

IGBT Modules

V_{CE}	1200	V
I_C	40	A
$V_{CE(SAT)} I_C=40A$	1.90	V

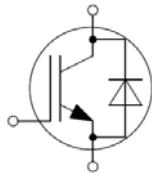
Applications

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

Features

- High breakdown voltage to 1200V for improved reliability
- Maximum junction temperature 175°C
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- High short circuit capability(10us)
- Isolated heatsink using DBC technology

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
Short Circuit Withstand Time, $V_{GE}=15V$, $V_{CC}=900V$, $V_{CEM} \leq 1200V$	T_{sc}	10	μs
Power Dissipation, $T_j=25^\circ C$	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}	$V_{GE}=0V, I_C=250\mu A$	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	5.1	5.8	6.4	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.90 2.20 2.30	2.30	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}	$V_{CE}=25V, V_{GE}=0V,$ $f=1\text{MHz}$	-	4.20	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.18	-	
Gate Charge	Q_G	$V_{CC}=960V, I_C=40A, V_{GE}=15V$	-	0.33	-	uC
Short Circuit Collector Current	I_{SC}	$V_{GE}=15V, t_{sc}\leq 10\mu s,$ $V_{CC}=900V, T_j\leq 150^\circ\text{C}$	-	140	-	A



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 = 40A T _J = 25°C, T _J = 125°C T _J = 150°C		1.90 1.90 1.85	2.40	V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_J= 25°C						
Turn-on Delay Time	t _{d(on)}	V _{CC} = 600V, I _C =40A, V _{GE} = -15V~15V, R _g =12Ω	-	45	-	ns
Rise Time	t _r		-	56	-	ns
Turn-on Energy	E _{on}		-	3.8	-	mJ
Turn-off Delay Time	t _{d(off)}		-	180	-	ns
Fall Time	t _f		-	80	-	ns
Turn-off Energy	E _{off}		-	1.7	-	mJ
Dynamic , at T_J= 125°C						
Turn-on Delay Time	t _{d(on)}	V _{CC} = 600V, I _C =40A, V _{GE} = -15V~15V, R _g =12Ω	-	50	-	ns
Rise Time	t _r		-	58	-	ns
Turn-on Energy	E _{on}		-	5.4	-	mJ
Turn-off Delay Time	t _{d(off)}		-	240	-	ns
Fall Time	t _f		-	85	-	ns
Turn-off Energy	E _{off}		-	2.7	-	mJ
Dynamic , at T_J= 150°C						
Turn-on Delay Time	t _{d(on)}	V _{CC} = 600V, I _C =40A, V _{GE} = -15V~15V, R _g =12Ω	-	53	-	ns
Rise Time	t _r		-	60	-	ns
Turn-on Energy	E _{on}		-	5.8	-	mJ
Turn-off Delay Time	t _{d(off)}		-	260	-	ns
Fall Time	t _f		-	90	-	ns
Turn-off Energy	E _{off}		-	3.0	-	mJ

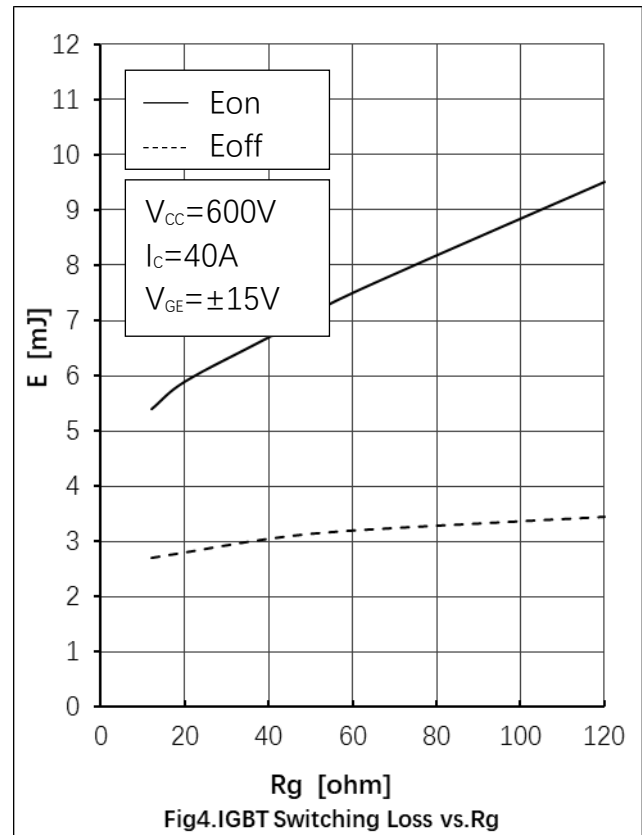
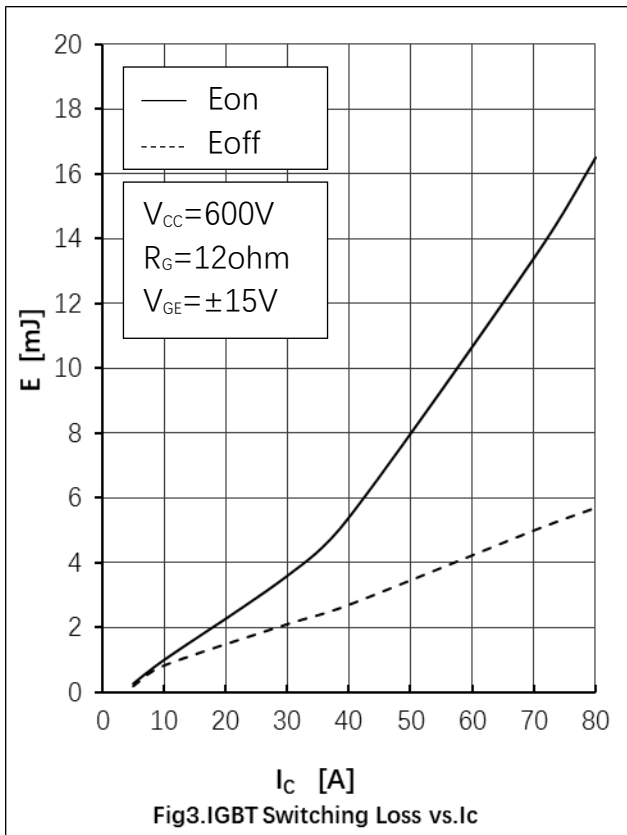
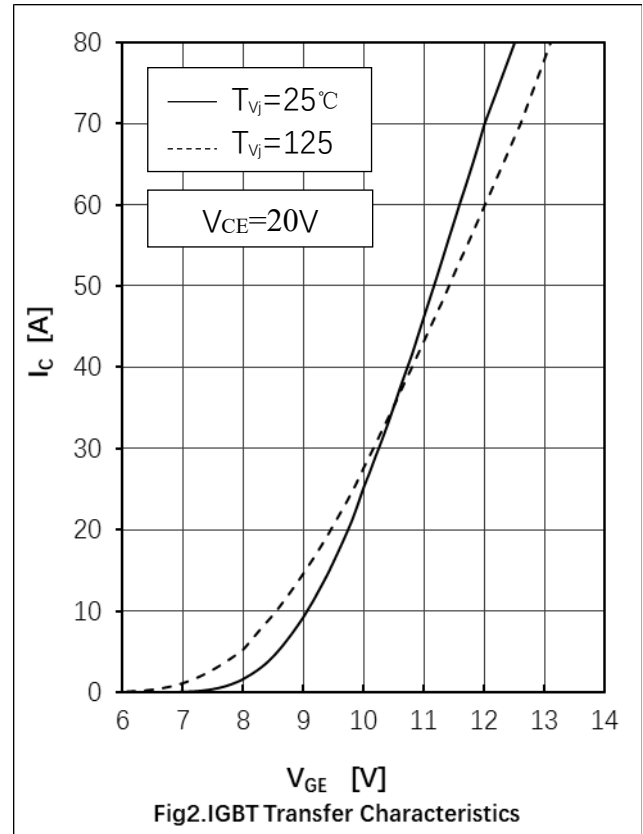
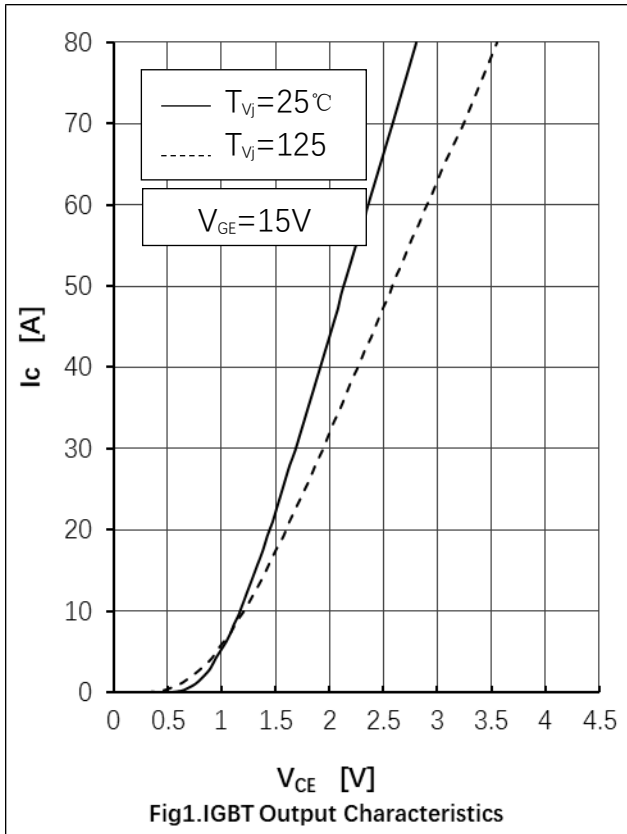


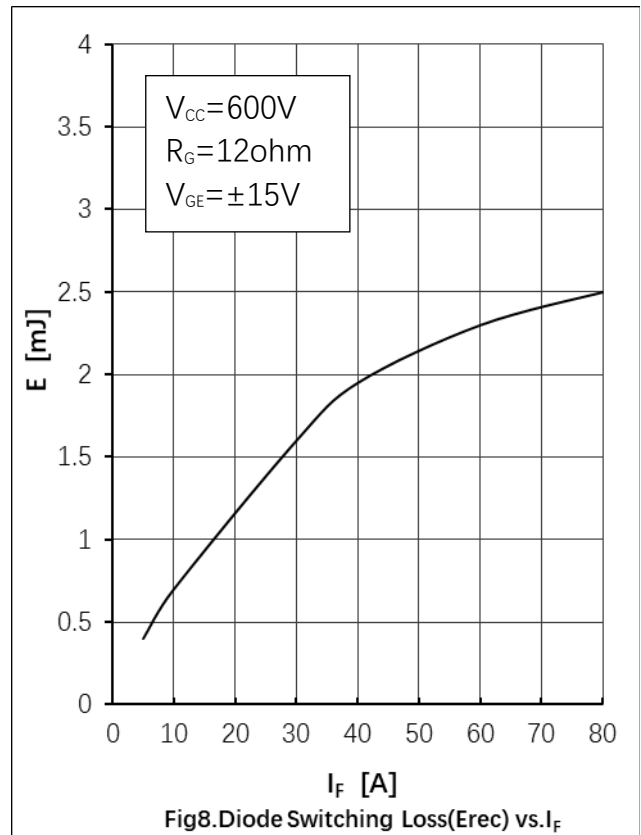
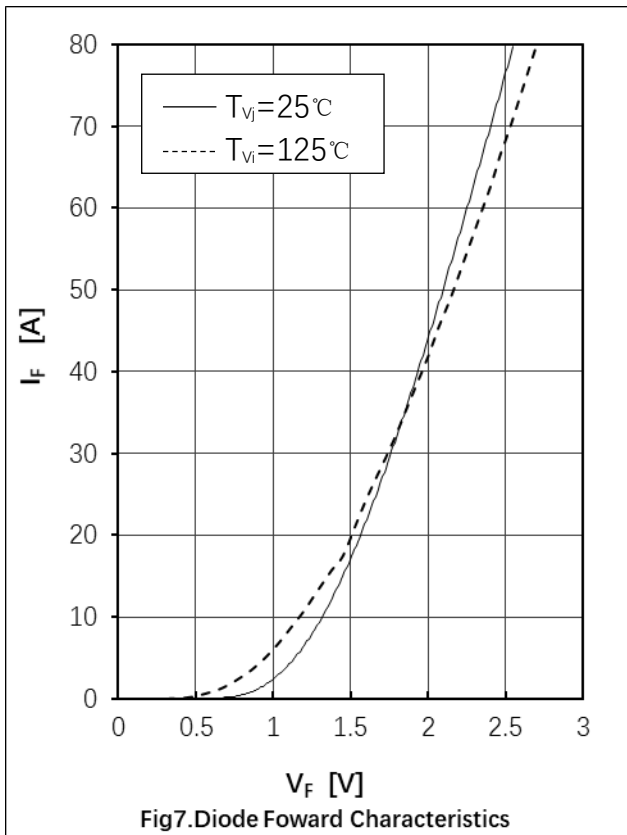
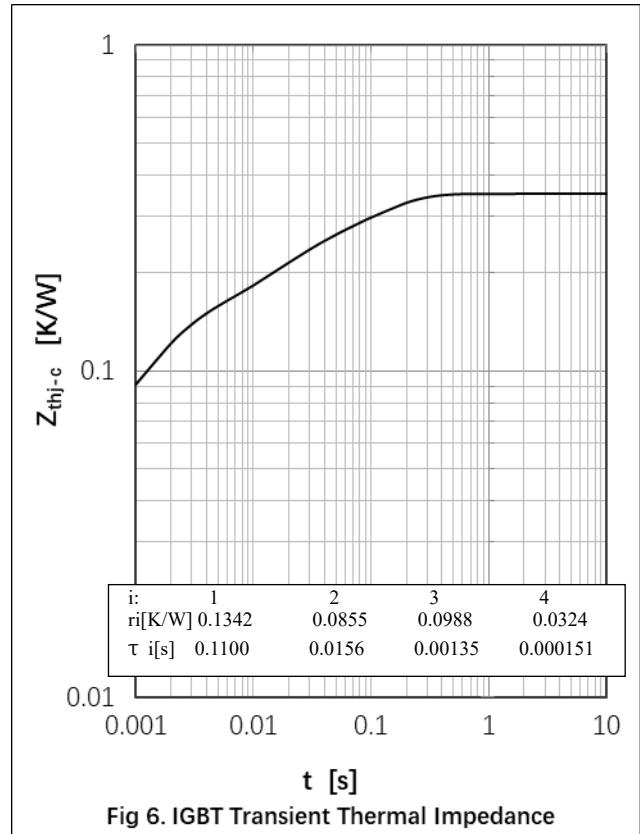
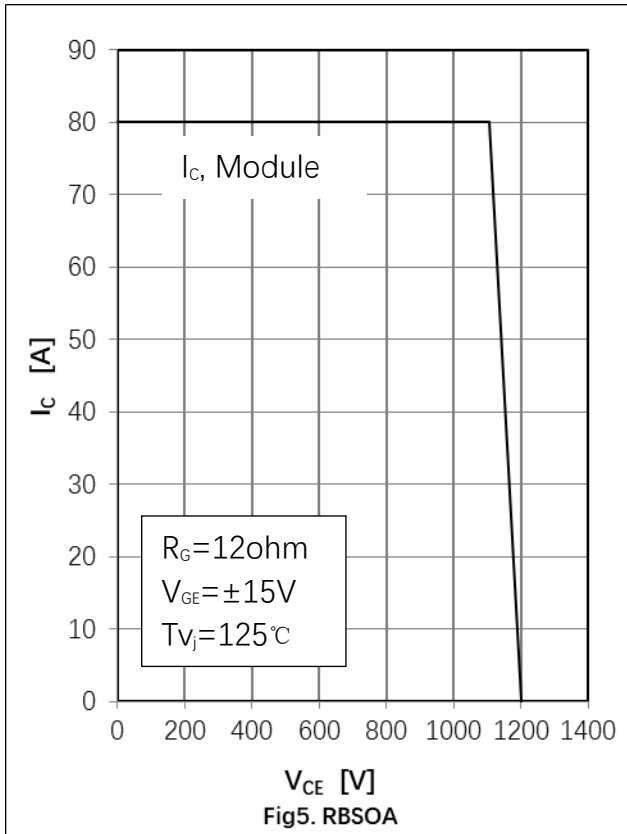
Electrical Characteristics of the Diode

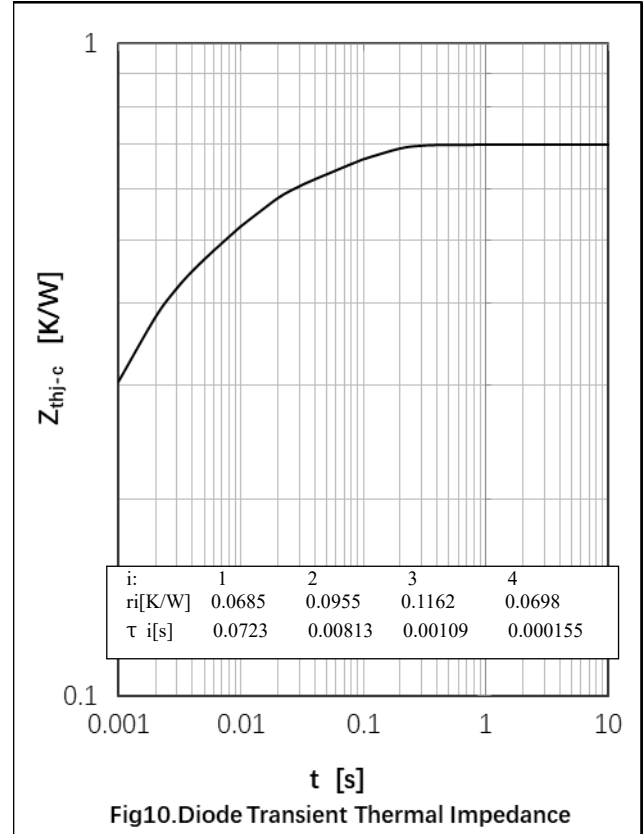
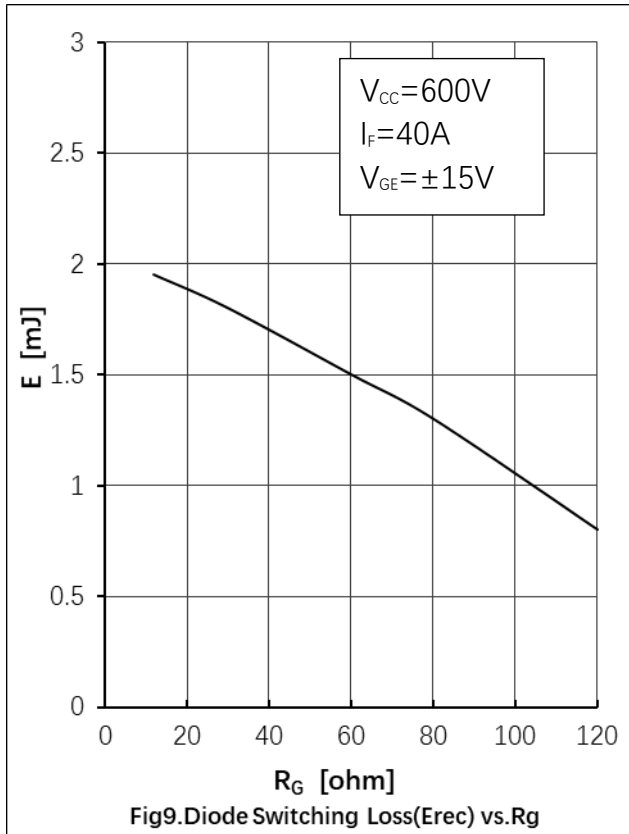
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25°C						
Diode Forward Voltage	V _{FM}	I _F = 40A	-	1.90	-	V
Reverse Recovery Current	I _{rr}	I _F =40A, V _R =600V, di/dt= -1800A/μs,	-	21	-	A
Reverse Recovery Charge	Q _{rr}		-	2.40	-	uC
Reverse Recovery Energy	E _{rec}		-	1.00	-	mJ
Dynamic , at T_j= 125°C						
Reverse Recovery Current	I _{rr}	I _F =40A, V _R =600V di/dt= -1800A/μs,	-	25	-	A
Reverse Recovery Charge	Q _{rr}		-	4.8	-	nC
Reverse Recovery Energy	E _{rec}		-	1.95	-	mJ
Dynamic , at T_j= 150°C						
Reverse Recovery Current	I _{rr}	I _F =40A, V _R =600V di/dt= -1800A/μs,	-	28	-	A
Reverse Recovery Charge	Q _{rr}		-	5.4	-	nC
Reverse Recovery Energy	E _{rec}		-	2.25	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{θ(j-c)}	0.35	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

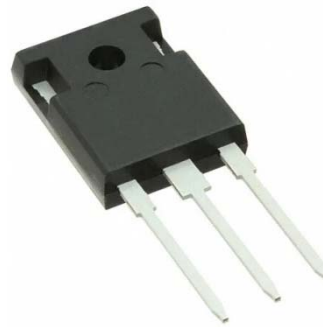
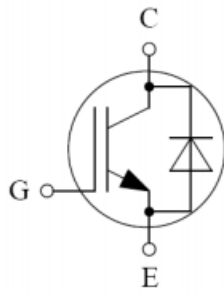








Circuit Diagram



Package Outline Information

CASE: TO-247

