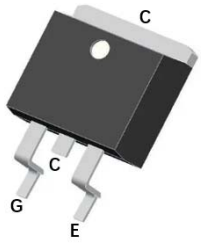
DGB10N65CTL0

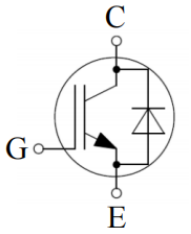
RoHS COMPLIANT

IGBT Discrete



V_{CE}	650	V
I_C	10	A
$V_{CE(SAT)}$ I_C=10A	1.40	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	 20 10	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	 20 10	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		40	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	40	A
Short Circuit Withstand Time, VGE= 15V, VCE≤ 400V	Tsc	5	μs
Diode Pulsed Current, tp limited by T_{jmax}	IFpuls	40	A
Power Dissipation , Tj=175°C,Tc=25°C	P_{tot}	100	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℃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	4.4	5.2	6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=10A 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	-	0.89	-	nF
Output capacitance	C_{oes}		-	0.04	-	
Reverse Transfer Capacitance	C_{res}		-	0.01	-	
Gate Charge	Q_G	V_{CC}=300V,I_C=10A, V_{GE}=15V	-	0.059	-	uC
Short circuit collector current	IC（SC）	V_{GE}=15V,t_{SC}≤5us V_{CC}=400V, Tj,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= 10A T_j= 25°C, T_j= 125°C T_j= 150°C		1.70 1.50 1.40	2.20	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=10A, V_{GE}=-5V~15V, Rg=51Ω	-	10	-	ns
Rise Time	t_r		-	26	-	ns
Turn-on Energy	E_{on}		-	0.36	-	mJ
Turn-off Delay Time	t_d(off)		-	68	-	ns
Fall Time	t_f		-	135	-	ns
Turn-off Energy	E_{off}		-	0.17	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	t_d(on)	T_j=125 C V_{CC}= 300V, I_C=10A, V_{GE}=-5V~15V, Rg=51Ω	-	14	-	ns
Rise Time	t_r		-	35	-	ns
Turn-on Energy	E_{on}		-	0.42	-	mJ
Turn-off Delay Time	t_d(off)		-	68	-	ns
Fall Time	t_f		-	162	-	ns
Turn-off Energy	E_{off}		-	0.29	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	t_d(on)	T_j=150 C V_{CC}= 300V, I_C=10A, V_{GE}=-5V~15V, Rg=51Ω	-	16	-	ns
Rise Time	t_r		-	41	-	ns
Turn-on Energy	E_{on}		-	0.46	-	mJ
Turn-off Delay Time	t_d(off)		-	69	-	ns
Fall Time	t_f		-	181	-	ns
Turn-off Energy	E_{off}		-	0.33	-	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=10A, V_R=300V, -di/dt= 365A/μs,	-	6	-	A
Diode reverse recovery time	trr		-	176	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.12	-	uC
Reverse Recovery Energy	Erec		-	0.05	-	mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=10A, V_R=300V, -di/dt= 365A/μs,	-	7	-	A
Diode reverse recovery time	trr		-	189	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.48	-	uC
Reverse Recovery Energy	Erec		-	0.09	-	mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=10A, V_R=300V, -di/dt= 365A/μs,	-	8	-	A
Diode reverse recovery time	trr		-	195	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.62	-	uC
Reverse Recovery Energy	Erec		-	0.11	-	mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{th}(j-c)	1.5	K/W
Diode Thermal Resistance, Junction - Case	R_{th}(j-c)	2.0	K/W
Thermal Resistance, Junction - Ambient	R_{th}(j-a)	60	K/W

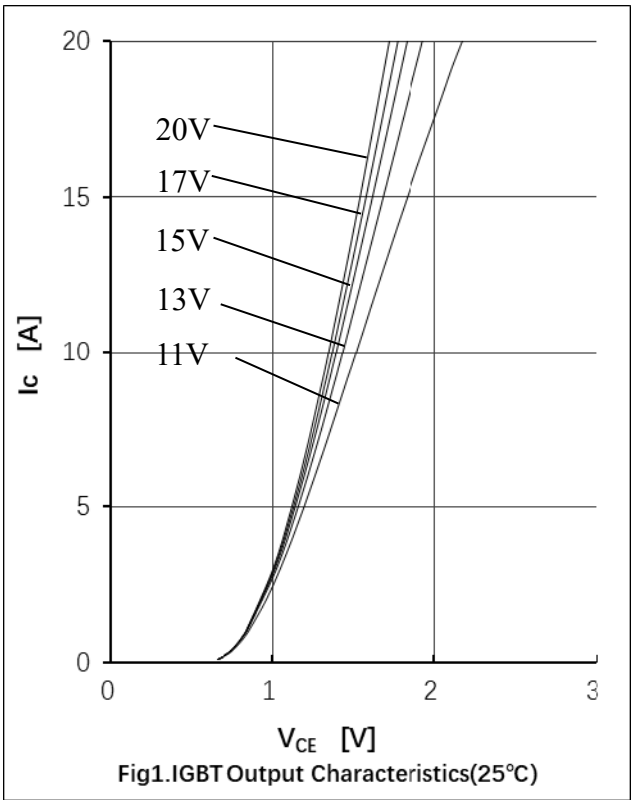


Fig1.IGBT Output Characteristics(25℃)

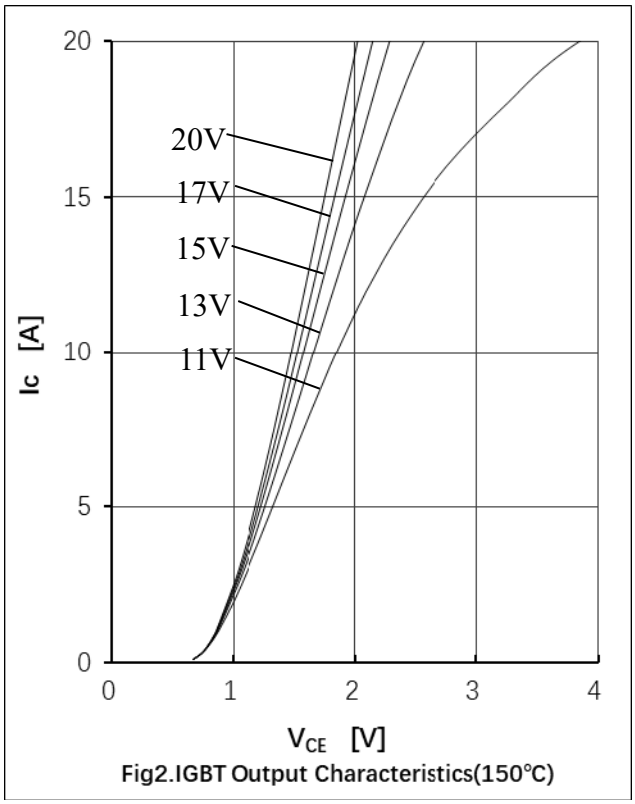


Fig2.IGBT Output Characteristics(150℃)

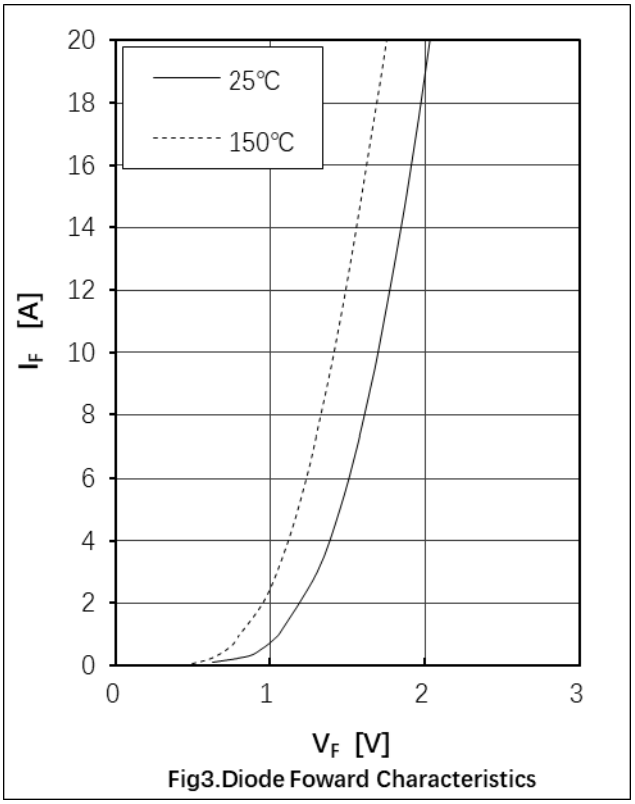


Fig3.Diode Foward Characteristics

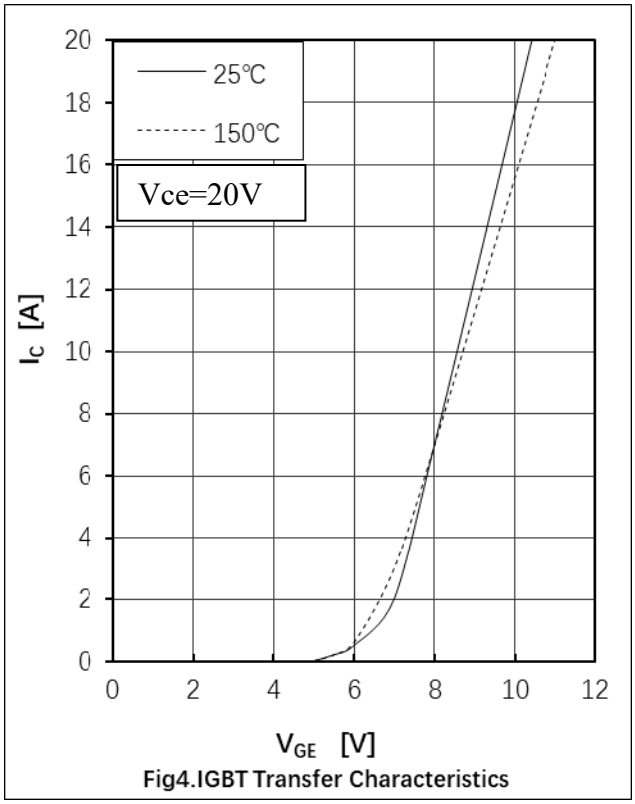


Fig4.IGBT Transfer Characteristics

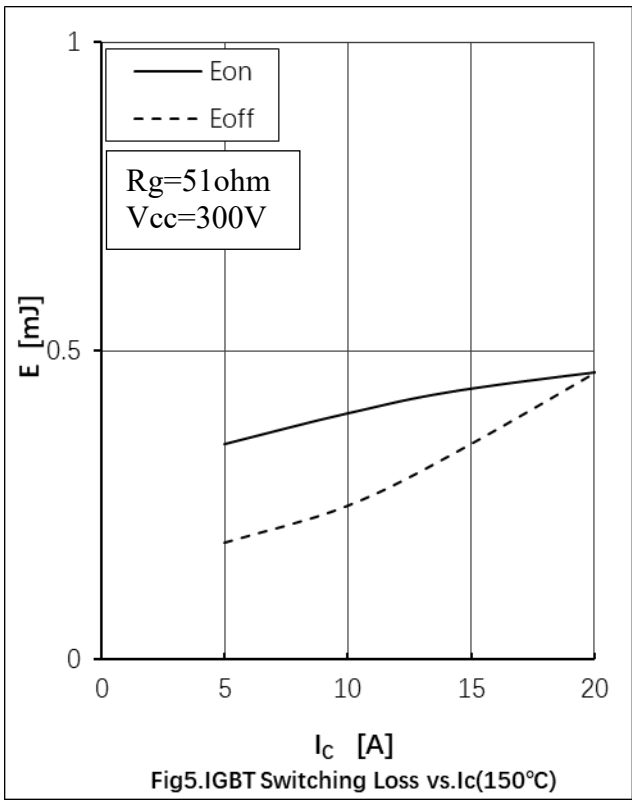


Fig5.IGBT Switching Loss vs.Ic(150℃)

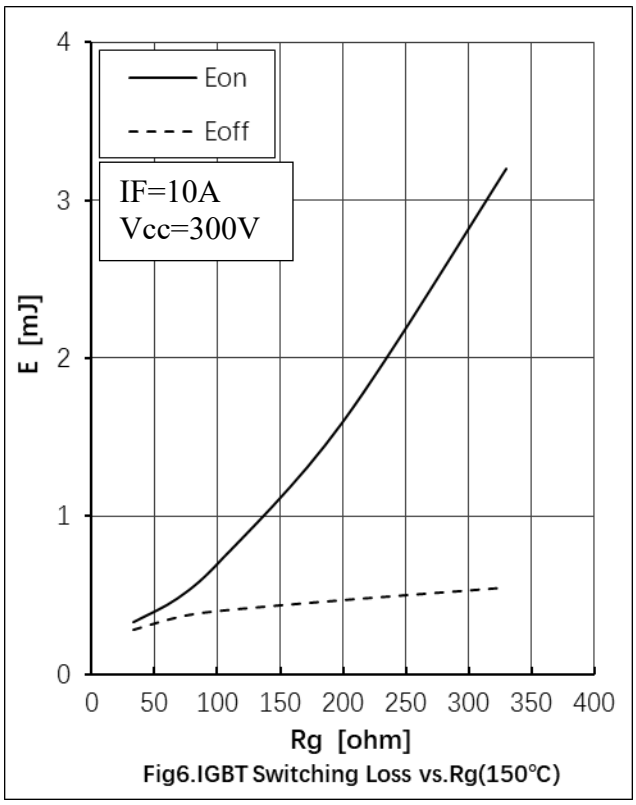


Fig6.IGBT Switching Loss vs.Rg(150℃)

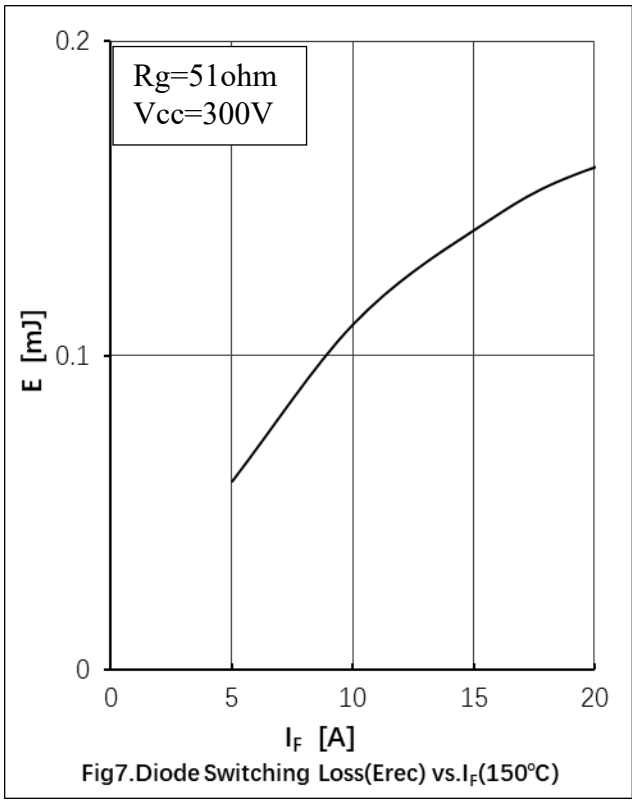


Fig7.Diode Switching Loss(Erec) vs.I_F(150℃)

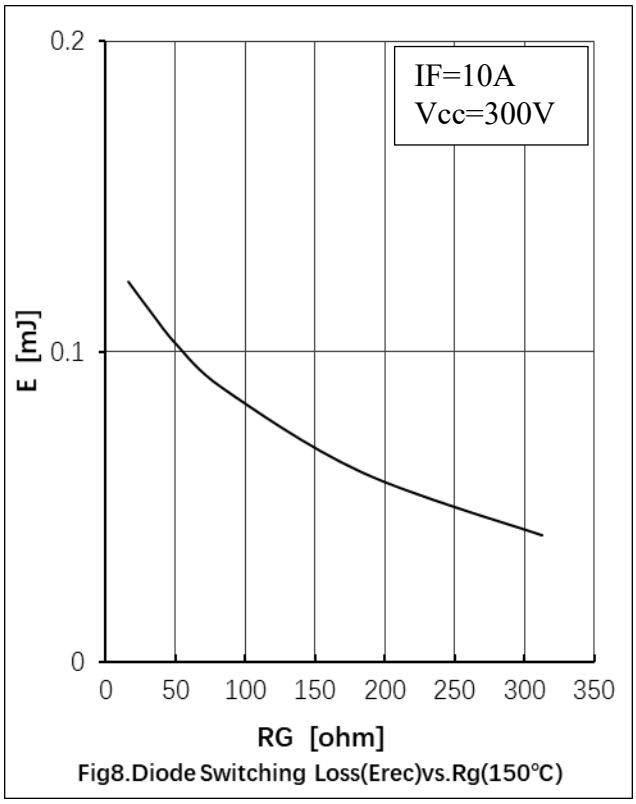


Fig8.Diode Switching Loss(Erec)vs.Rg(150℃)

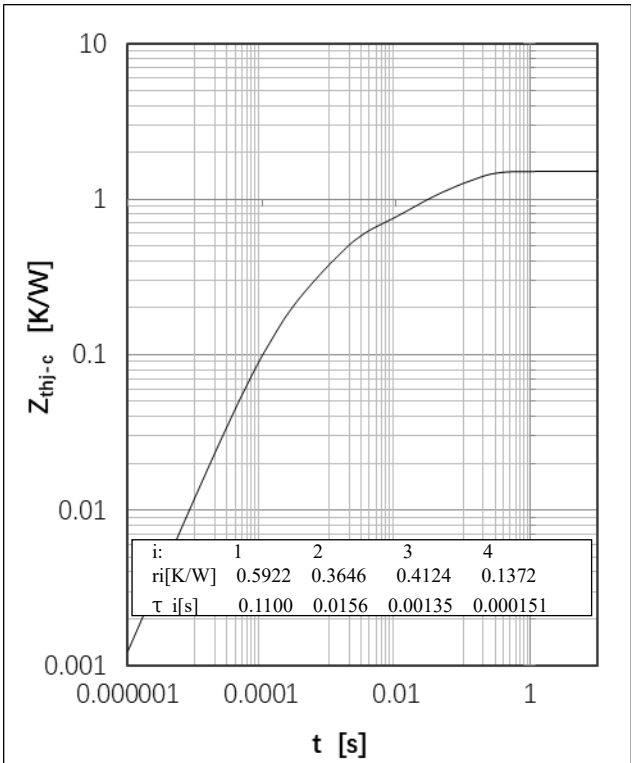


Fig 9. IGBT Transient Thermal Impedance

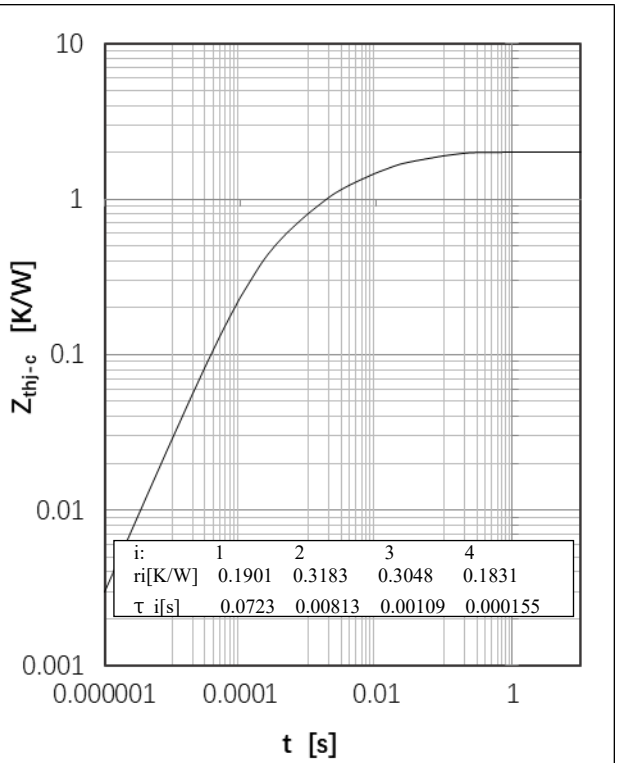
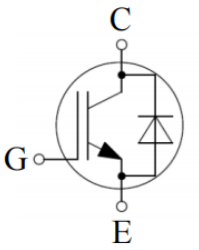
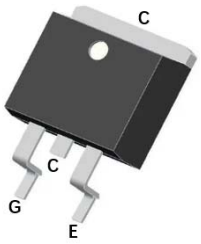


Fig10.Diode Transient Thermal Impedance

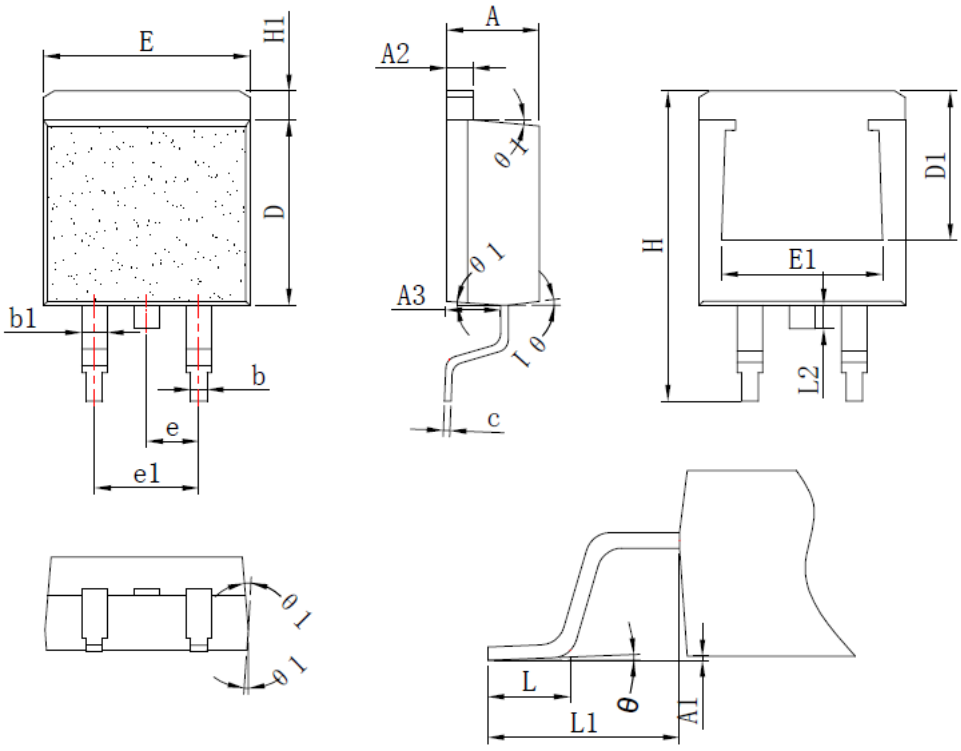
Circuit Diagram





Package Outline Information

CASE: TO 263



SYMBOL	mm		
	MIN	NOM	MAX
*A	4.42	4.52	4.62
*A1	0.00	0.10	0.20
*A2	1.24	1.27	1.32
*A3	2.50	2.60	2.70
*b	0.75	0.80	0.85
*b1	1.20	1.25	1.30
*c	0.33	0.38	0.43
*D	8.88	9.00	9.12
D1	7.25REF		
*E	9.92	10.07	10.22
E1	7.85	8.00	8.15
*e	2.50	2.54	2.58
e1	5.08REF		
*H	14.80	15.10	15.30
H1	1.12	1.28	1.42
*L	2.10	2.23	2.36
L1	4.55	4.75	4.95
L2	1.10	1.30	1.50
*θ	0°	2°	5°
θ1	3°	-	9°

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