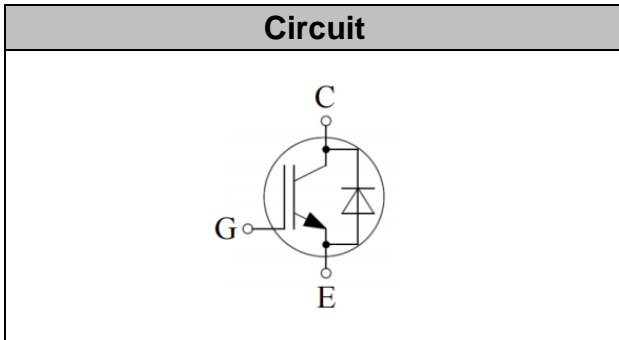




IGBT Discrete

V_{CE}	650	V
I_C	20	A
$V_{CE(SAT)} I_C=20A$	1.60	V



Applications

- Soft switching applications
- Air conditioning
- Motor drive inverter

Features

- High speed smooth switching device for hard & soft switching
- Maximum junction temperature 175°C
- 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} $T_C=25^\circ C$ $T_C=100^\circ C$	I_C	40 20	A
Diode Forward Current, limited by T_{jmax} $T_C=25^\circ C$ $T_C=100^\circ C$	I_F	40 20	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10\mu s, D < 0.010$)	V_{GE}	± 30	V
Turn off Safe Operating Area $V_{CE} \leq 600V$, $T_j \leq 150^\circ C$		60	A
Pulsed Collector Current, $V_{GE}=15V$, t_p limited by T_{jmax}	I_{CM}	60	A
Short Circuit Withstand Time, $V_{GE}=15V$, $V_{CE} \leq 400V$	T_{SC}	5	μs
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	60	A
Power Dissipation, $T_j=175^\circ C, T_c=25^\circ C$	P_{tot}	120	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}	$V_{GE}=0V, I_C=250\mu A$	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	$V_{CE(sat)}$	$V_{GE}=15V, I_C=20A$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		1.60 1.75 1.80	1.95	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$ $T_j=25^\circ\text{C}$, $T_j=150^\circ\text{C}$			0.25 1.00	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			± 200	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz$	-	0.90	-	nF
Output capacitance	C_{oes}		-	0.04	-	
Reverse Transfer Capacitance	C_{res}		-	0.01	-	
Gate Charge	Q_G	$V_{CC}=300V, I_C=20A,$ $V_{GE}=15V$	-	0.085	-	uC
Short circuit collector current	$I_{C(SC)}$	$V_{GE}=15V, t_{SC}\leq 5\mu s$ $V_{CC}=400V,$ $T_{j,start}=25^\circ\text{C}$	-	115	-	A



Electrical Characteristics of the Diode ($T_j=25^\circ\text{C}$ unless otherwise specified):

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	$I_F=20\text{A}$ $T_j=25^\circ\text{C}$, $T_j=125^\circ\text{C}$ $T_j=150^\circ\text{C}$		2.00 1.80 1.70	2.50	V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at $T_j=25^\circ\text{C}$						
Turn-on Delay Time	$t_{d(on)}$	$T_j=25^\circ\text{C}$ $V_{CC}=300\text{V}$, $I_C=20\text{A}$, $V_{GE}=-5\text{V}\sim 15\text{V}$, $R_g=51\ \Omega$	-	12	-	ns
Rise Time	t_r		-	33	-	ns
Turn-on Energy	E_{on}		-	0.41	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	68	-	ns
Fall Time	t_f		-	129	-	ns
Turn-off Energy	E_{off}		-	0.22	-	mJ
Dynamic , at $T_j=125^\circ\text{C}$						
Turn-on Delay Time	$t_{d(on)}$	$T_j=125^\circ\text{C}$ $V_{CC}=300\text{V}$, $I_C=20\text{A}$, $V_{GE}=-5\text{V}\sim 15\text{V}$, $R_g=51\ \Omega$	-	16	-	ns
Rise Time	t_r		-	41	-	ns
Turn-on Energy	E_{on}		-	0.48	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	69	-	ns
Fall Time	t_f		-	154	-	ns
Turn-off Energy	E_{off}		-	0.35	-	mJ
Dynamic , at $T_j=150^\circ\text{C}$						
Turn-on Delay Time	$t_{d(on)}$	$T_j=150^\circ\text{C}$ $V_{CC}=300\text{V}$, $I_C=20\text{A}$, $V_{GE}=-5\text{V}\sim 15\text{V}$, $R_g=51\ \Omega$	-	18	-	ns
Rise Time	t_r		-	49	-	ns
Turn-on Energy	E_{on}		-	0.52	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	69	-	ns
Fall Time	t_f		-	173	-	ns
Turn-off Energy	E_{off}		-	0.38	-	mJ



Electrical Characteristics of the DIODE

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25°C						
Reverse Recovery Current	I _{rr}	I _F =20A, V _R =300V, -di/dt= 500A/μs,	-	11	-	A
Reverse Recovery Charge	Q _{rr}		-	0.20	-	uC
Reverse Recovery Energy	E _{rec}		-	0.07	-	mJ
Dynamic , at T_j= 125°C						
Reverse Recovery Current	I _{rr}	I _F =20A, V _R =300V, -di/dt=500A/μs,	-	14	-	A
Reverse Recovery Charge	Q _{rr}		-	0.75	-	uC
Reverse Recovery Energy	E _{rec}		-	0.20	-	mJ
Dynamic , at T_j= 150°C						
Reverse Recovery Current	I _{rr}	I _F =20A, V _R =300V, -di/dt= 500A/μs,	-	16	-	A
Reverse Recovery Charge	Q _{rr}		-	0.86	-	uC
Reverse Recovery Energy	E _{rec}		-	0.25	-	mJ

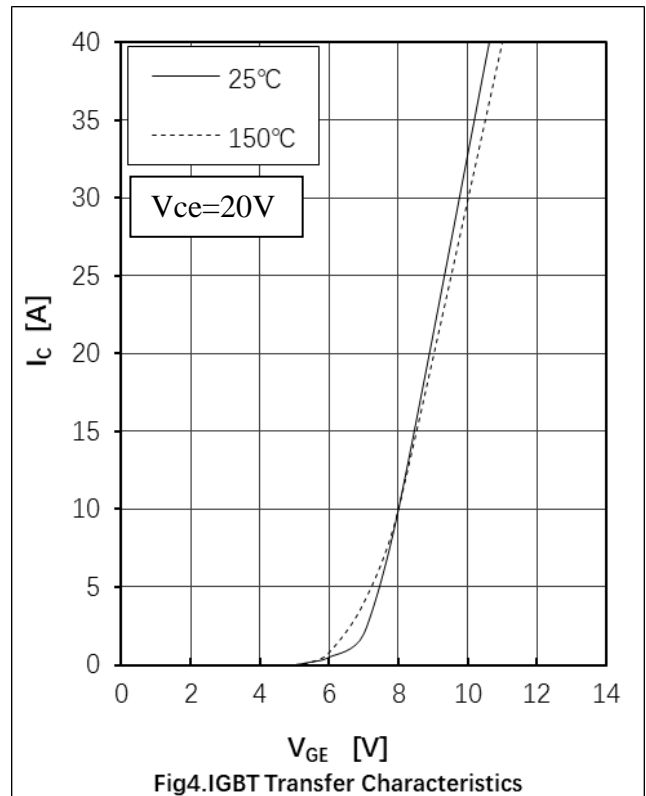
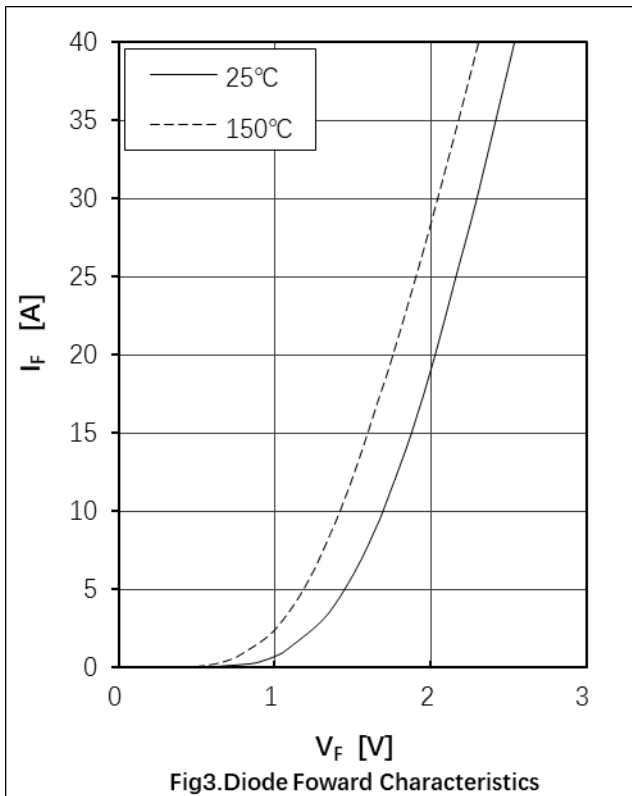
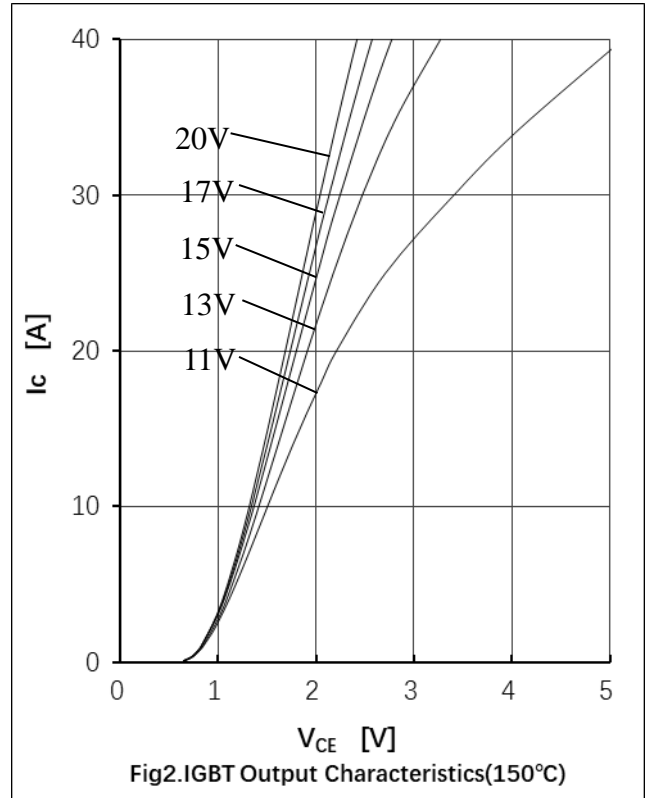
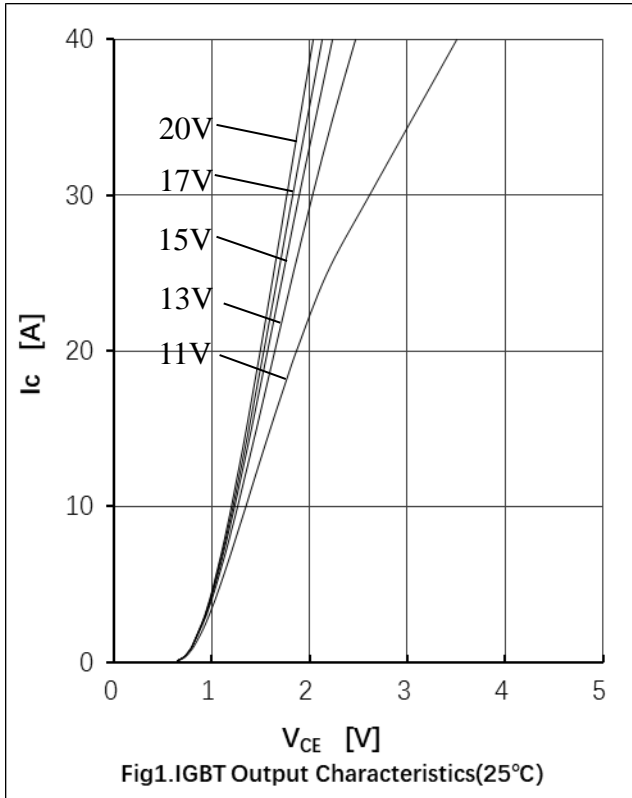
Thermal Resistance

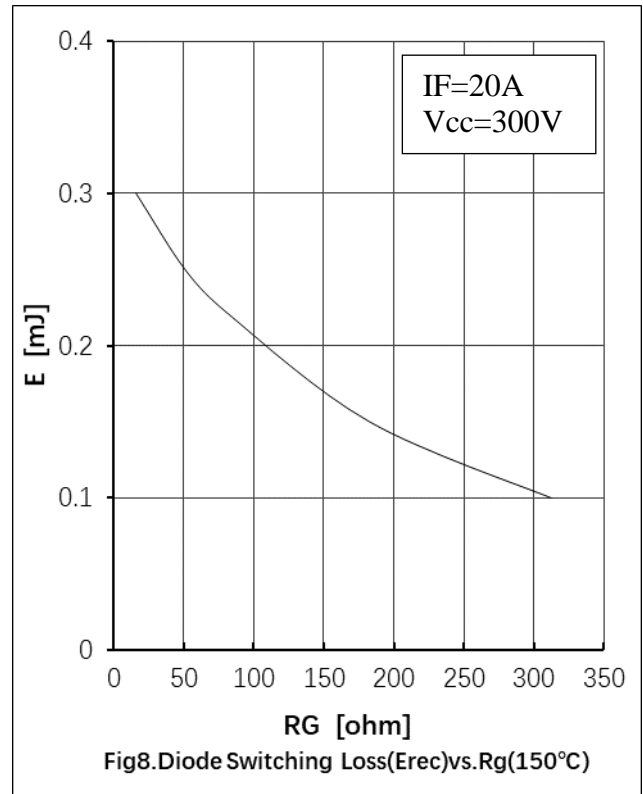
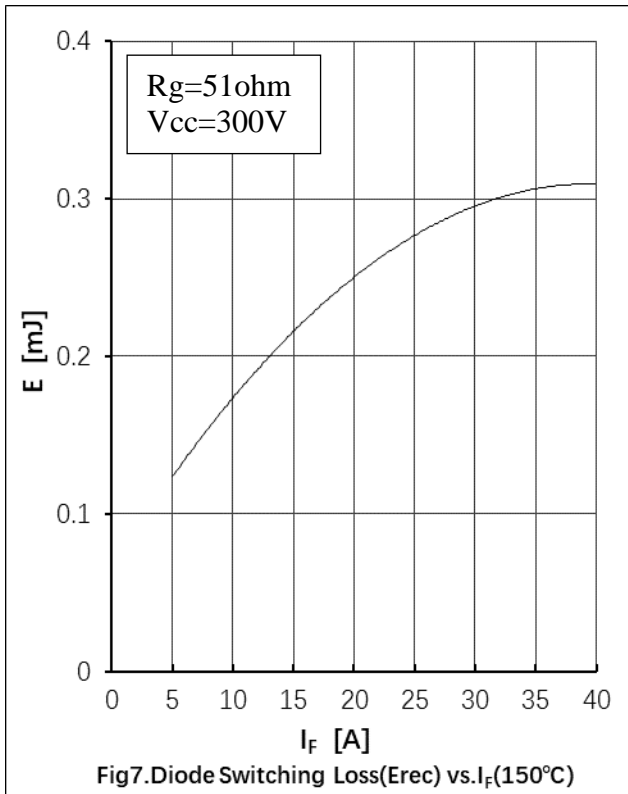
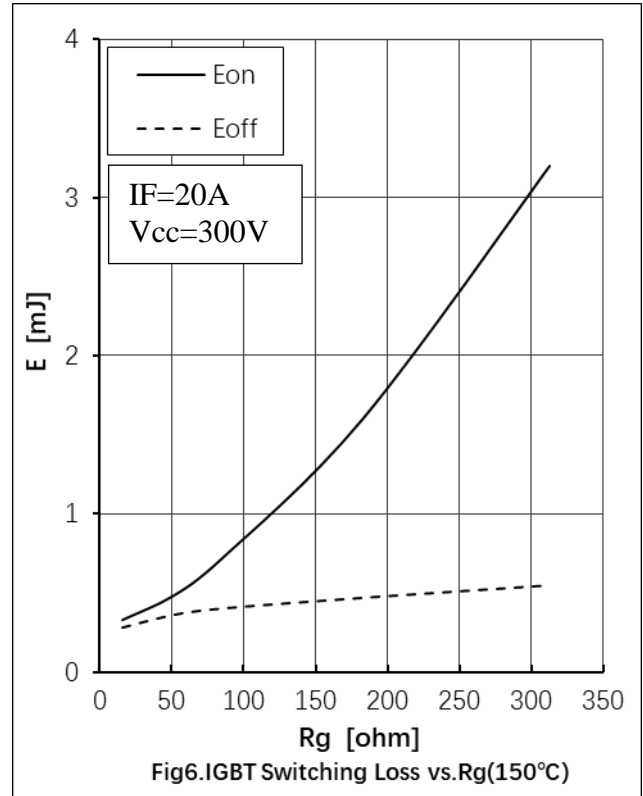
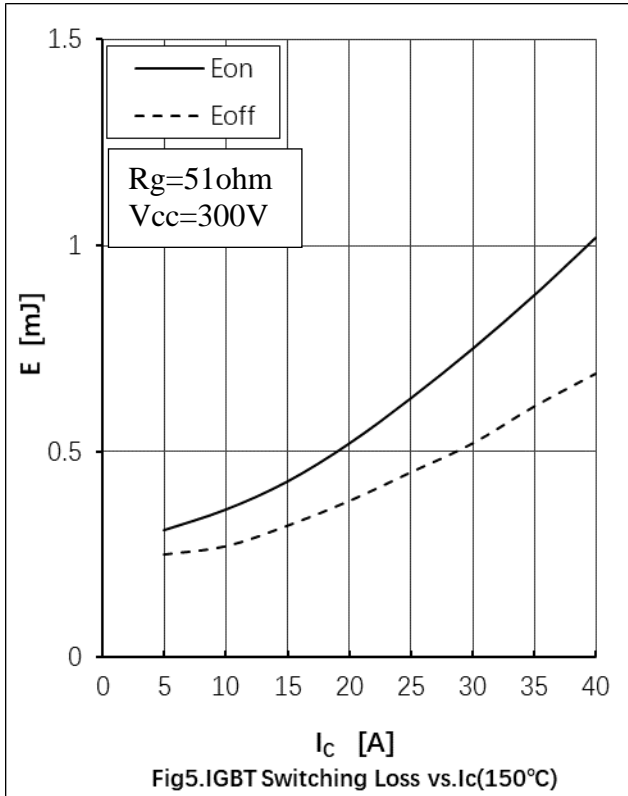
Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R _{th(j-c)}	1.25	K/W
Diode Thermal Resistance, Junction - Case	R _{th(j-c)}	1.5	K/W
Thermal Resistance, Junction - Ambient	R _{th(j-a)}	60	K/W

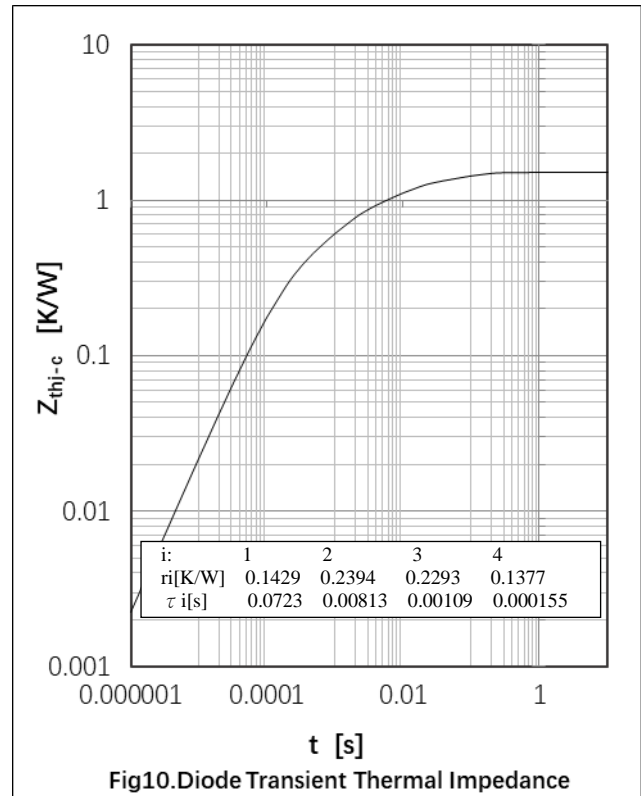
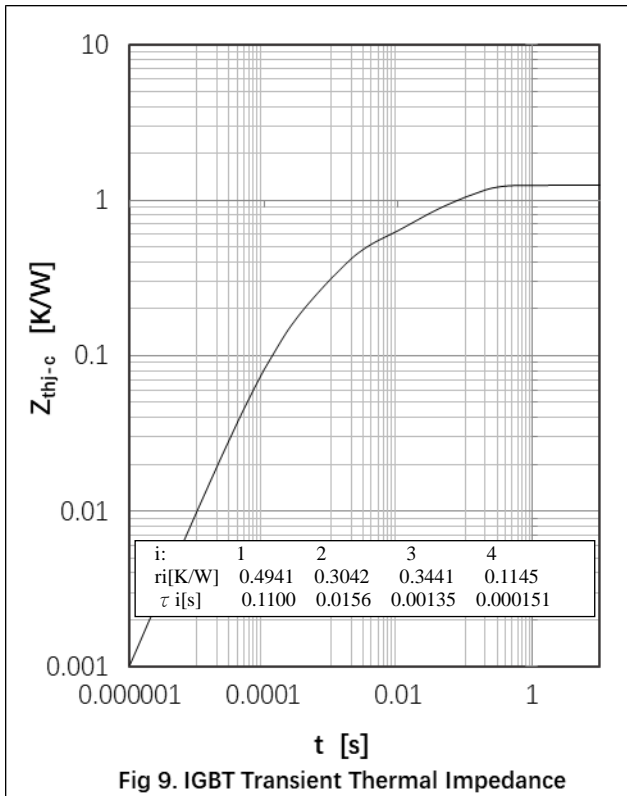


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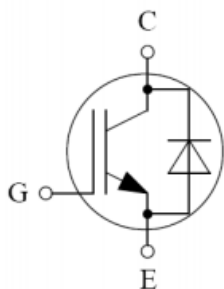
RoHS
COMPLIANT







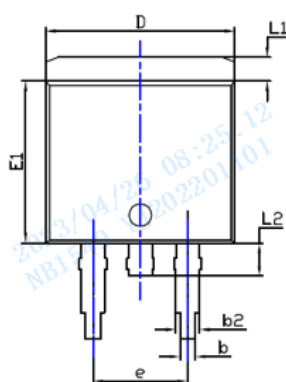
● **Circuit Diagram**



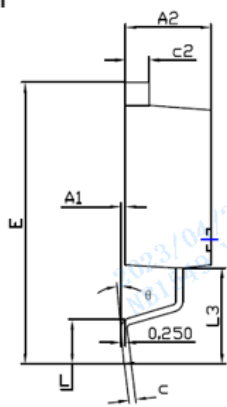
● **Package Outline Information**

CASE: TO 263

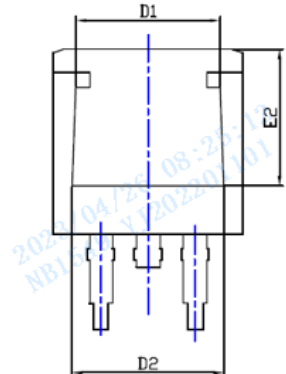
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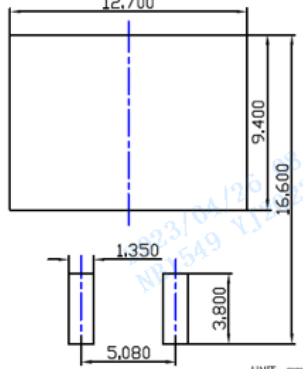
TOP VIEW



SIDE VIEW



BOTTOM VIEW



SUGGESTED SOLDER PAD LAYOUT

UNIT: mm

SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.010	0.000	---	0.250
A2	0.174	0.180	0.186	4.430	4.580	4.730
b	0.028	0.032	0.036	0.720	0.820	0.920
b2	0.046	0.050	0.054	1.180	1.280	1.380
c	0.013	0.015	0.018	0.330	0.390	0.450
c2	0.048	0.050	0.053	1.220	1.280	1.34
D	0.394	0.400	0.406	10.000	10.150	10.300
D1	0.295	0.307	0.319	7.500	7.800	8.100
D2	0.303	0.315	0.327	7.700	8.000	8.300
E	0.571	0.591	0.610	14.500	15.000	15.500
E1	0.337	0.341	0.348	8.550	8.700	8.850
E2	0.276	0.287	0.299	7.000	7.300	7.600
e	0.200BSC			5.080BSC		
L	0.070	---	0.110	1.790	---	2.790
L1	0.044	---	0.056	1.120	---	1.420
L2	0.030	---	0.070	0.770	---	1.770
L3	0.197REF			5.000REF		
∅	0*	---	8*	0*	---	8*

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.