

IGBT Modules

V_{CE}	1200	V
I_C	40	A
$V_{CE(SAT)} I_C=40A$	1.70	V

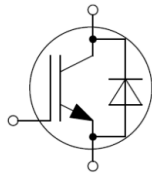
Applications

- High frequency switching application
- Resonant converters
- Uninterruptible power supply
- Welding converters

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	80 40	A
Diode Forward Current, limited by T_{jmax} $T_C=25^\circ C$ $T_C=100^\circ C$	I_F	80 40	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage	V_{GE}	± 30	V
Turn off Safe Operating Area $V_{CE} \leq 1200V$, $T_j \leq 150^\circ C$		160	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	160	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	160	A
Power Dissipation, $T_j=175^\circ C$, $T_C=25^\circ C$	P_{tot}	500	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	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	3.5	4.5	5.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.70 2.10 2.20	2.00	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V$ $T_j=25^\circ\text{C}$, $T_j=150^\circ\text{C}$			1 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}	$V_{CE}=25V, V_{GE}=0V,$ $f=1\text{MHz}$	-	2.12	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.08	-	
Gate Charge	Q_G	$V_{CC}=960V, I_C=40A,$ $V_{GE}=15V$	-	0.165	-	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	$I_F = 40\text{A}$ $T_j = 25^\circ\text{C}$, $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$		2.00 2.00 2.00		V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at $T_j = 25^\circ\text{C}$						
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600\text{V}$, $I_C = 40\text{A}$, $V_{GE} = -15\text{V} \sim 15\text{V}$, $R_g = 12\Omega$	-	25	-	ns
Rise Time	t_r		-	35	-	ns
Turn-on Energy	E_{on}		-	2.2	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	240	-	ns
Fall Time	t_f		-	50	-	ns
Turn-off Energy	E_{off}		-	1.7	-	mJ
Dynamic , at $T_j = 125^\circ\text{C}$						
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600\text{V}$, $I_C = 40\text{A}$, $V_{GE} = -15\text{V} \sim 15\text{V}$, $R_g = 12\Omega$	-	35	-	ns
Rise Time	t_r		-	40	-	ns
Turn-on Energy	E_{on}		-	3.0	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	360	-	ns
Fall Time	t_f		-	60	-	ns
Turn-off Energy	E_{off}		-	2.3	-	mJ
Dynamic , at $T_j = 150^\circ\text{C}$						
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600\text{V}$, $I_C = 40\text{A}$, $V_{GE} = -15\text{V} \sim 15\text{V}$, $R_g = 12\Omega$	-	40	-	ns
Rise Time	t_r		-	42	-	ns
Turn-on Energy	E_{on}		-	3.2	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	385	-	ns
Fall Time	t_f		-	63	-	ns
Turn-off Energy	E_{off}		-	2.5	-	mJ

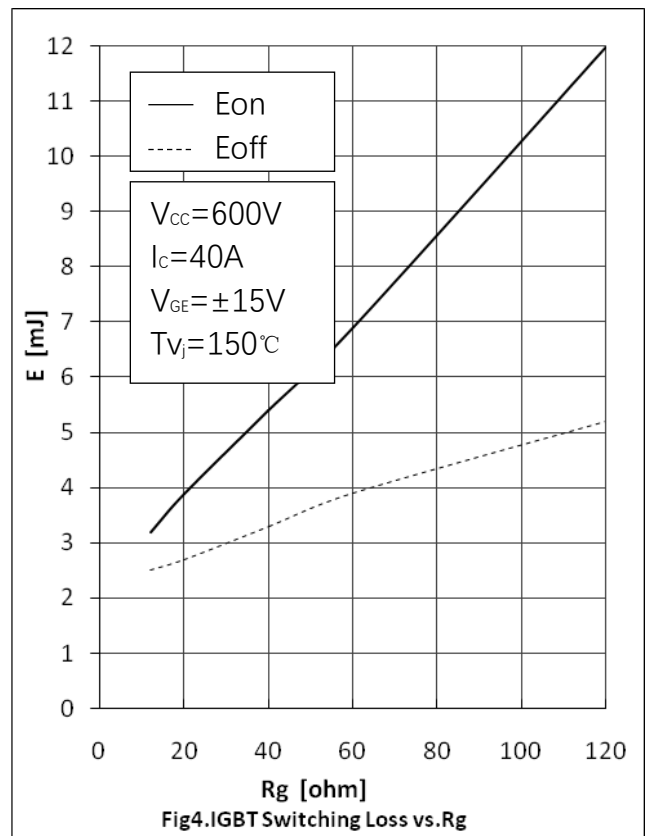
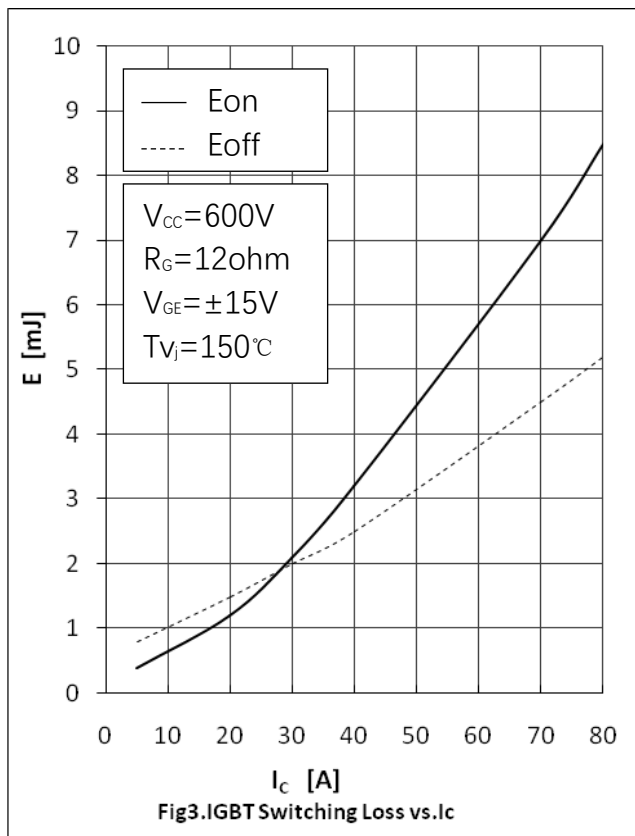
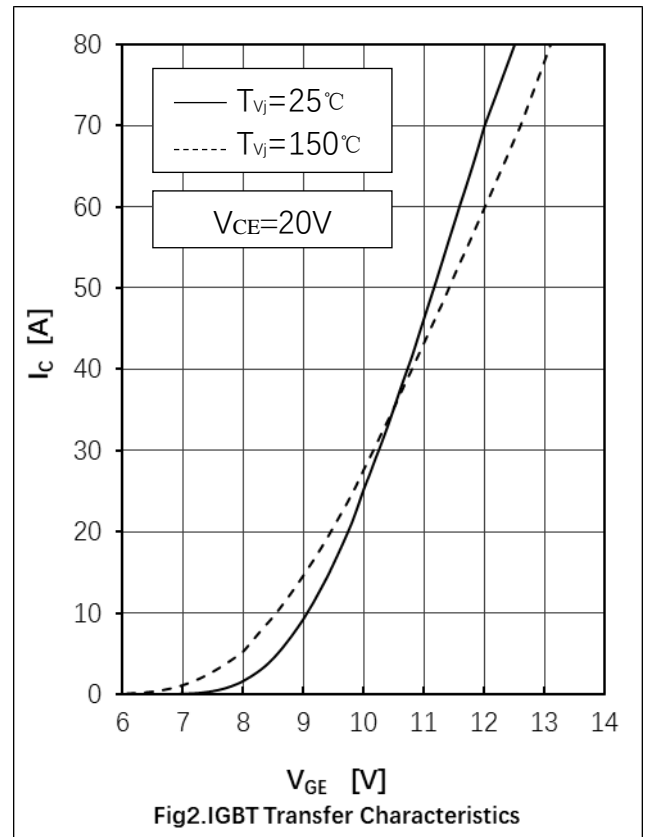
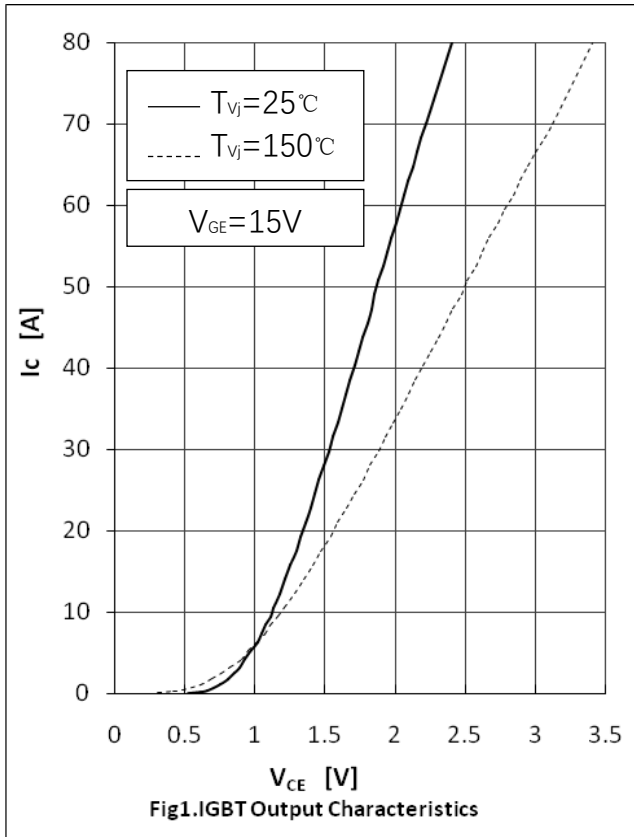


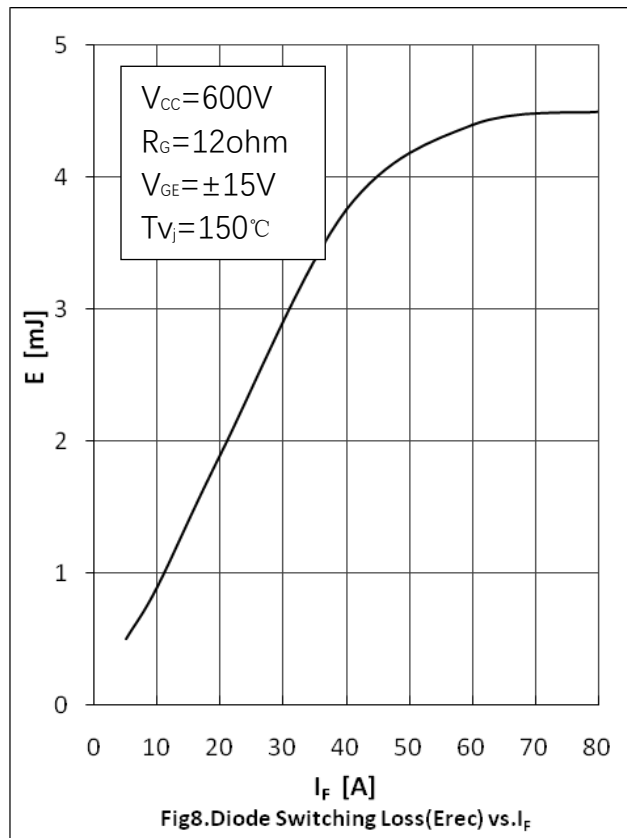
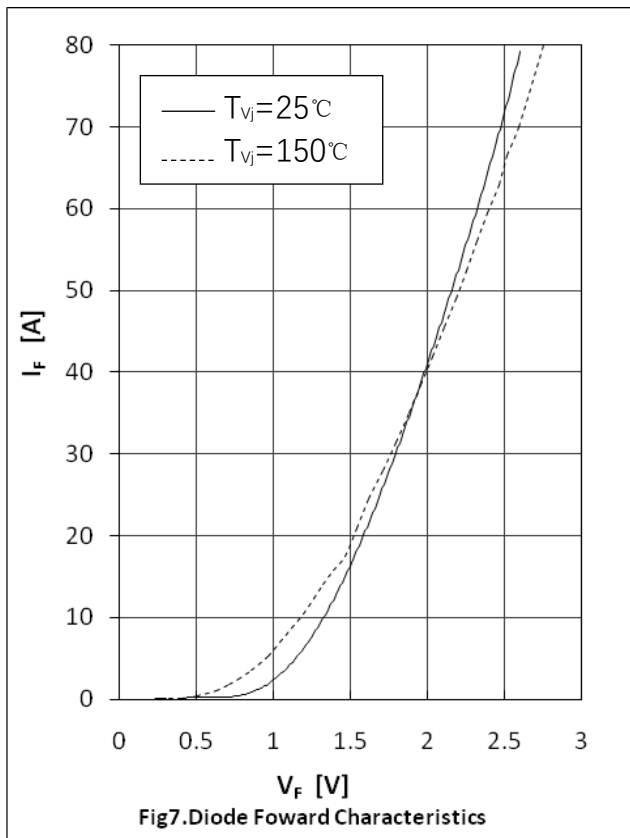
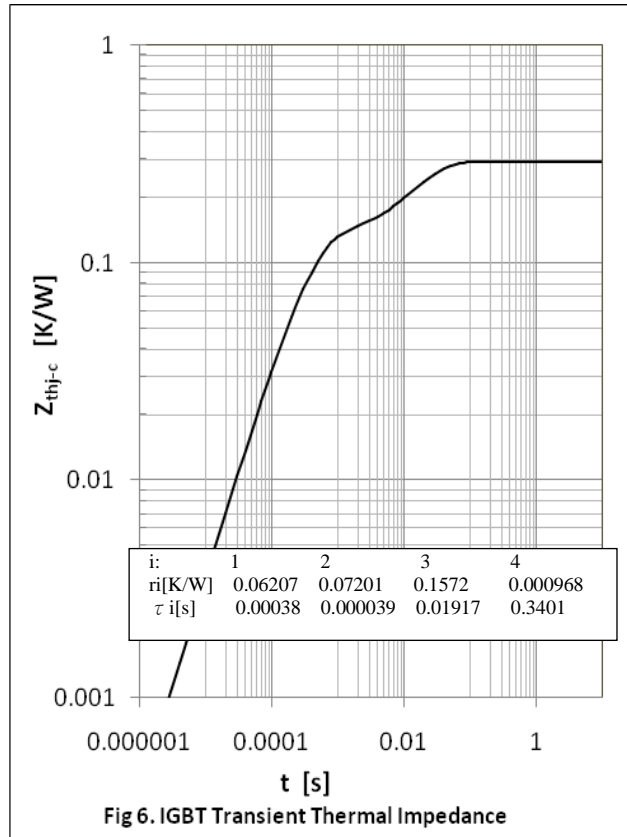
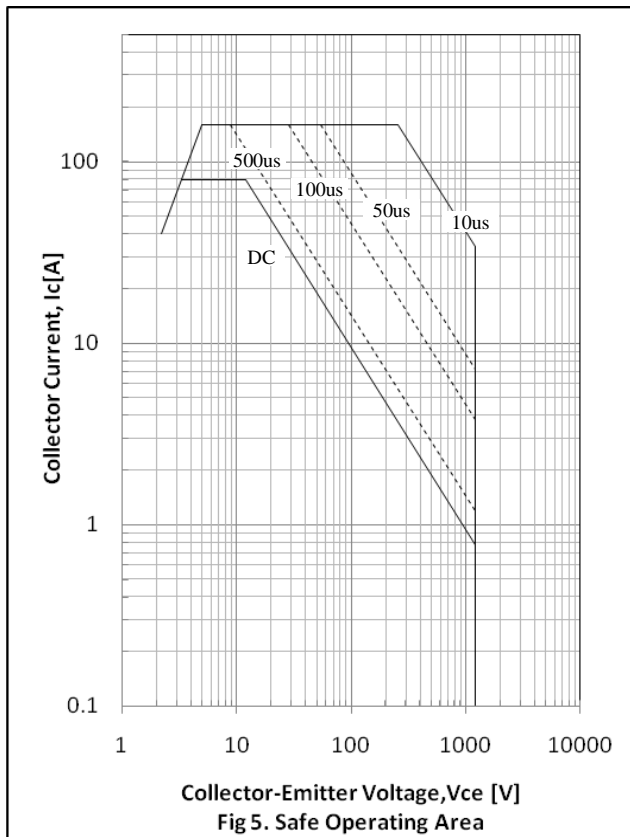
Electrical Characteristics of the DIODE

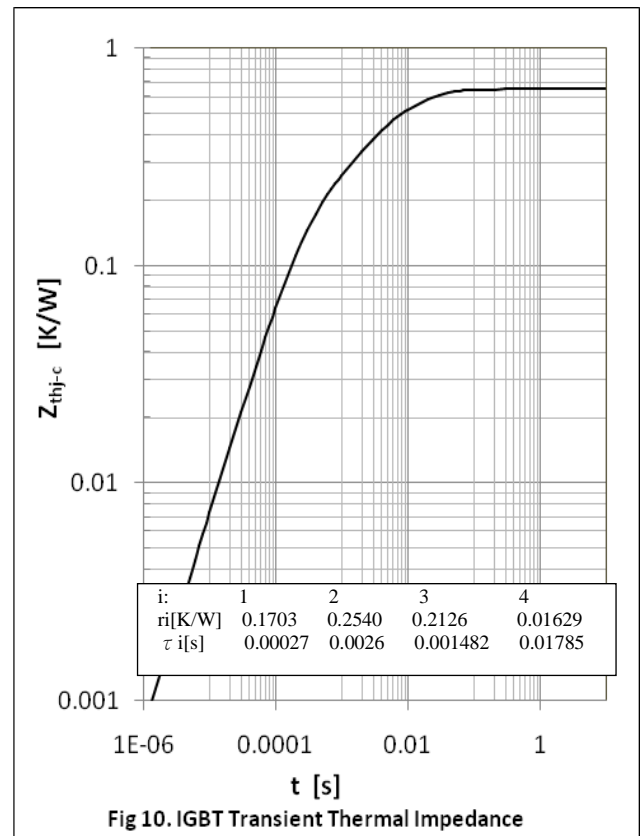
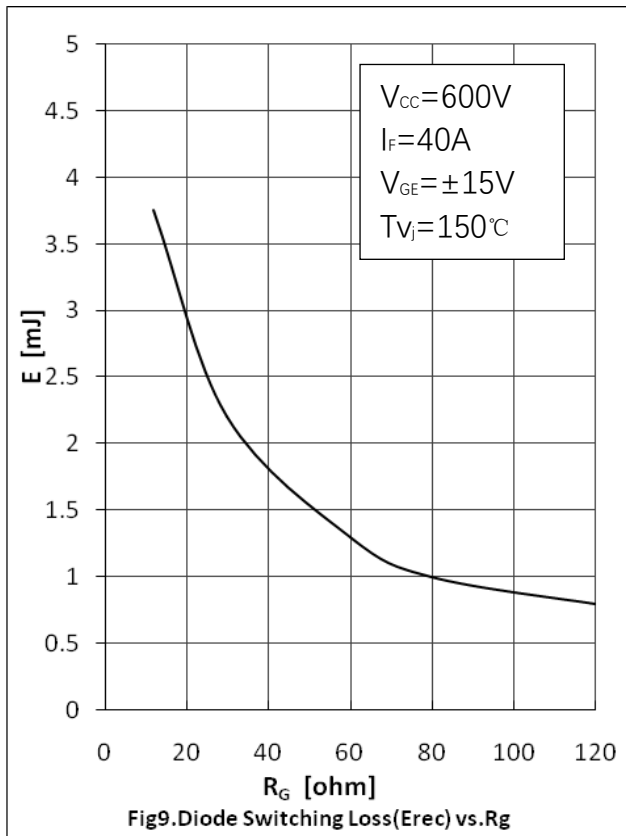
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Dynamic , at T_j= 25°C							
Reverse Recovery Current	I _{rr}	I _F =40A, V _R =600V, di/dt= -450A/μs,	-	13	-	A	
Diode reverse recovery time	trr				227	ns	
Reverse Recovery Charge	Q _{rr}			-	1.82	-	uC
Reverse Recovery Energy	E _{rec}			-	0.48		mJ
Dynamic , at T_j= 125°C							
Reverse Recovery Current	I _{rr}	I _F =40A, V _R =600V di/dt= -450A/μs,	-	16	-	A	
Diode reverse recovery time	trr				380	ns	
Reverse Recovery Charge	Q _{rr}			-	3.58	-	uC
Reverse Recovery Energy	E _{rec}			-	0.95		mJ
Dynamic , at T_j= 150°C							
Reverse Recovery Current	I _{rr}	I _F =40A, V _R =600V di/dt= -450A/μs,	-	17	-	A	
Diode reverse recovery time	trr				424	ns	
Reverse Recovery Charge	Q _{rr}			-	3.75	-	uC
Reverse Recovery Energy	E _{rec}			-	1.05		mJ

Thermal Resistance

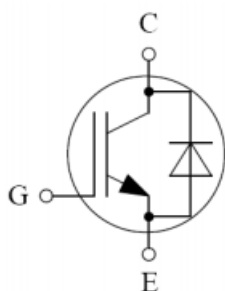
Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{θ(j-c)}	0.30	K/W
Diode Thermal Resistance, Junction - Case	R _{θ(j-c)}	0.65	K/W
Thermal Resistance, Junction - Ambient	R _{θ(j-a)}	40	K/W







● **Circuit Diagram**



● **Package Outline Information**

CASE: TO 247

