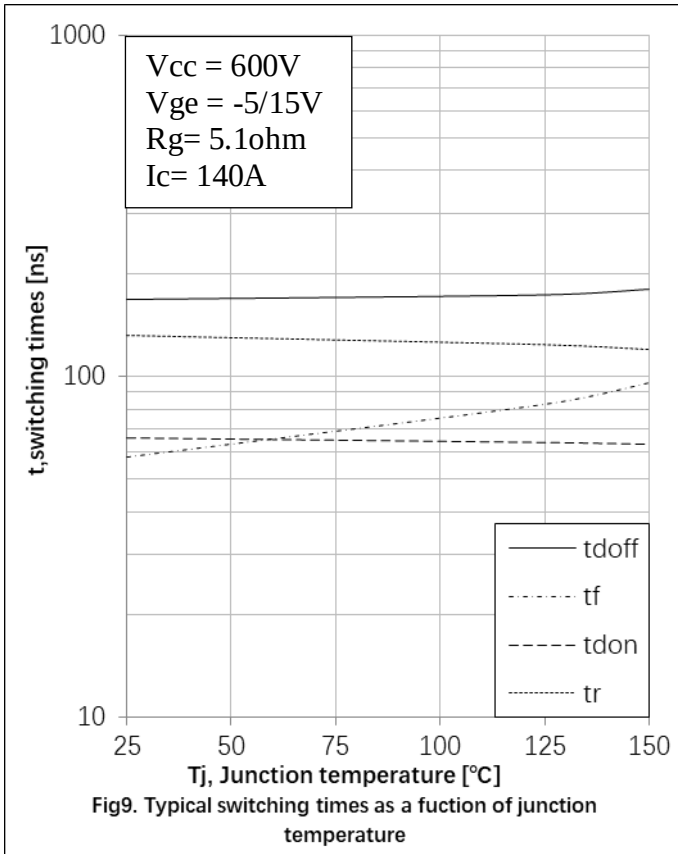
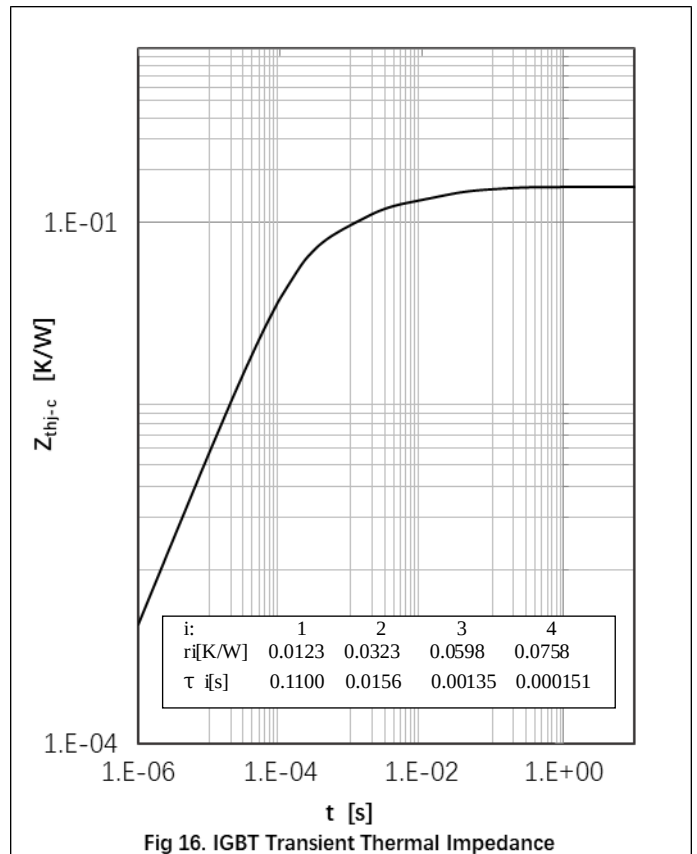
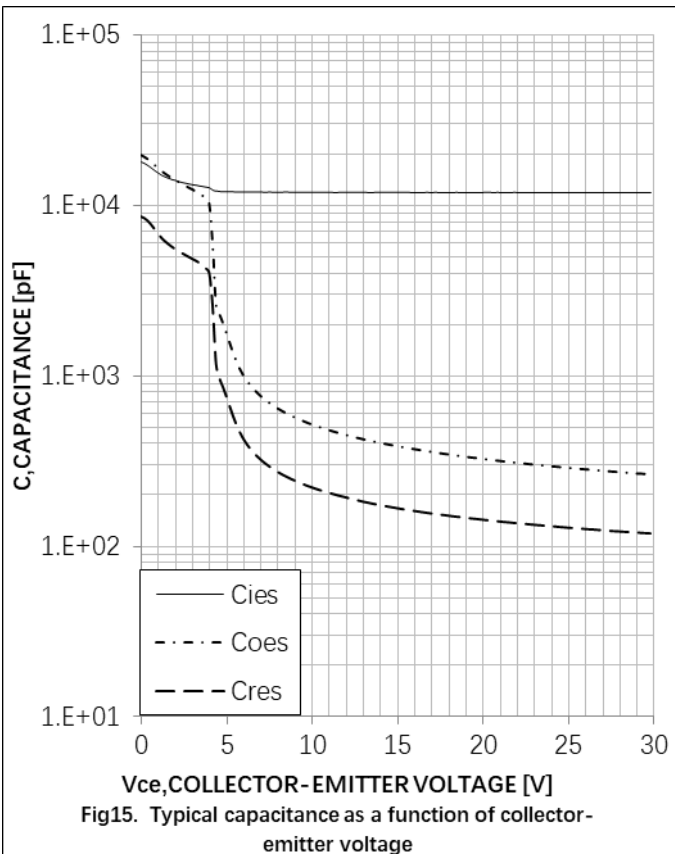
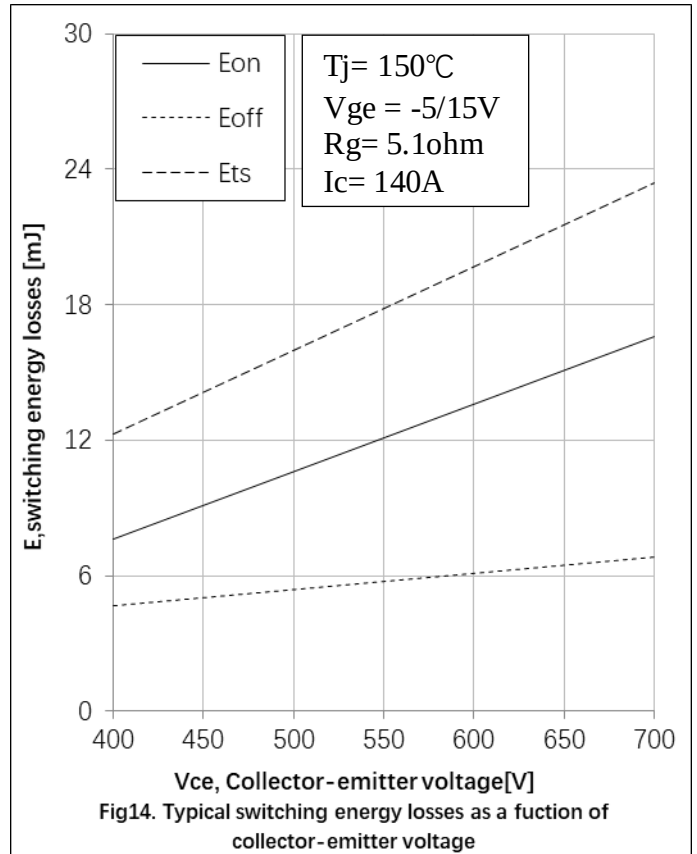
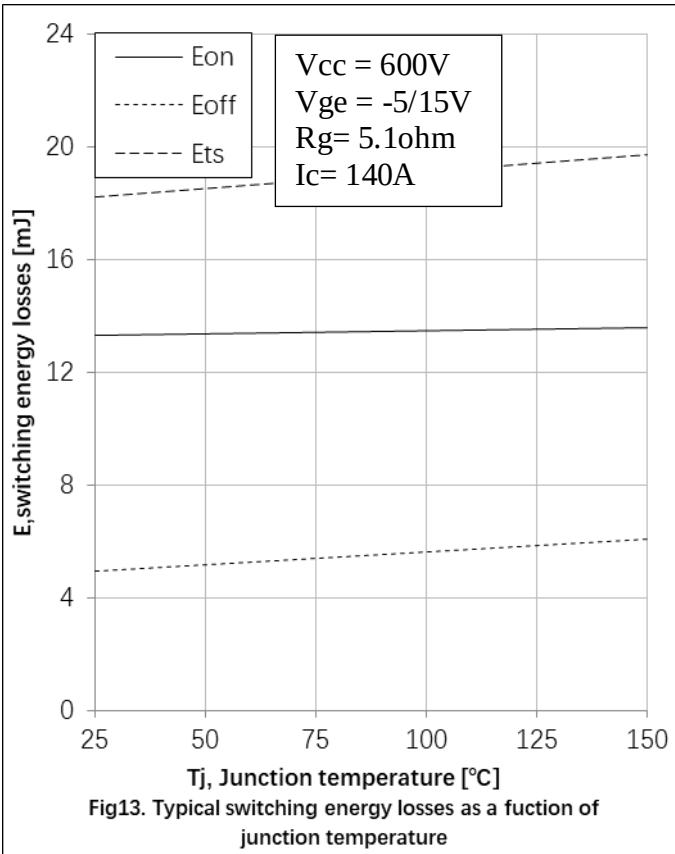
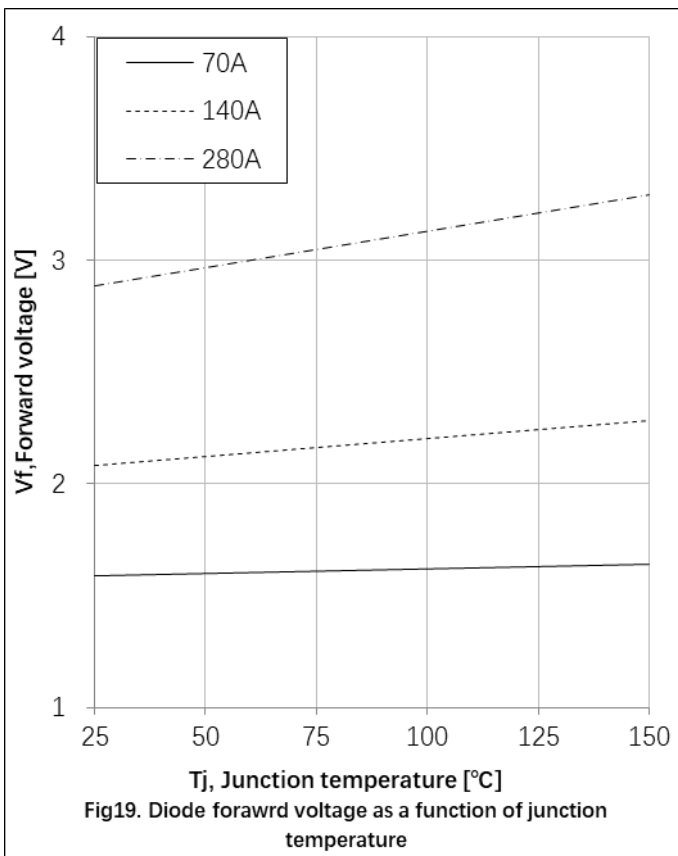
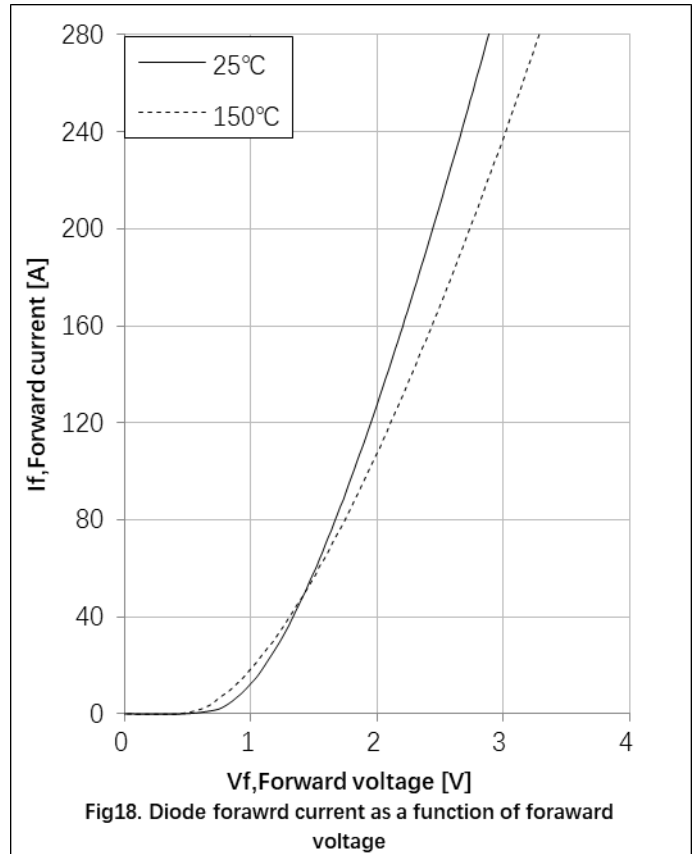
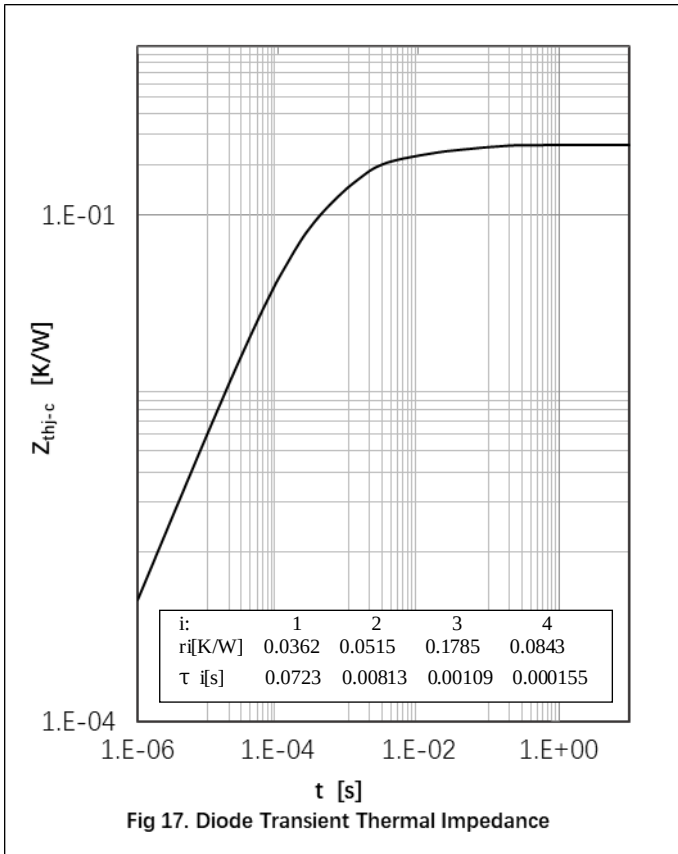


Fig4. Typical output characteristic ($T_j = 150^\circ\text{C}$)

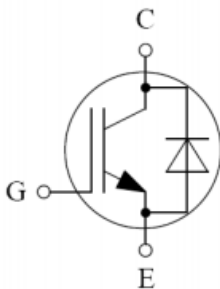






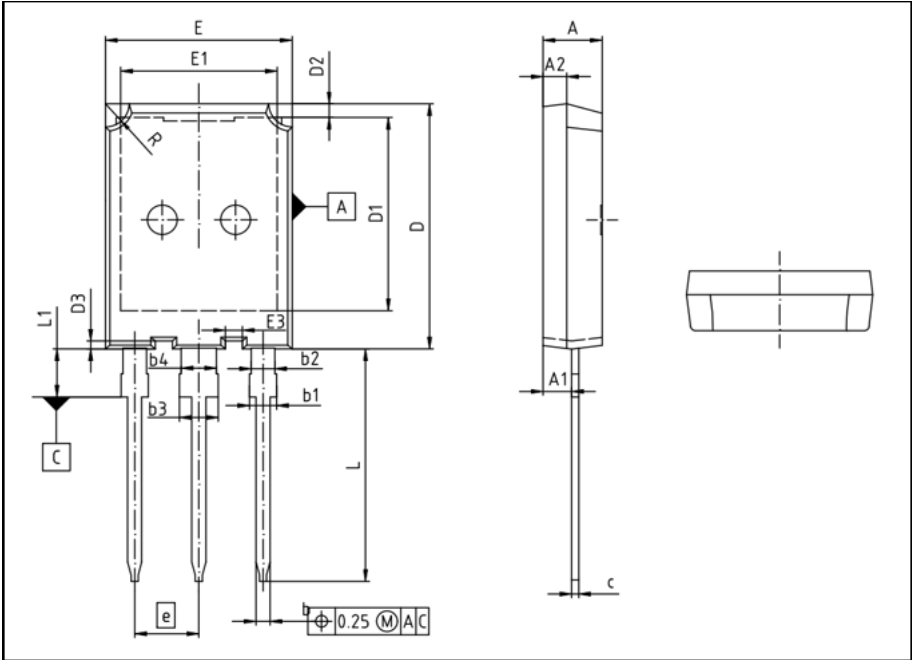


Circuit Diagram



● Package Outline Information

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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