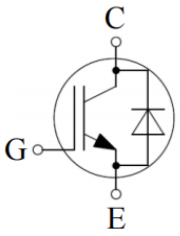
DGF15N65CTL0

RoHS COMPLIANT

IGBT Discrete

V_{CE}	650	V
I_C	15	A
$V_{CE(SAT)}$ I_C=15A	1.60	V

Circuit



Applications

- Soft switching applications
- Air conditioning
- Motor drive inverter

Features

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175℃
- Positive temperature coefficient
- High ruggedness, temperature stable

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	650	V
DC Collector Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_C	 30 15	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	 30 15	A
Continuous Gate-Emitter Voltage	V_{GE}	±20	V
Transient Gate-Emitter Voltage (tp≤10μs,D<0.010)	V_{GE}	±30	V
Turn off Safe Operating Area V_{CE}≤600V, T_j≤ 150°C		45	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	45	A
Short Circuit Withstand Time, VGE= 15V, VCE≤ 400V	Tsc	5	μs
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	45	A
Power Dissipation , Tj=175°C,Tc=25°C	P_{tot}	110	W

Operating Junction Temperature	T_j	-40...+175	℃
Storage Temperature	T_s	-55...+150	℃
Soldering Temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	℃

Electrical Characteristics of the IGBT（T_j= 25℃unless otherwise specified）:

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V, I_C=250μA	650		-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=1mA	5.0	5.8	6.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=15A T_j=25°C, T_j=125°C T_j=150°C		1.40 1.55 1.60	1.70	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 1.00	mA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}= 0V, V_{GE}= ± 20V			±200	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	V_{CE}= 25V, V_{GE}= 0V, f = 1MHz	-	0.88	-	nF
Output capacitance	C_{oes}		-	0.04	-	
Reverse Transfer Capacitance	C_{res}		-	0.01	-	
Gate Charge	Q_G	V_{CC}=300V,I_C=15A, V_{GE}=15V	-	0.069	-	uC
Short circuit collector current	$I_{C(SC)}$	V_{GE}=15V,t_{SC}≤5us V_{CC}=400V, $T_{j,start}$=25°C	-	110	-	A

Electrical Characteristics of the Diode（T_j= 25℃unless otherwise specified）:

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	I_F= 15A T_j= 25°C, T_j= 125°C T_j= 150°C		1.90 1.70 1.60	2.40	V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25℃						
Turn-on Delay Time	$t_{d(on)}$	T_j=25°C V_{CC}= 300V, I_C=15A, V_{GE}=-5V~15V, Rg=51Ω	-	10	-	ns
Rise Time	t_r		-	28	-	ns
Turn-on Energy	E_{on}		-	0.33	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	68	-	ns
Fall Time	t_f		-	138	-	ns
Turn-off Energy	E_{off}		-	0.16	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	T_j=125°C V_{CC}= 300V, I_C=15A, V_{GE}=-5V~15V, Rg=51Ω	-	14	-	ns
Rise Time	t_r		-	36	-	ns
Turn-on Energy	E_{on}		-	0.38	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	69	-	ns
Fall Time	t_f		-	161	-	ns
Turn-off Energy	E_{off}		-	0.27	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	T_j=150°C V_{CC}= 300V, I_C=15A, V_{GE}=-5V~15V, Rg=51Ω	-	16	-	ns
Rise Time	t_r		-	43	-	ns
Turn-on Energy	E_{on}		-	0.43	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	69	-	ns
Fall Time	t_f		-	182	-	ns
Turn-off Energy	E_{off}		-	0.32	-	mJ

Electrical Characteristics of the DIODE

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25℃						
Reverse Recovery Current	I_{rr}	I_F=15A, V_R=300V, -di/dt= 460A/μs,	-	9	-	A
Reverse Recovery Charge	Q_{rr}		-	0.17	-	uC
Reverse Recovery Energy	Erec		-	0.05	-	mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=15A, V_R=300V, -di/dt= 460A/μs,	-	12	-	A
Reverse Recovery Charge	Q_{rr}		-	0.65	-	uC
Reverse Recovery Energy	Erec		-	0.22	-	mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=15A, V_R=300V, -di/dt= 460A/μs,	-	14	-	A
Reverse Recovery Charge	Q_{rr}		-	0.82	-	uC
Reverse Recovery Energy	Erec		-	0.25	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	4.4	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	4.8	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	60	K/W

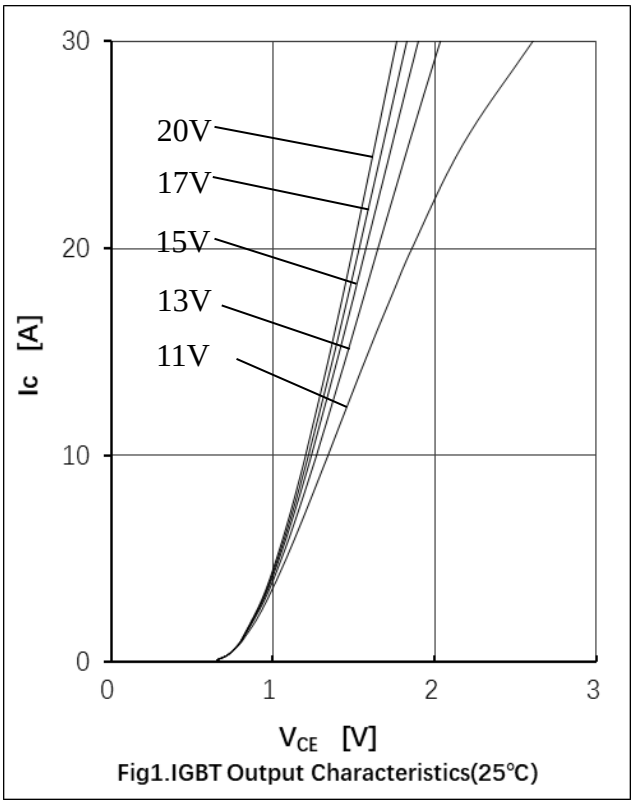


Fig1.IGBT Output Characteristics(25℃)

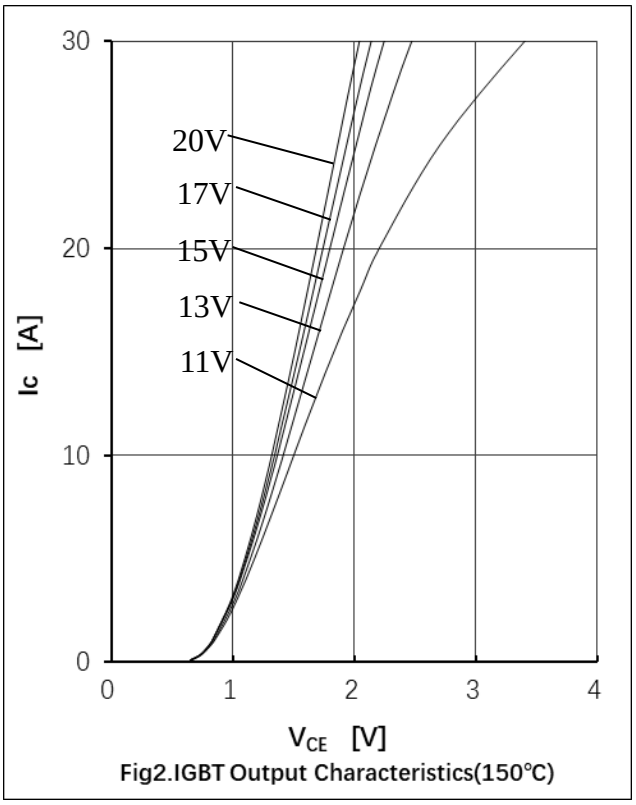


Fig2.IGBT Output Characteristics(150℃)

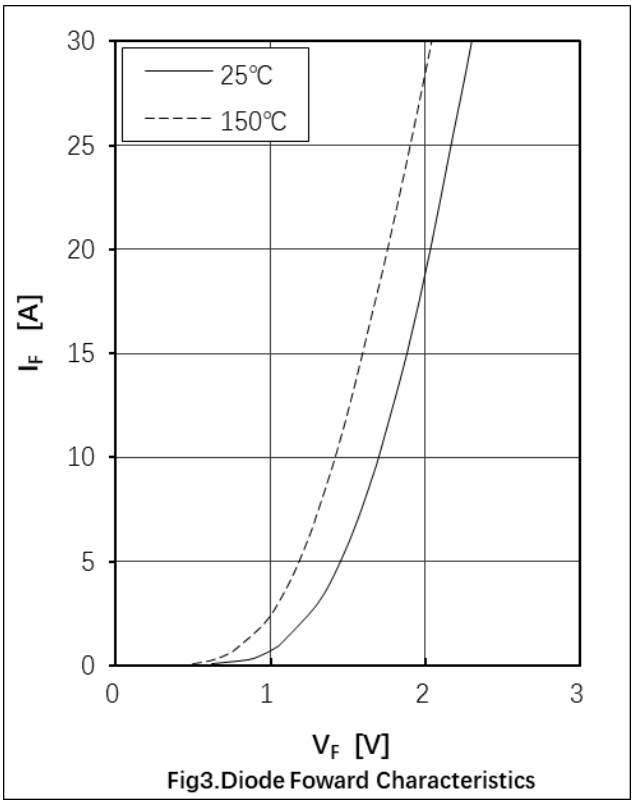


Fig3.Diode Foward Characteristics

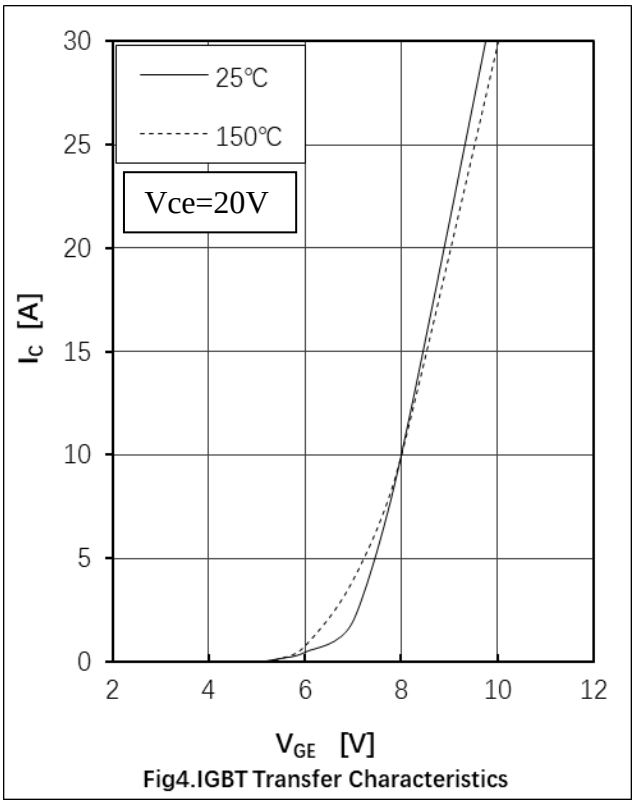


Fig4.IGBT Transfer Characteristics

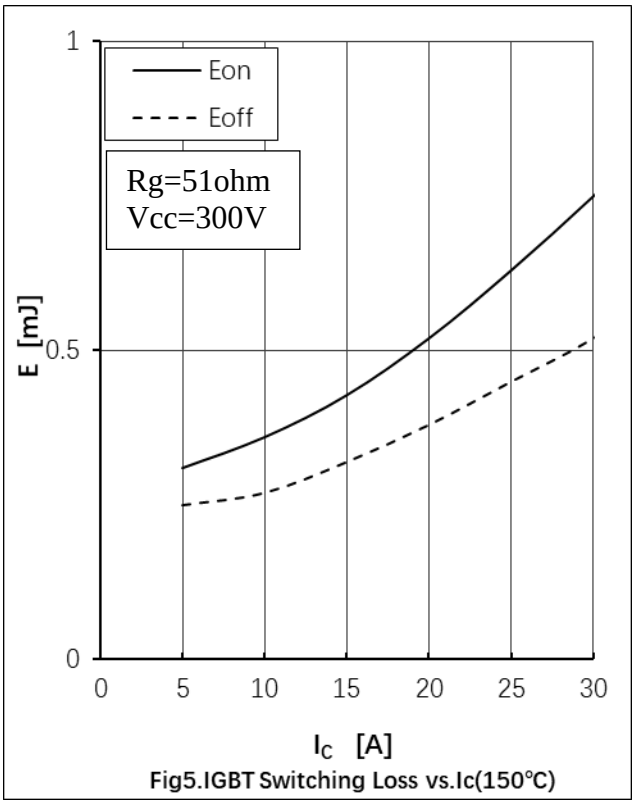


Fig5.IGBT Switching Loss vs.Ic(150℃)

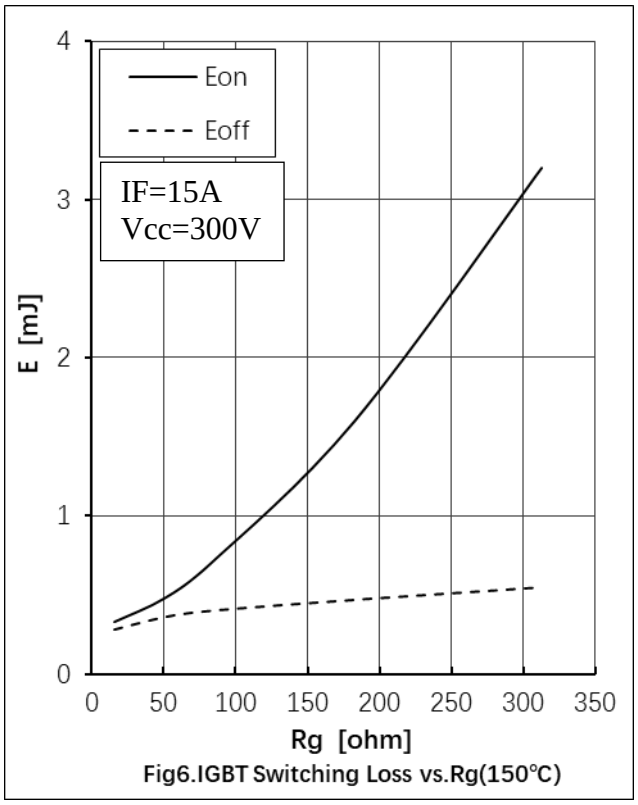


Fig6.IGBT Switching Loss vs.Rg(150℃)

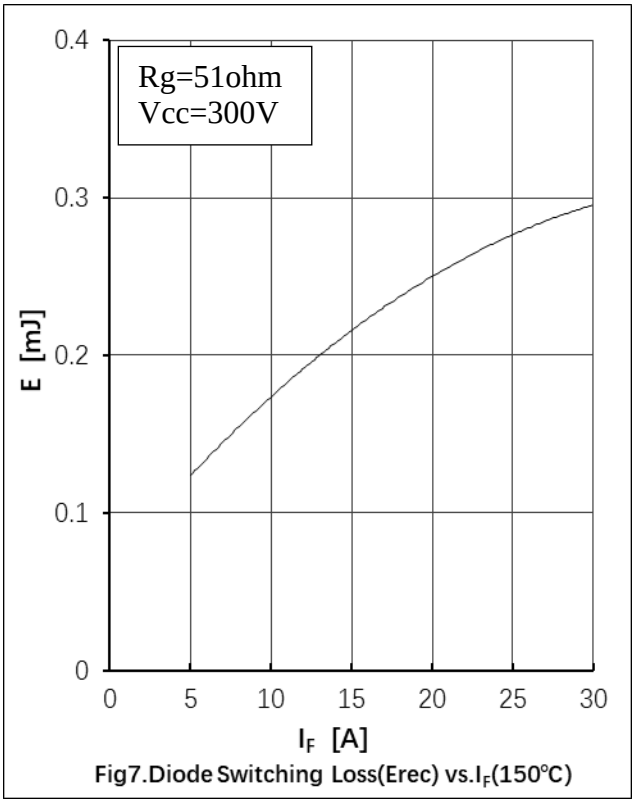


Fig7.Diode Switching Loss(Erec) vs.I_F(150℃)

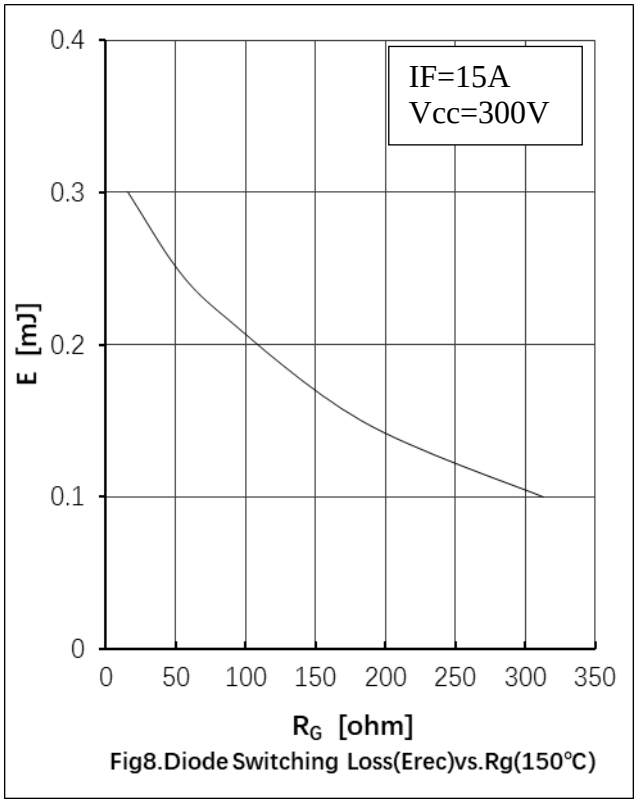


Fig8.Diode Switching Loss(Erec)vs.Rg(150℃)

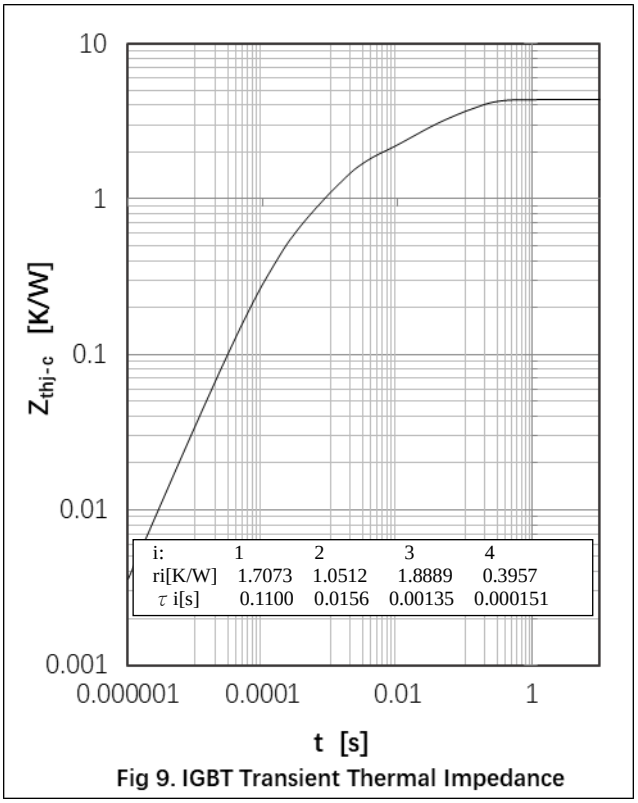


Fig 9. IGBT Transient Thermal Impedance

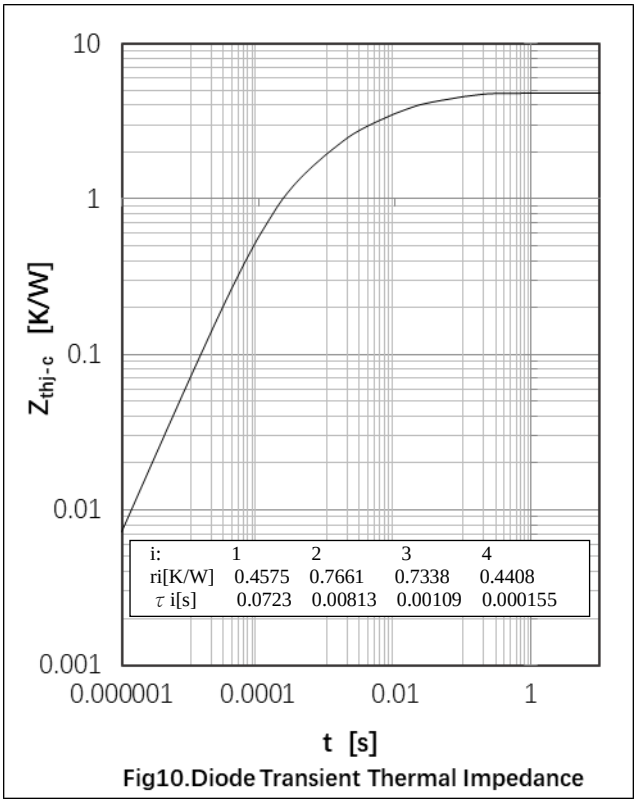
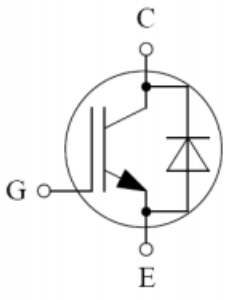


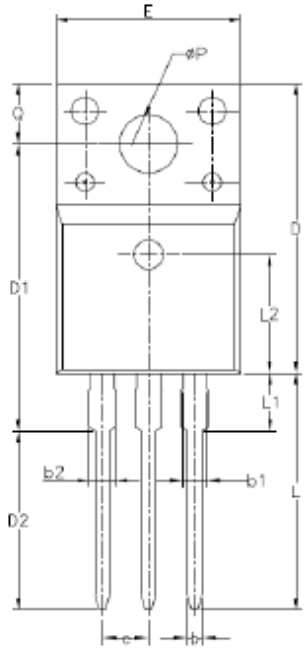
Fig10.Diode Transient Thermal Impedance

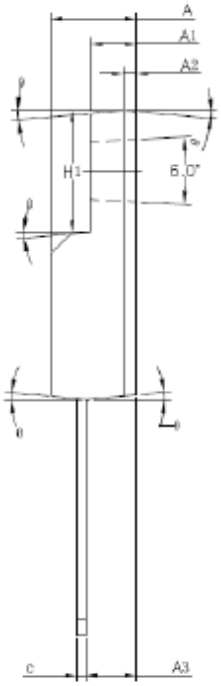
Circuit Diagram

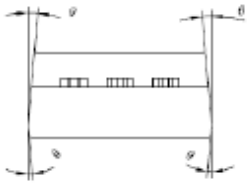


Package Outline Information

TO-220F package information







SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2		0.70 REF	
A3	2.56	2.76	2.93
b	0.70	–	0.90
b1	1.18	–	1.38
b2	–	–	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e		2.54BSC	
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	–	–	3.50
L2		6.50REF	
øP	3.08	3.18	3.28
Q	3.20	–	3.40
θ1	1°	3°	5°