CGWT40N120F2KAD

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V_{CE}	Ic (Tc=100℃)	$V_{CE(sat)}$
1200V	40A	1.7V

TO-247

DESCRIPTION

The CGWT40N120F2KAD is used JSCJ's second generation IGBT technology, has advanced Trench and FS (Field Stop) Structure，it's with very low Collector-Emitter Saturation Voltage, can easy to use in parallel.

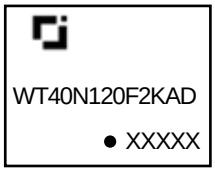
Features

- 1200V breakdown Voltage
- Low Vce(sat) and positive temperature coefficient
- Low switching loss
- With fast and soft recovery freewheeling diode
- Good EMI behavior

Application

- Solar
- UPS & FPC applications
- Welder

MARKING

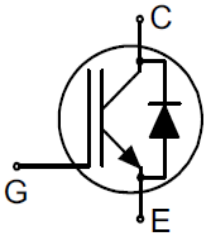


WT40N120F2KAD = Device code

Solid dot = Green molding compound device, if none, the normal device

XXXX = Code

EQUIVALENT CIRCUIT



Order Code	Package	Marking	Parking
CGWT40N120F2KAD	TO-247	WT40N120F2KAD	Tube

Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
	Gate-Emitter transient voltage	±30	V
I_C	Collector Current	80	A
	Collector Current @T_C=100℃	40	
I_{Cpluse}	Plused Collector Current, tp limited by T_{Jmax}	160	A
I_{LM}(1)	Turn-off latching current	160	A
I_F	Continuous Diode Forward Current	80	A
	Continuous Diode Forward Current @T_C=100℃	40	A
I_{FM}	Diode Pulsed Current, Limited by T_{Jmax}	160	A
P_D	Power Dissipation @T_C=25℃	357	W
	Power Dissipation @T_C =100℃	178	
T_J(2)	Operating Junction Temperature	-40 to 175	℃
T_{STG}	Storage Temperature	-55 to 150	℃
T_L	Maximum lead temperature for soldering	260	℃

(1) V_{cc} =600V, V_{GE} = 15 V, T_J ≤ 150 °C.
(2) During overload conditions, allow operation at the maximum junction temperature, Tvj=175℃, with a maximum duty cycle of 20% (60s at most)

Thermal Characteristics

Symbol	Parameter	Value	Units
$R\theta_{JC}$	Maximum IGBT Junction-to-Case	0.42	℃/W
$R\theta_{JC}$	Maximum Diode Junction-to-Case	1.2	℃/W
$R\theta_{JA}$	Maximum Junction-to-Ambient	40	℃/W

Electrical Characteristics (TJ=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Ration			Units
			Min.	Typ.	Max.	
STATIC PARAMETERS						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	V_{GE}=0V,I_{CE}=1mA	1200	--	--	V
I_{CES}	Zero Gate Voltage Collector Current	V_{GE}=0V,V_{CE}=1200V	--	--	1.0	mA
I_{GES}	Gate-Emitter leakage current	V_{GE}=±20V	--	--	±250	nA
		V_{GE}=±30V	--	--	±500	nA
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=250uA ,V_{CE}=V_{GE}	4.5	--	7.5	V
V_F	Diode Forward Voltage	I_F=40A,T_J=25℃	--	3.5	--	V
		I_F=40A,T_J=125℃	--	2.4	--	V
		I_F=40A,T_J=150℃	--	2.3	--	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=40A,V_{GE}=15V, T_J=25℃	--	1.7	--	V
		I_C=40A,V_{GE}=15V, T_J=125℃	--	2	--	V
		I_C=40A,V_{GE}=15V, T_J=150℃	--	2.1	--	V
DYNAMIC PARAMETERS						
C_{ies}	Input Capacitance	V_{CE}=30V,V_{GE}=0V f=1MHz	--	4225	--	pF
C_{oes}	Output Capacitance		--	125	--	
C_{res}	Reverse Transfer Capacitance		--	27.5	--	
Rg	Gate resistance	V_{GE}=0V, V_{CC}=0V, f=1MHz	--	1	--	Ω
Q_G	Total Gate Charge	V_{CE} =960 V, I_C = 40 A, V_{GE} = 15 V		170.6		nC
Q_{GE}	Gate to Emitter Charge			41		nC
Q_{GC}	Gate to Collector Charge			92.3		nC
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-On Delay Time	V_{CE}=600V, I_C=40A, R_g=10Ω, V_{GE}=15V, Inductive Load T_J=25℃	--	41	--	ns
t_r	Current Rise Time		--	93	--	
$t_{d(off)}$	Turn-Off Delay Time		--	171	--	
t_f	Current Fall Time		--	66	--	
E_{on}(3)	Turn-On Switching Energy		--	3	--	mJ
E_{off}	Turn-Off Switching Energy		--	1.4	--	
E_{ts}	Total Switching Energy		--	4.4	--	

（3） Including the reverse recovery of the diode.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

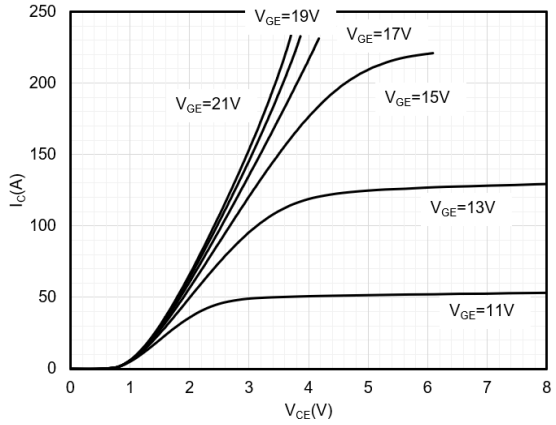


Figure 1: Output Characteristic

(Tj=25°C)

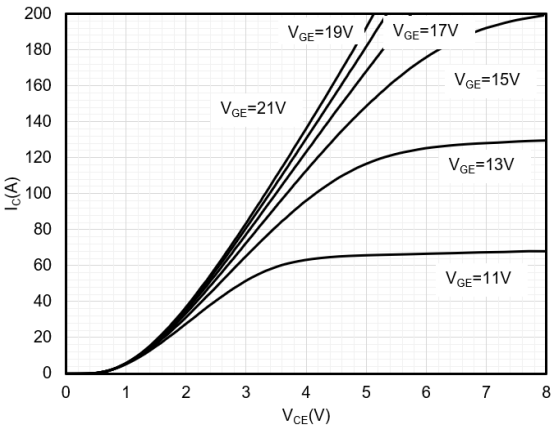


Figure 2: Output Characteristic

(Tj=150°C)

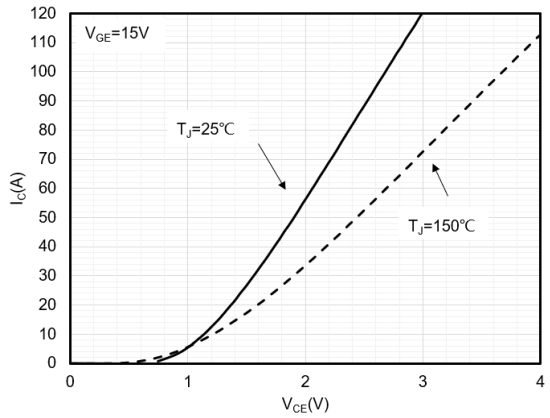


Figure 3: Collector-Emitter Saturation Voltage

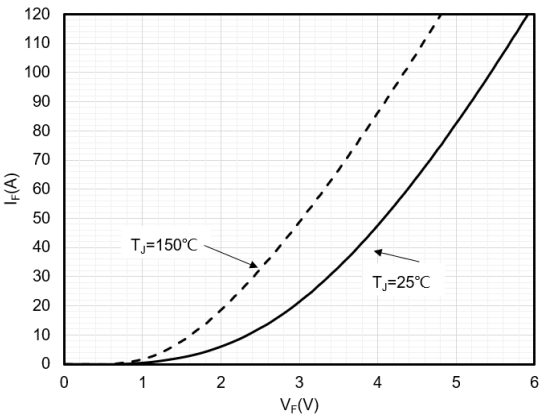


Figure 4: Diode Characteristic

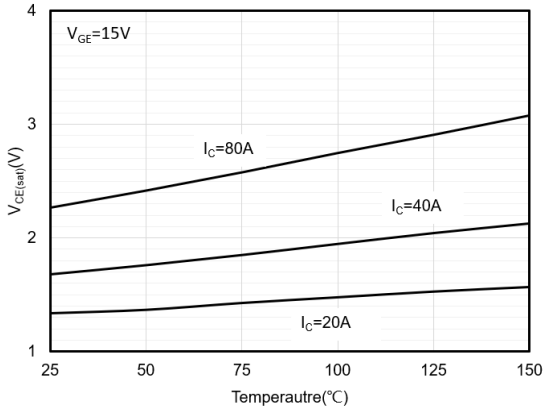


Figure 5: Collector-Emitter Saturation Voltage vs. Junction Temperature

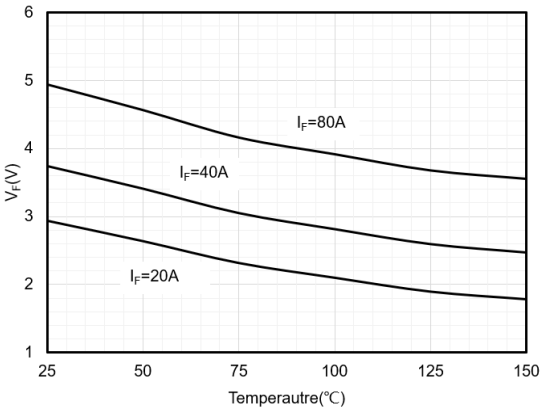


Figure 6: Diode Forward voltage vs. Junction Temperature

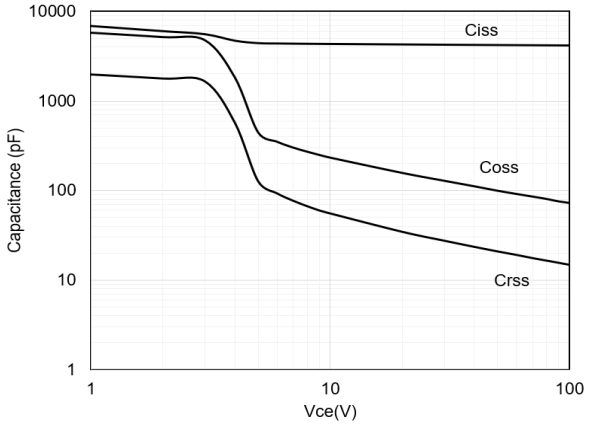


Figure 7: Capacitance Characteristic

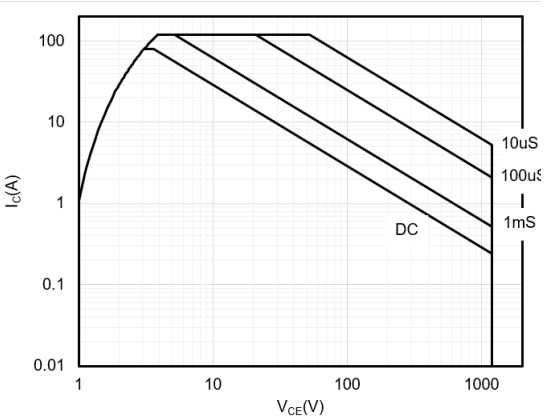


Figure 8: Forward Bias Safe Operating Area

(T_C=25℃， V_{GE}=15V)

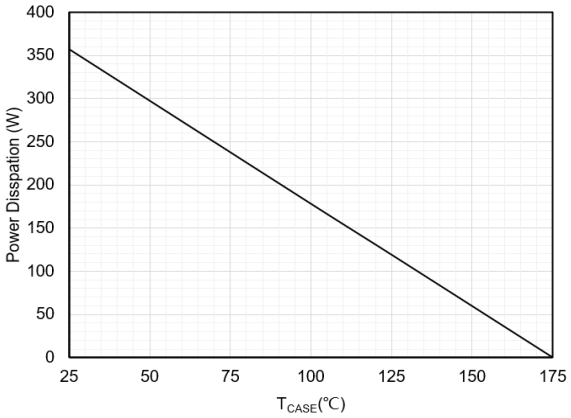


Figure 9: Power Dissipation as a Function of Case

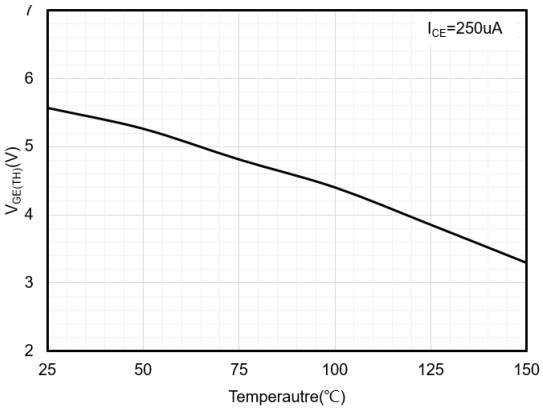


Figure 10: VGE(TH) vs. T_J

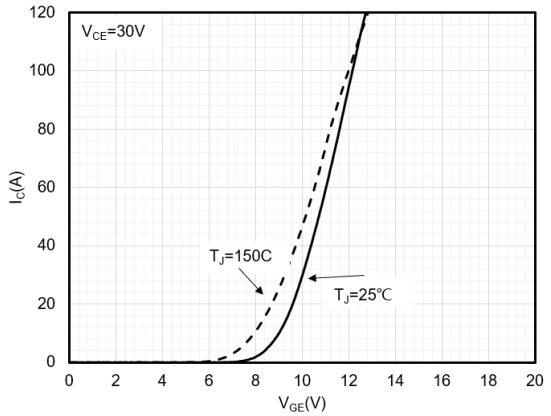


Figure 11: Transfer Characteristic

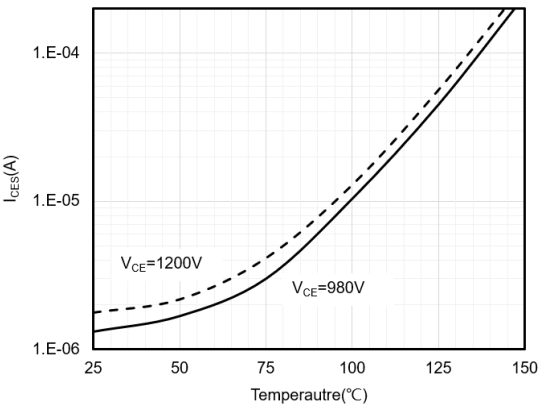


Figure 12: Reverse Leakage Current vs. T_J

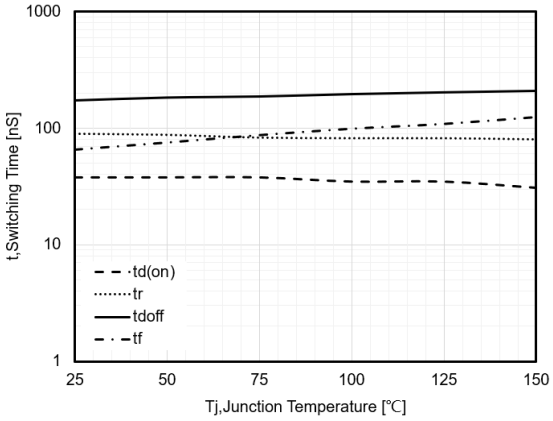


Figure 13 Typical Switching times as a function of Junction Temperature

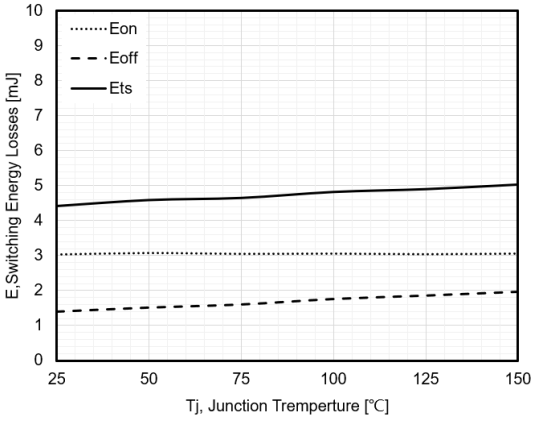


Figure 14 Typical Switching losses as a function of Junction Temperature

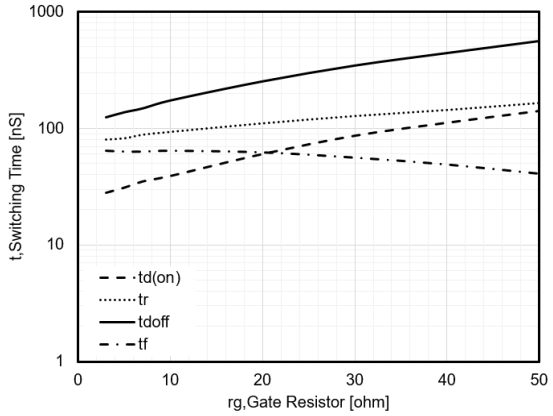


Figure 15 Typical Switching Times as a function of gate resistor

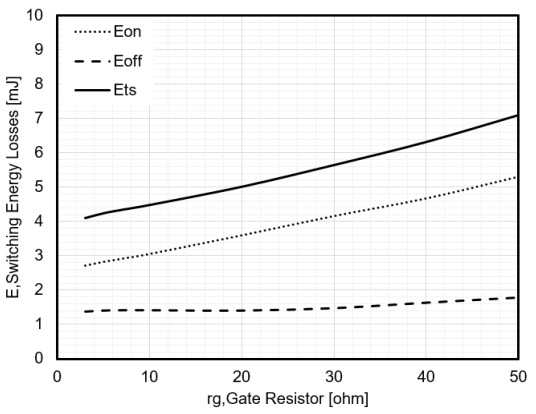


Figure 16 Typical Switching Energy losses as a function of gate resistor

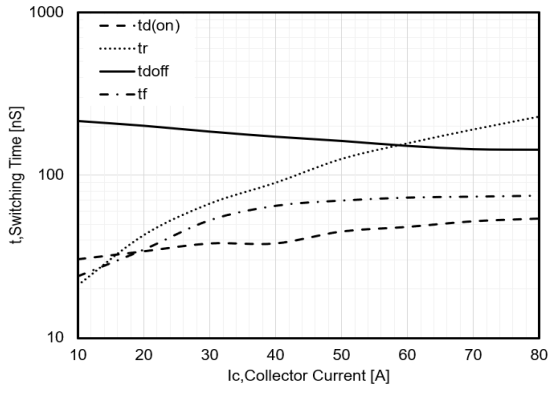


Figure 17 Typical Switching Times as a function of Collector Current

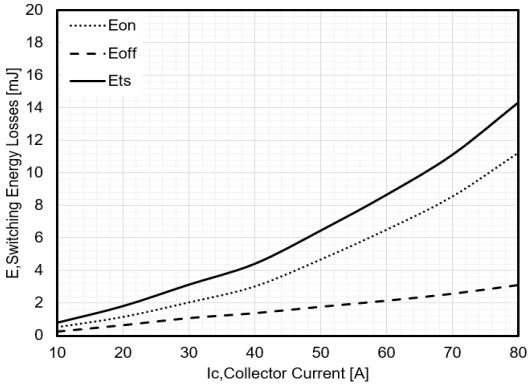


Figure 18 Typical Switching losses as a function of Collector Current

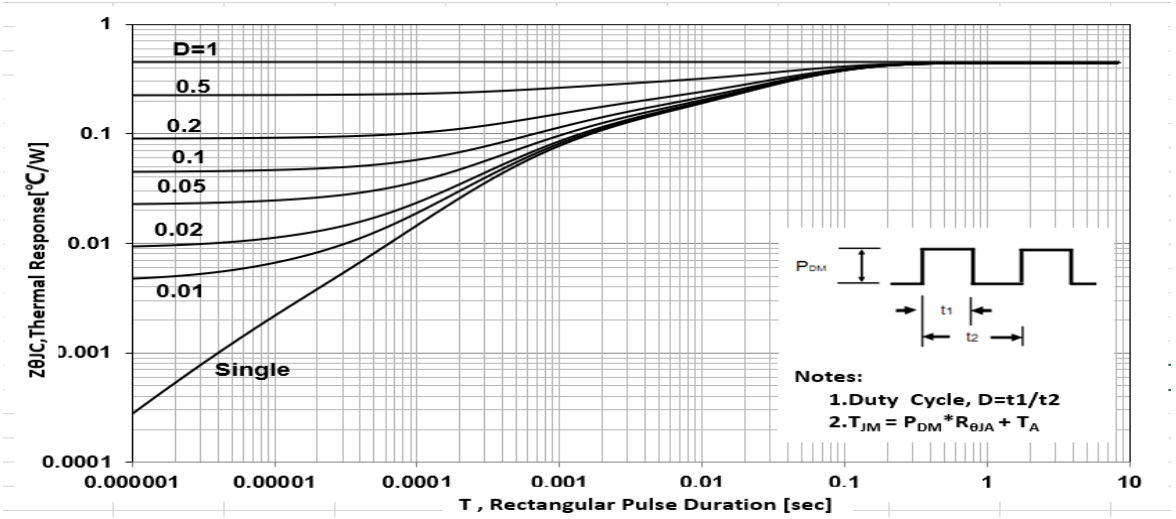
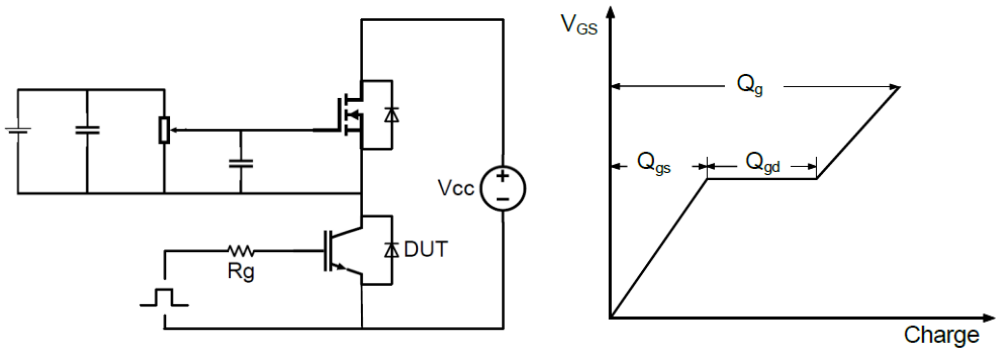


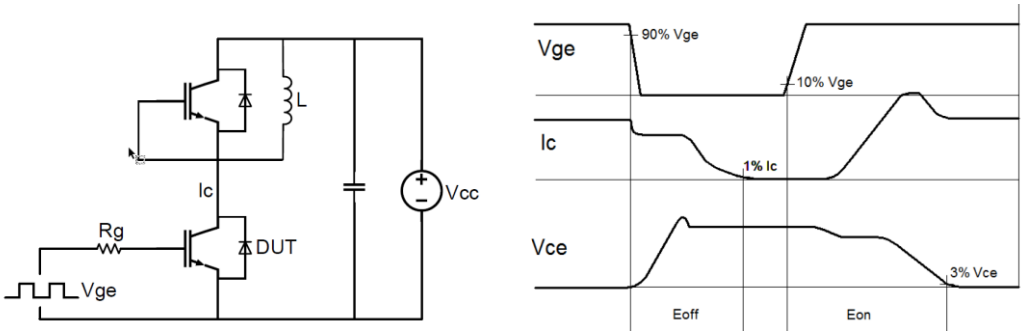
Figure 19 Normalized Transient Thermal Impedance for IGBT

TEST CIRCUIT AND WAVEFOMRS

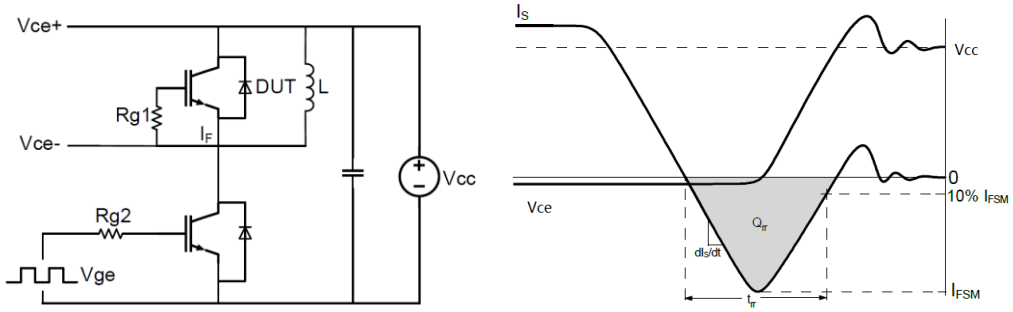
Gate Charge



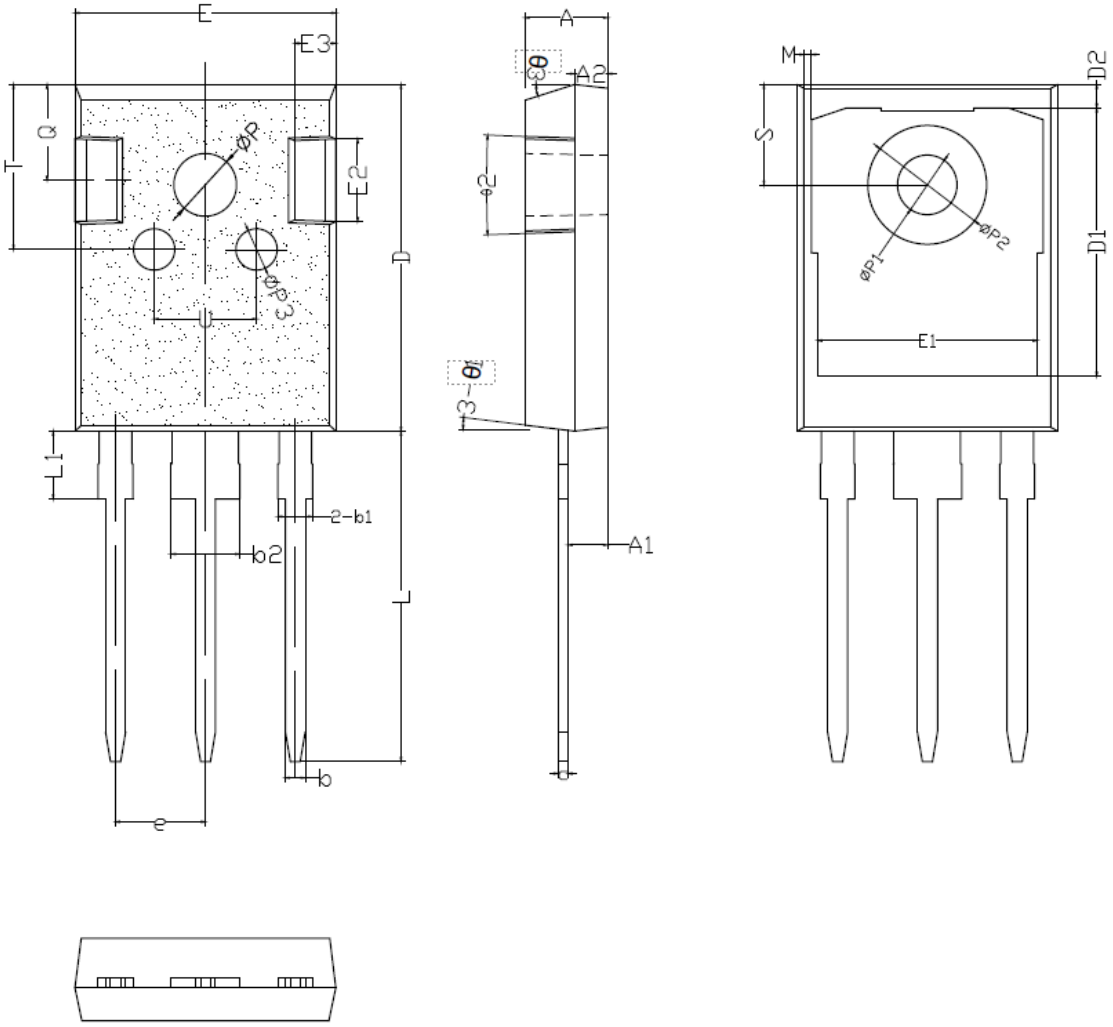
Inductive Switching Test Circuit



Diode Reverse Recovery



TO-247 PACKAGE OUTLINE DIMENSIONS



SYMBOL	mm		
	MIN	NOM	MAX
*A	4.90	5.00	5.10
*A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
*b	1.15	1.20	1.25
*b1	1.95	2.10	2.25
*b2	2.95	3.10	3.25
*c	0.55	0.60	0.65
*D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35
*E	15.70	15.80	15.90

E1	13.10	13.25	13.40
E2	4.85	4.95	5.10
E3	2.40	2.50	2.60
*e	5.40	5.44	5.48
*L	19.80	19.98	20.15
*L1	-	-	4.30
*ΦP	3.40	3.50	3.60
*ΦP1	6.90	7.10	7.30
ΦP2	2.40	2.50	2.60
ΦP3	2.40	2.50	2.60
Q	5.60	5.80	6.00
*S	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	6.20	6.40
θ1	5°	7°	9°
θ2	1°	3°	5°
θ3	13°	15°	17°
*为管控尺寸			