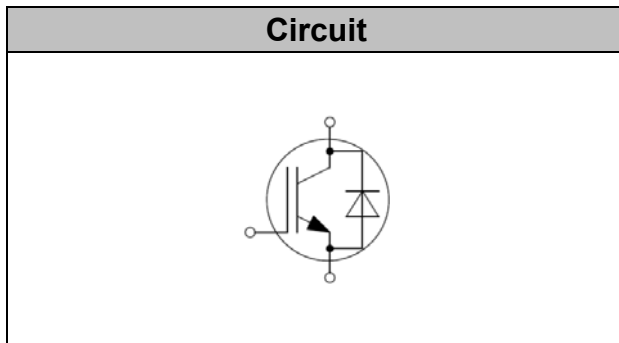




## IGBT Discrete

$V_{CE}$	1200	V
$I_C$	40	A
$V_{CE(SAT)} I_C=40A$	1.85	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)

## 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	$V_{GE}$	$\pm 20$	V
Transient Gate-Emitter Voltage ( $t_p \leq 10\mu s, D < 0.010$ )	$V_{GE}$	$\pm 30$	V
Turn off Safe Operating Area $V_{CE} \leq 1200V$ , $T_j \leq 150^\circ C$		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	$\mu s$
Power Dissipation, $T_j=175^\circ C, T_C=25^\circ C$	$P_{tot}$	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
<b>Static</b>						
Collector-Emitter Breakdown Voltage	$BV_{CES}$	$V_{GE}=0V, I_C=250\mu A$	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=1.0mA$	5.1	5.8	6.4	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j=25^\circ\text{C}$ , $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.85 2.20 2.30	2.30	V
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{CE}=1200V, V_{GE}=0V$ $T_j=25^\circ\text{C}$ , $T_j=150^\circ\text{C}$			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	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	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<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> = 40A T <sub>j</sub> = 25°C, T <sub>j</sub> = 125°C T <sub>j</sub> = 150°C		2.00 1.80 1.70		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> =40A, V <sub>GE</sub> = -15V~15V, R <sub>g</sub> =12Ω	-	45	-	ns
Rise Time	t <sub>r</sub>		-	56	-	ns
Turn-on Energy	E <sub>on</sub>		-	3.8	-	mJ
Turn-off Delay Time	t <sub>d(off)</sub>		-	180	-	ns
Fall Time	t <sub>f</sub>		-	80	-	ns
Turn-off Energy	E <sub>off</sub>		-	1.7	-	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> =40A, V <sub>GE</sub> = -15V~15V, R <sub>g</sub> =12Ω	-	50	-	ns
Rise Time	t <sub>r</sub>		-	58	-	ns
Turn-on Energy	E <sub>on</sub>		-	5.4	-	mJ
Turn-off Delay Time	t <sub>d(off)</sub>		-	240	-	ns
Fall Time	t <sub>f</sub>		-	85	-	ns
Turn-off Energy	E <sub>off</sub>		-	2.7	-	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> =40A, V <sub>GE</sub> = -15V~15V, R <sub>g</sub> =12Ω	-	53	-	ns
Rise Time	t <sub>r</sub>		-	60	-	ns
Turn-on Energy	E <sub>on</sub>		-	5.8	-	mJ
Turn-off Delay Time	t <sub>d(off)</sub>		-	260	-	ns
Fall Time	t <sub>f</sub>		-	90	-	ns
Turn-off Energy	E <sub>off</sub>		-	3.0	-	mJ

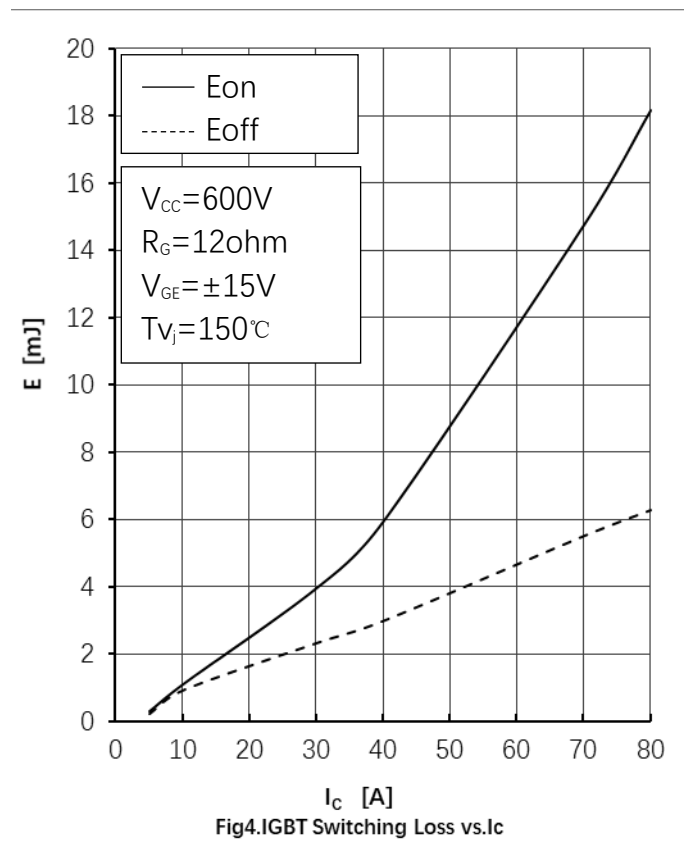
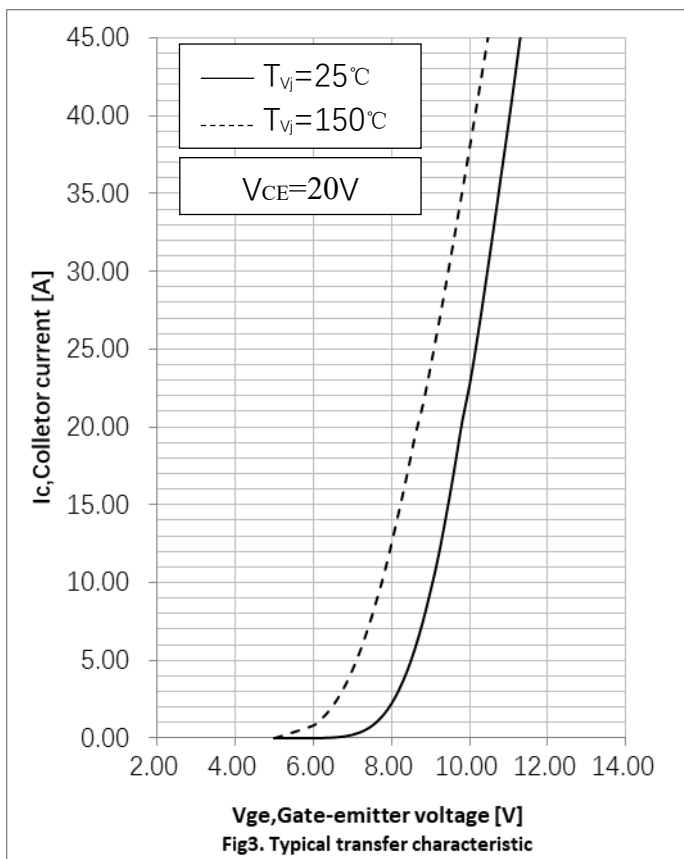
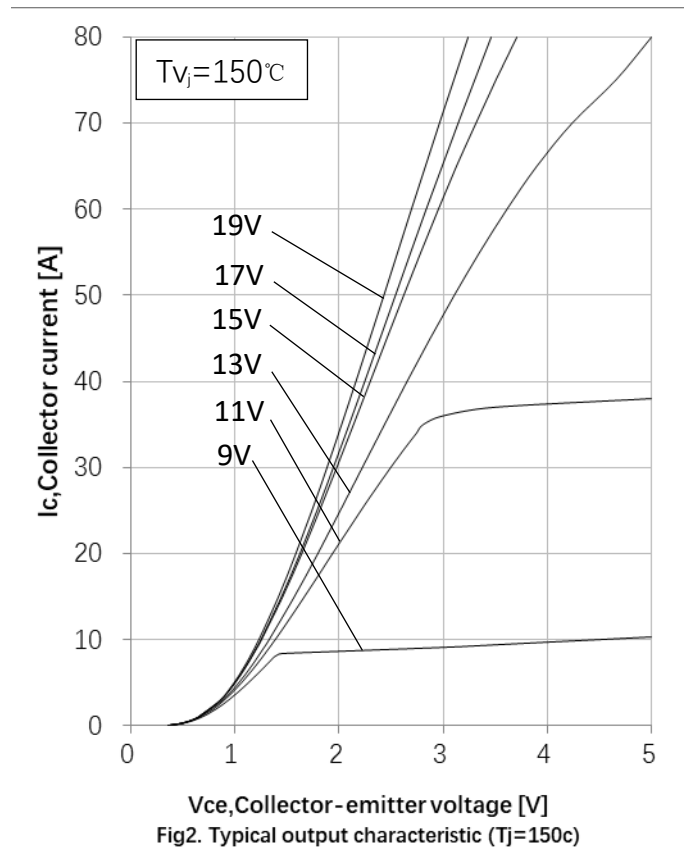
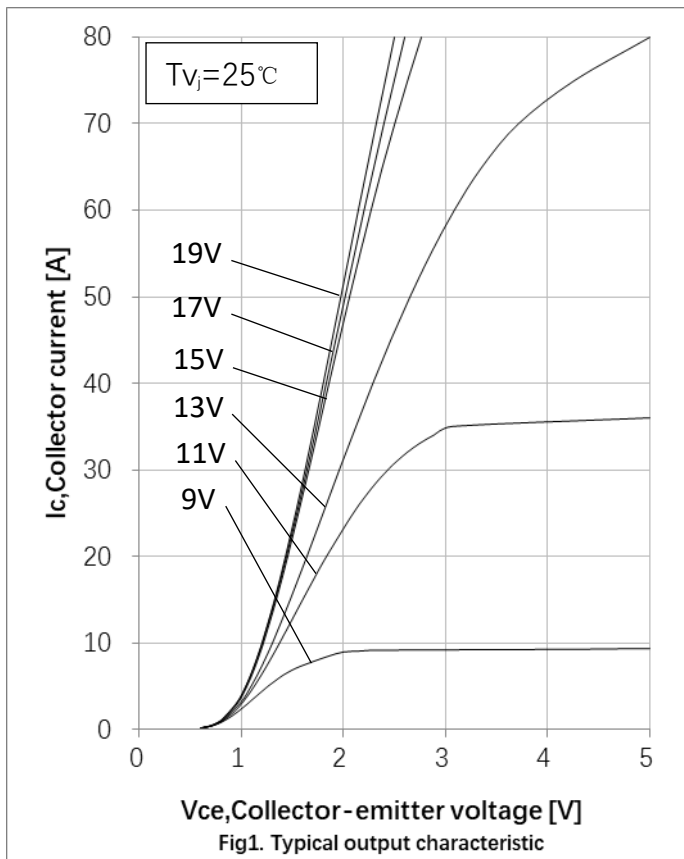


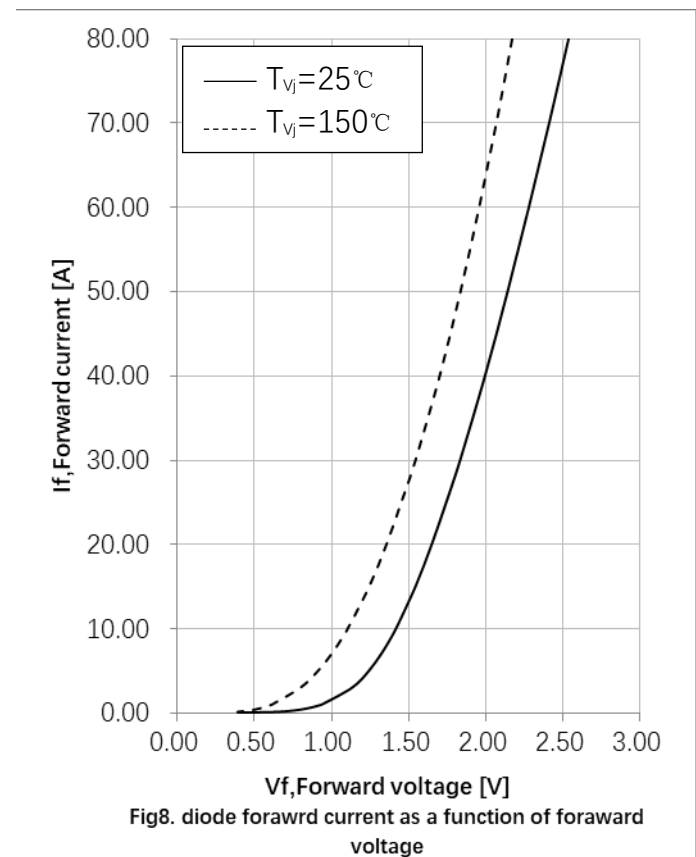
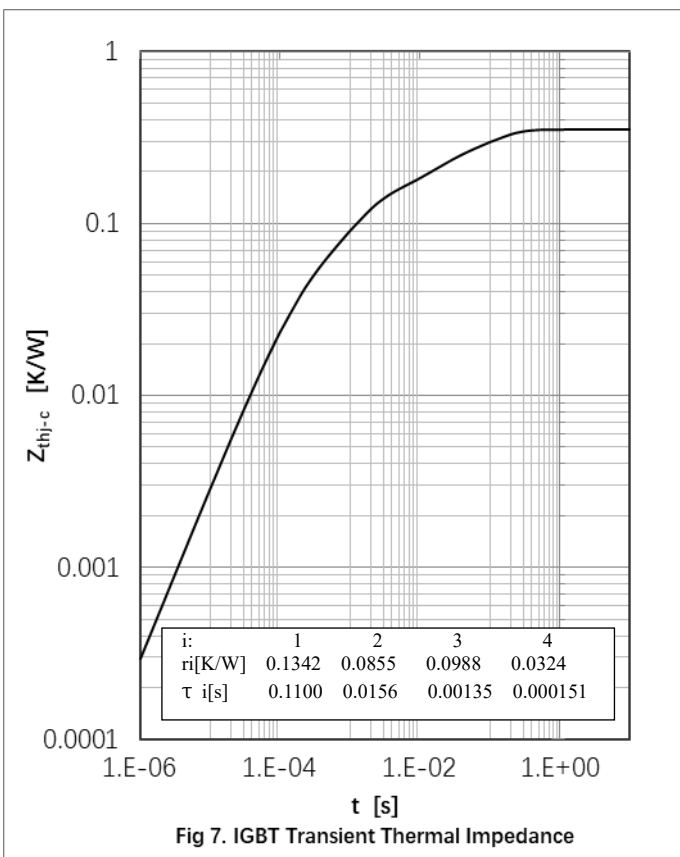
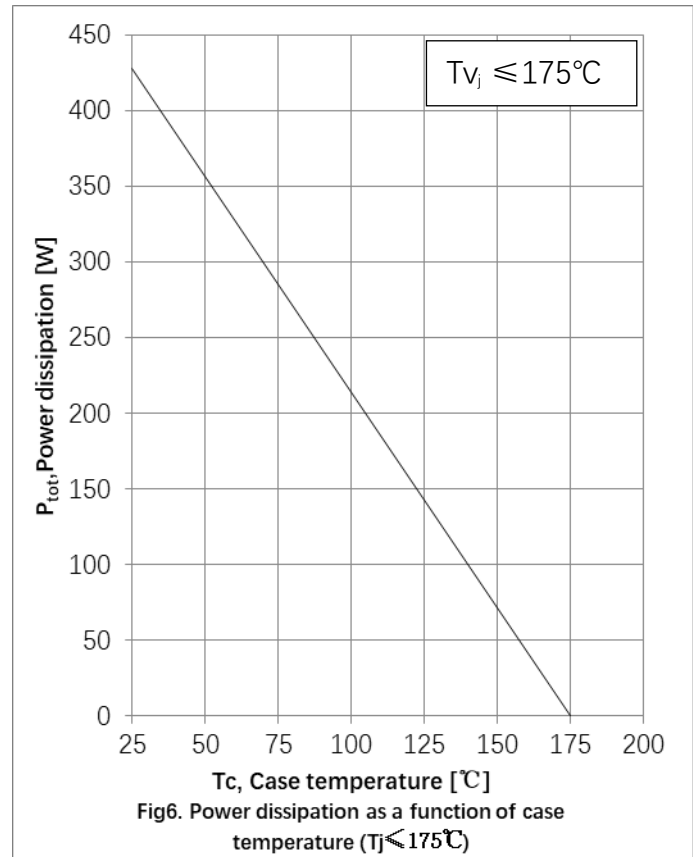
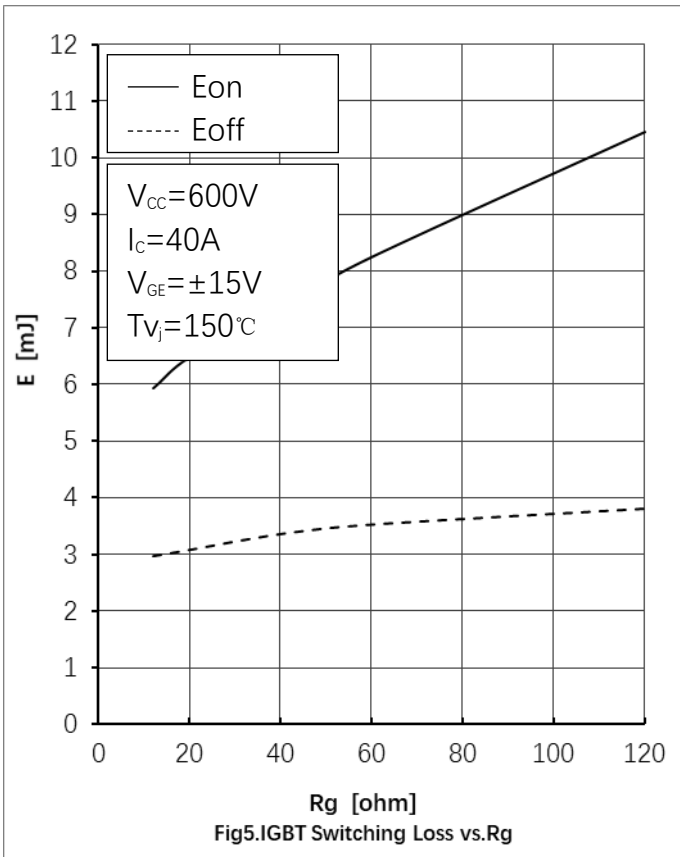
## Electrical Characteristics of the DIODE

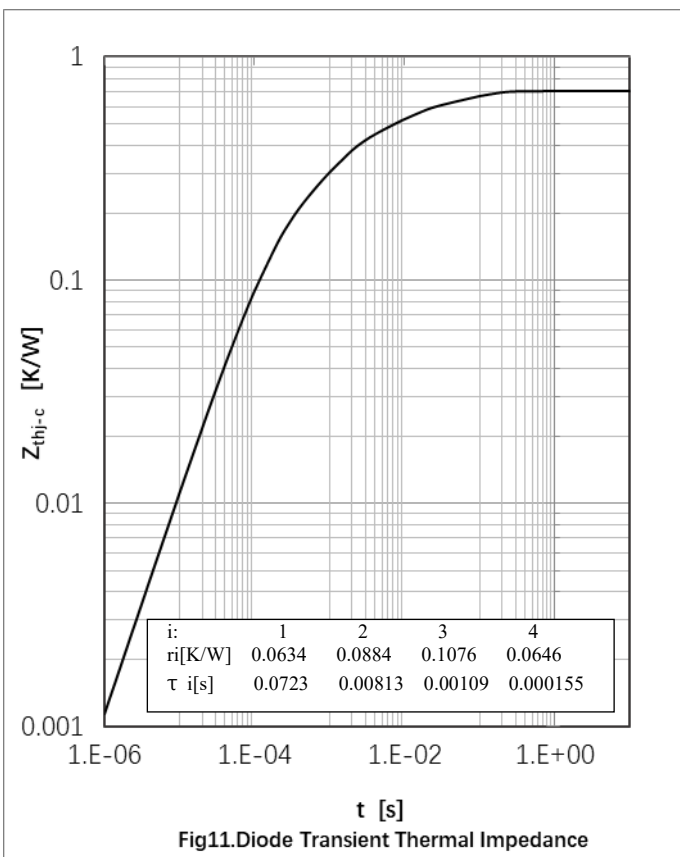
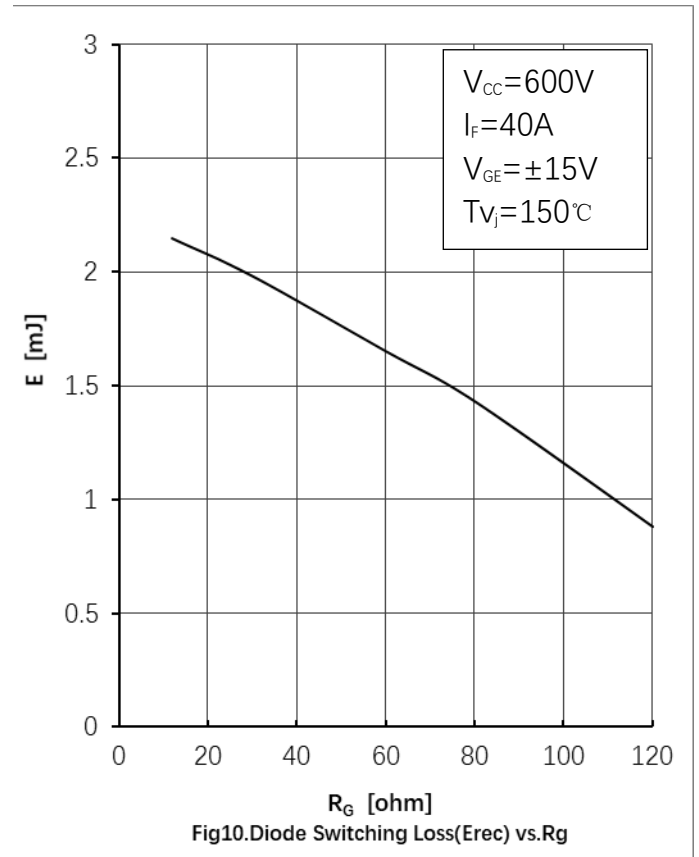
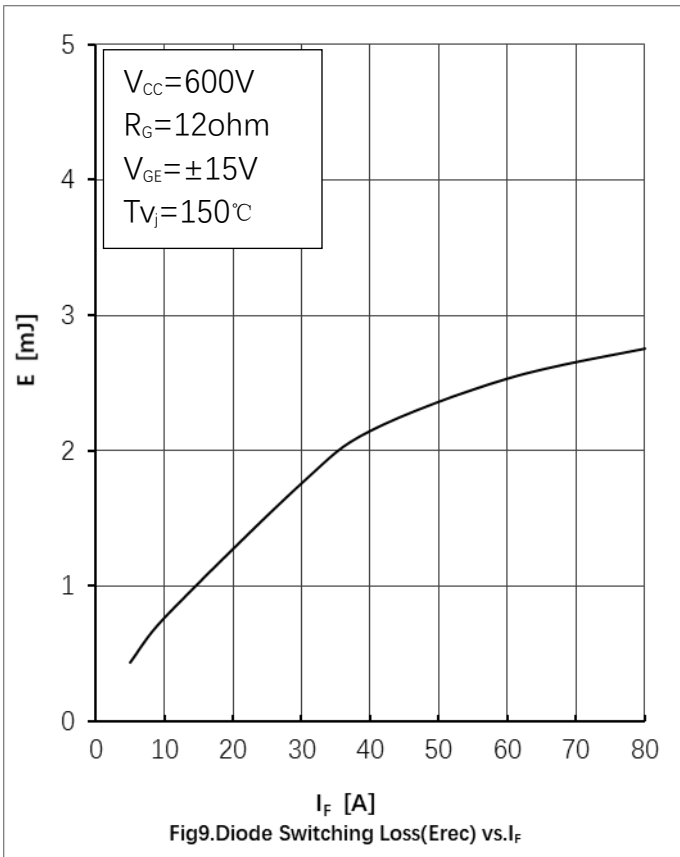
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Dynamic , at T<sub>j</sub>= 25°C</b>						
Diode Forward Voltage	V <sub>FM</sub>	I <sub>F</sub> = 40A	-	1.90	-	V
Reverse Recovery Current	I <sub>rr</sub>	I <sub>F</sub> =40A, V <sub>R</sub> =600V, di/dt= -1800A/μs,	-	21	-	A
Reverse Recovery Charge	Q <sub>rr</sub>		-	2.40	-	uC
Reverse Recovery Energy	E <sub>rec</sub>		-	1.00		mJ
<b>Dynamic , at T<sub>j</sub>= 125°C</b>						
Reverse Recovery Current	I <sub>rr</sub>	I <sub>F</sub> =40A, V <sub>R</sub> =600V di/dt= -1800A/μs,	-	25	-	A
Reverse Recovery Charge	Q <sub>rr</sub>		-	4.8	-	uC
Reverse Recovery Energy	E <sub>rec</sub>		-	1.95		mJ
<b>Dynamic , at T<sub>j</sub>= 150°C</b>						
Reverse Recovery Current	I <sub>rr</sub>	I <sub>F</sub> =40A, V <sub>R</sub> =600V di/dt= -1800A/μs,	-	28	-	A
Reverse Recovery Charge	Q <sub>rr</sub>		-	5.4	-	uC
Reverse Recovery Energy	E <sub>rec</sub>		-	2.25		mJ

## Thermal Resistance

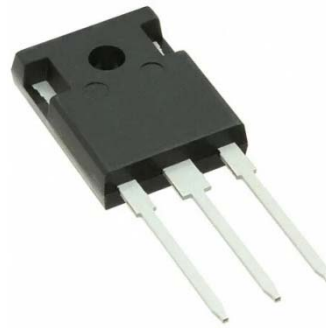
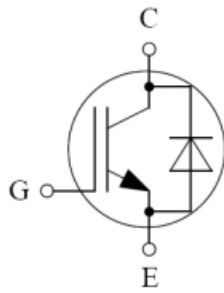
Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R <sub>th(j-c)</sub>	0.35	K/W
Diode Thermal Resistance, Junction - Case	R <sub>th(j-c)</sub>	0.65	K/W
Thermal Resistance, Junction - Ambient	R <sub>th(j-a)</sub>	40	K/W







● Circuit Diagram



● Package Outline Information

