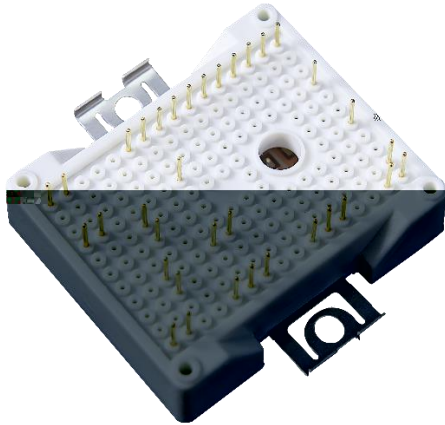




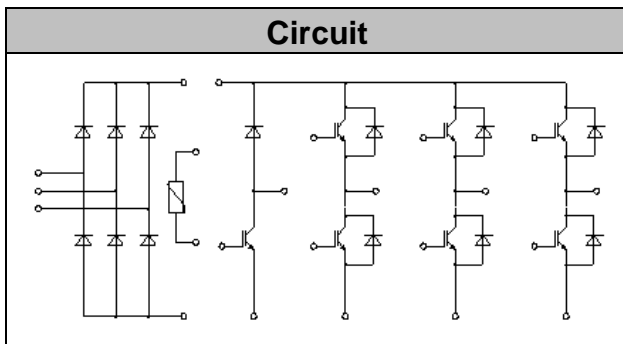
IGBT Modules



V _{CEs}	1200V
I _C	15A

Applications

Motor Drivers
AC and DC Servo Drive Amplifier
UPS (Uninterruptible Power Supplies)



Features

Low switching losses
Low V_{CE(sat)} with positive temperature coefficient
Including fast & soft recovery anti-parallel FWD
Low inductance case
High short circuit capability(10us)
Isolated heatsink using DBC technology
Maximum junction temperature 175

● IGBT- inverter

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V _{CEs}	V _{GE} =0V, I _C =1mA, T _{vj} =25	1200	V
Continuous Collector Current	I _C	T _C =100 v _{jmax} 175	15	A
Repetitive Peak Collector Current	I _{CRM}	t _p =1ms	30	A
Gate-Emitter Voltage	V _{GES}	T _{vj} =25	20	V
Total Power Dissipation	P _{tot}	T _C =25 T _{vjmax} =175	155	W

● IGBT- inverter

Characteristic values

Parameter	Symbol	Conditions	Value			Unit	
			Min.	Typ.	Max.		
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=0.5mA, T_{vj}=25$	5.2	5.8	6.4	V	
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25$			1.0	mA	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=15A, V_{GE}=15V, T_{vj}=25$		1.80	2.20	V	
		$I_C=15A, V_{GE}=15V, T_{vj}=125$		2.10			
		$I_C=15A, V_{GE}=15V, T_{vj}=150$		2.20			
Gate Charge	Q_G			0.15		uC	
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz, T_{vj}=25$		1.1		nF	
Reverse Transfer Capacitance	C_{res}			0.04		nF	
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25$			400	nA	
Turn-on Delay Time	$t_{d(on)}$	$I_C=15A, V_{CE}=600V, V_{GE}=\pm 15V, R_G=39, T_{vj}=25$		90		ns	
Rise Time	t_r			64		ns	
Turn-off Delay Time	$t_{d(off)}$			180		ns	
Fall Time	t_f			135		ns	
Energy Dissipation During Turn-on Time	E_{on}			1.42		mJ	
Energy Dissipation During Turn-off Time	E_{off}			0.78		mJ	
Turn-on Delay Time	$t_{d(on)}$		$I_C=15A, V_{CE}=600V, V_{GE}=\pm 15V, R_G=39, T_{vj}=125$		95		ns
Rise Time	t_r				70		ns
Turn-off Delay Time	$t_{d(off)}$				260		ns
Fall Time	t_f				180		ns
Energy Dissipation During Turn-on Time	E_{on}			1.85		mJ	
Energy Dissipation During Turn-off Time	E_{off}			1.13		mJ	
SC Data	I_{SC}	$t_p=10\mu s, V_{GE}=15V, T_{vj}=150, V_{CC}=900V, V_{CEM}=1200V$			90		A

● Diode-inverter

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25$	1200	V
Continuous DC Forward Current	I_F		15	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	30	A
I^2t -value	I^2t	$V_R=0V, t_p=10ms, T_{vj}=125$	16.0	A ² s
		$V_R=0V, t_p=10ms, T_{vj}=150$	14.0	

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=15A, T_{vj}=25$		2.00	2.65	V
		$I_F=15A, T_{vj}=125$		2.10		
		$I_F=15A, T_{vj}=150$		2.10		
Recovered Charge	Q_{rr}	$I_F=15A$		1.20		uC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $-di_F/dt=600A/us$		13.0		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=25$		0.37		mJ
Recovered Charge	Q_{rr}	$I_F=15A$		2.05		uC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $-di_F/dt=600A/us$		12.0		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=125$		0.68		mJ

IGBT-brake-chopper
Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	$V_{GE}=0V, I_C = 1mA, T_{vj}=25$	1200	V
Continuous Collector Current	I_C	$T_C=100$ v_{jmax} 175	15	A
Repetitive Peak Collector Current	I_{CRM}	$t_p=1ms$	30	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25$	20	V
Total Power Dissipation	P_{Tot}	$T_C=25$, $T_{vjmax}=175$	155	W

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit	
			Min.	Typ.	Max.		
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C = 0.5mA, T_{vj}=25$	5.2	5.8	6.4	V	
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25$			1.0	mA	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=15A, V_{GE}=15V, T_{vj}=25$		1.85	2.25	V	
		$I_C=15A, V_{GE}=15V, T_{vj}=125$		2.15			
		$I_C=15A, V_{GE}=15V, T_{vj}=150$		2.25			
Gate Charge	Q_G			0.09		uC	
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz, T_{vj}=25$		1.35		nF	
Reverse Transfer Capacitance	C_{res}			0.08		nF	
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25$			400	nA	
Turn-on Delay Time	$t_{d(on)}$	$I_C = 15A$ $V_{CE} = 600V$ $V_{GE} = \pm 15V$ $R_G = 39$ $T_{vj} = 25$		46		ns	
Rise Time	t_r			45		ns	
Turn-off Delay Time	$t_{d(off)}$				182		ns
Fall Time	t_f				168		ns
Energy Dissipation During Turn-on Time	E_{on}				0.92		mJ
Energy Dissipation During Turn-off Time	E_{off}				0.56		mJ



Turn

● Diode-rectifier

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25$	1600	V
Average output Current 50/60Hz, sine wave	$I_{F(AV)}$	$T_C=100$	20	A
Maximum RMS Current at Rectifier Output	I_{RMSM}	$T_C=100$	40	A
Surge Forward Current	I_{FSM}	$V_R=0V, t_p=10ms, T_{vj}=45$	270	A
I^2t -value	I^2t	$V_R=0V, t_p=10ms, T_{vj}=45$	360	A ² s

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_F	$I_F=15A, T_{vj}=150$		0.96		V
Reverse Current	I_R	$T_{vj}=150, V_R=1600V$			1.0	mA

● NTC-Thermistor

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	R_{25}			5.0		k
Deviation of R100	R/R	$T_C=100, R_{100}=493.3$	-5		5	%
Power Dissipation	P_{25}				20.0	mW
B-value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15 K))]$		3375		K



● Module Characteristics

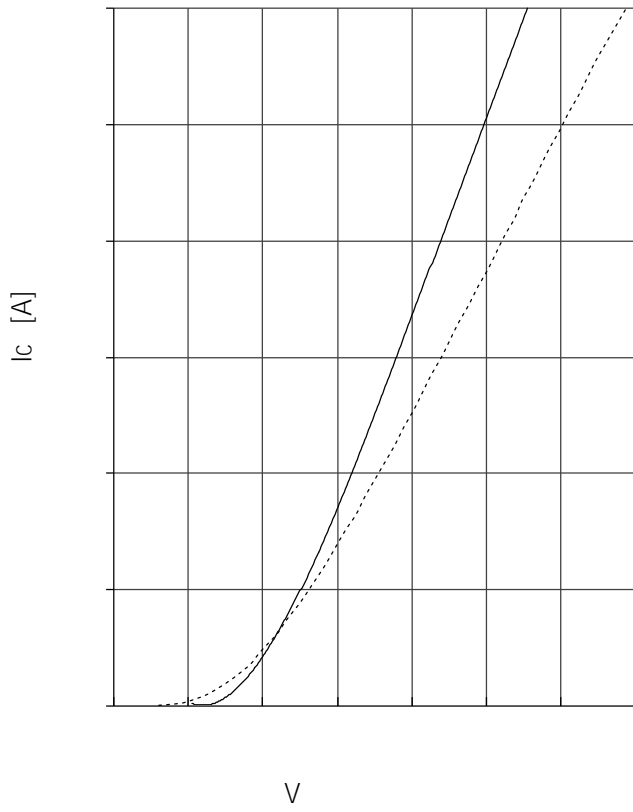
$T_C=25^\circ\text{C}$ unless otherwise specified

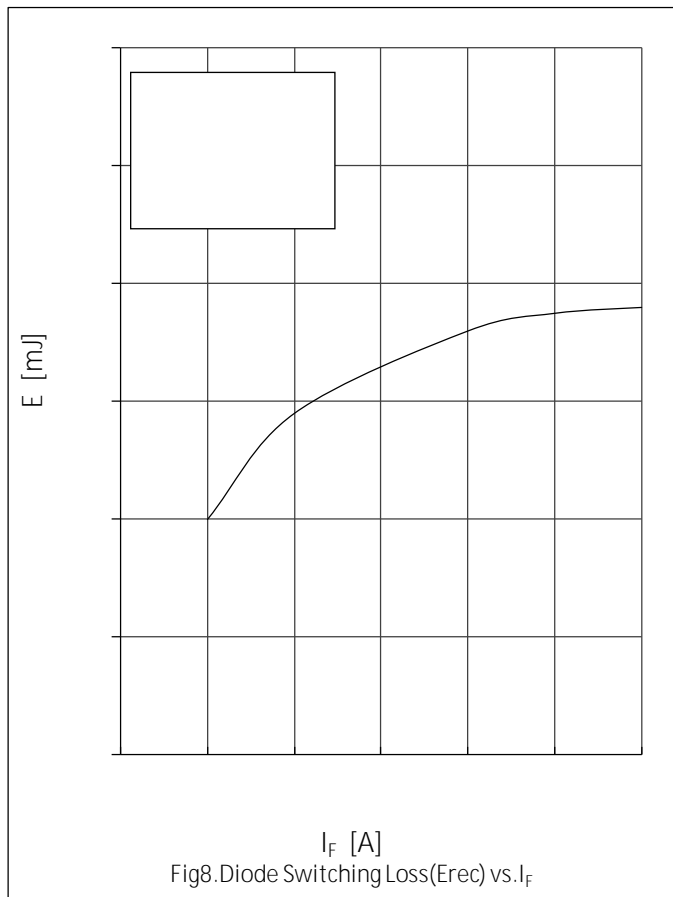
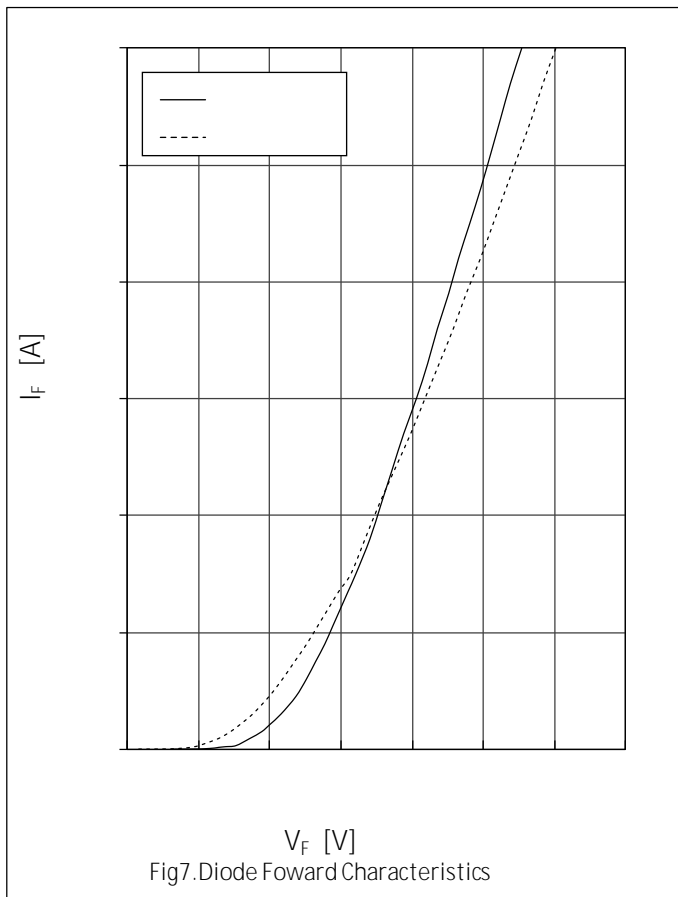
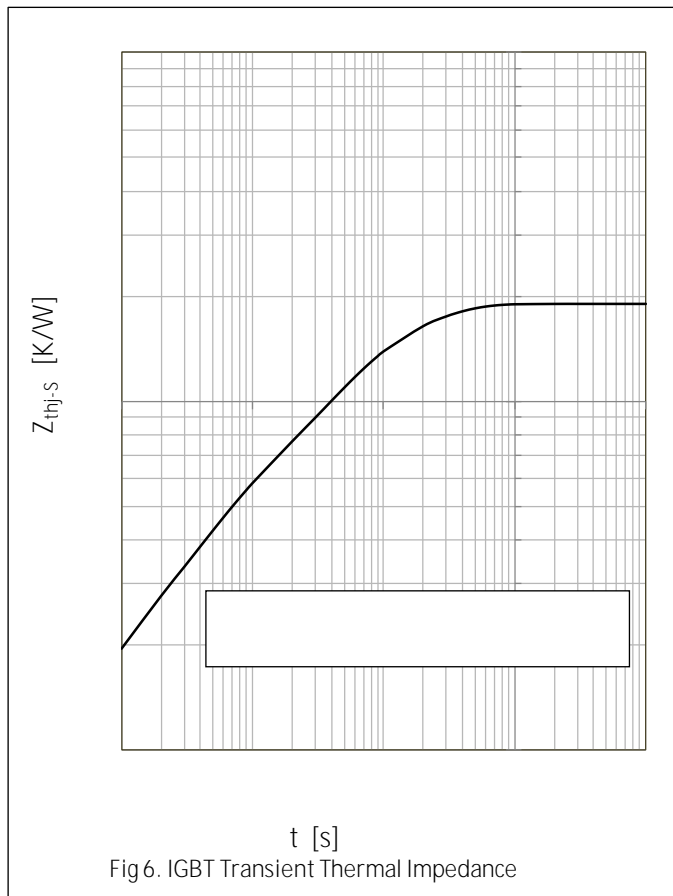
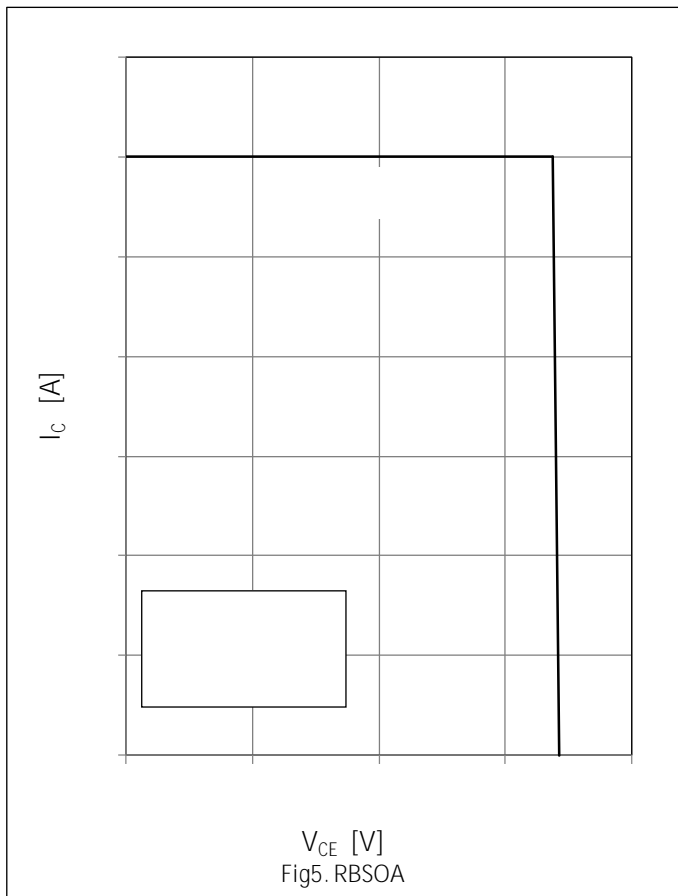
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation Voltage	V_{isol}	$t=1\text{min}, f=50\text{Hz}$	2500			V
Maximum Junction Temperature	T_{jmax}				175	
Operating Junction Temperature	T_{vjop}		-40		150	
Storage Temperature	T_{stg}		-40		125	
Stray-inductance-module	L_{SCE}			30		

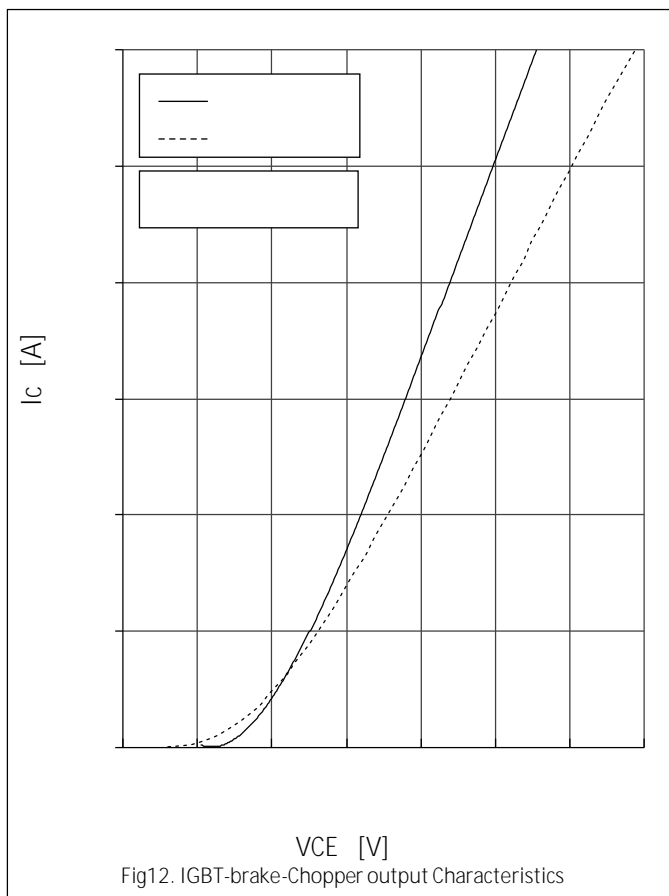
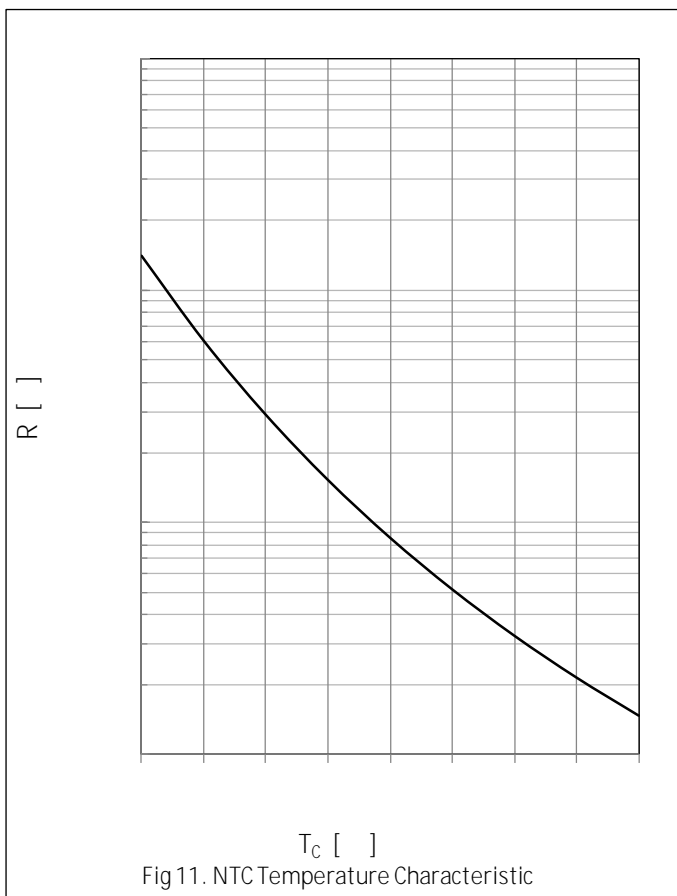
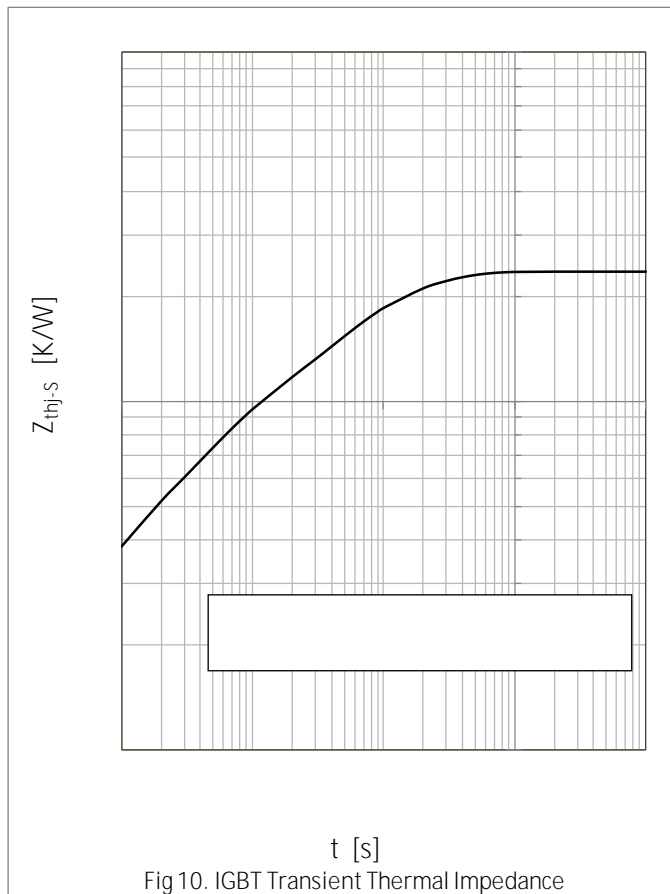
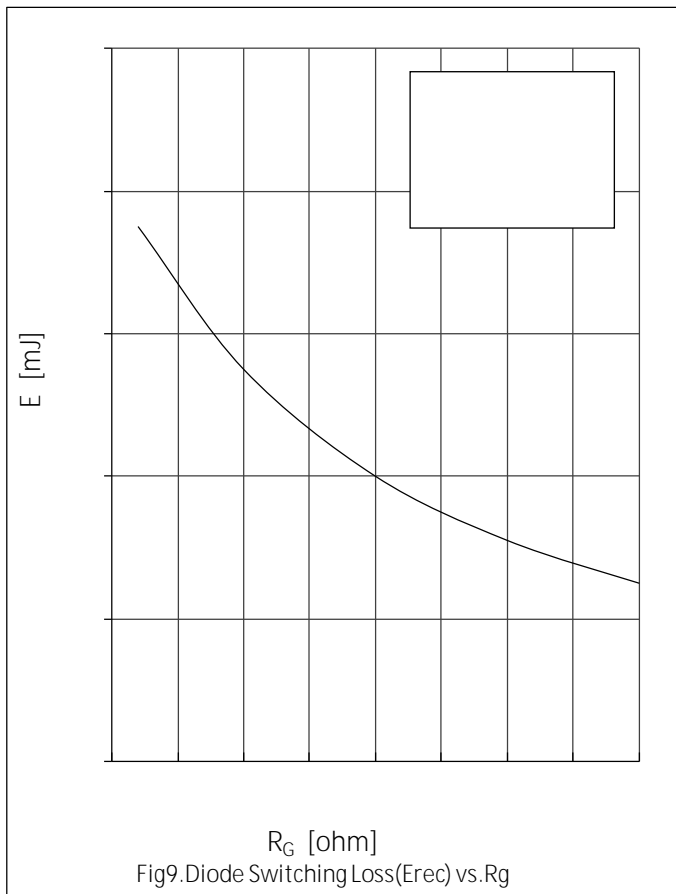
Module lead resistance,
terminals-chip

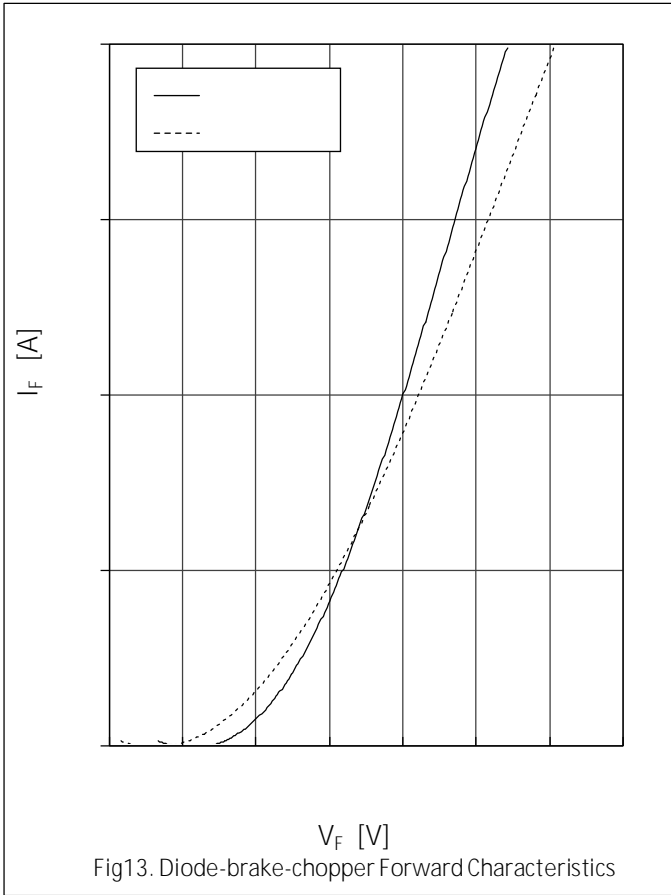
$R_{\text{CC}+\text{EE}}$

$T_C=25$











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