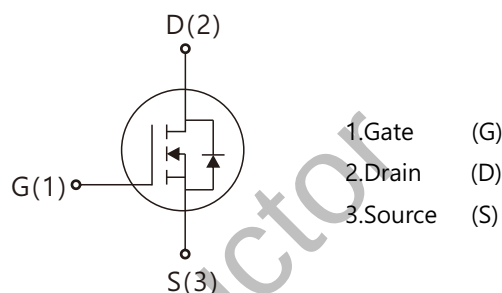
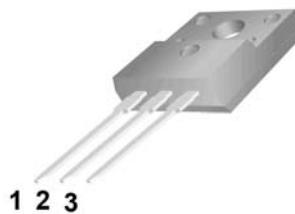


FQPF10N65SE**Features:**

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Q_g=35nC (Typ.).
- ☐ BVDSS=650 V, I_D=10A
- ☐ R_{DS(on)} : 0.9 Ω (Max) @V_G=10V
- ☐ 100% Avalanche Tested

TO-220F

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

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-Source Voltage	650	V
I _D	Drain Current	T _j =25°C	A
		T _j =100°C	
V _{GSS}	Gate Threshold Voltage	30	V
E _{AS}	Single Pulse Avalanche Energy (note1)	380	mJ
I _{AR}	Avalanche Current (note2)	10	A
P _D	Power Dissipation (T _j =25°C)	65	W
T _j	Junction Temperature(Max)	150	°C
T _{stg}	Storage Temperature	-55~+150	°C
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJC}	Thermal Resistance, Junction to Case	-	2.4	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	-	62.5	°C/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA , V _{GS} =0	650	-	-	V
△BVDSS/ △TJ	Breakdown Voltage Temperature Coefficient	I _D =250μA ,Reference to 25°C	-	0.67	-	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	-	-	10	μA
		V _{DS} =520V, Tj=125°C			100	
I _{GSSF}	Gate-body leakage Current, Forward	V _{GS} =+30V, V _{DS} =0V	-	-	100	nA
I _{GSSR}	Gate-body leakage Current, Reverse	V _{GS} =-30V, V _{DS} =0V	-	-	-100	
On Characteristics						
V _{GS(TH)}	Date Threshold Voltage	I _D =250μA,V _{DS} =V _{GS}	2	-	4	V
R _{DS(ON)}	Static Drain-Source On-Resistance	I _D =5.0A,V _{GS} =10V	-	0.8	0.9	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	V _{DS} =25V , V _{GS} =0 , f=1.0MHz	-	1500	-	pF
Coss	Output Capacitance		-	194	-	
Crss	Reverse Transfer Capacitance		-	18	-	
Sw itching Characteristics						
Td(on)	Turn-On Delay Time	V _{DD} =325V , I _D =10A R _G =25Ω (Note 3,4)	-	23		nS
Tr	Turn-On Rise Time			15		
Td(off)	Turn-Off Delay Time		-	90		
Tf	Turn-Off Rise Time		-	30		
Qg	Total Gate Charge	V _{DS} =520V,V _{GS} =10V , I _D =10A (Note3,4)	-	35		nC
Qgs	Gate-Source Charge			7	-	
Qgd	Gate-Drain Charge			18	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Is	Max. Diode Forward Current	-		- -	10	A
I _{SM}	Max. Pulsed Forward Current	-		- -	40	
V _{SD}	Diode Forward Voltage	I _D =10A	-	-	1.4	V
Trr	Reverse Recovery Time	I _S =10A,V _{GS} =0V diF/dt=100A/μs	-	320	-	nS
Qrr	Reverse Recovery Charge	(Note3)	-	4.2	-	μC

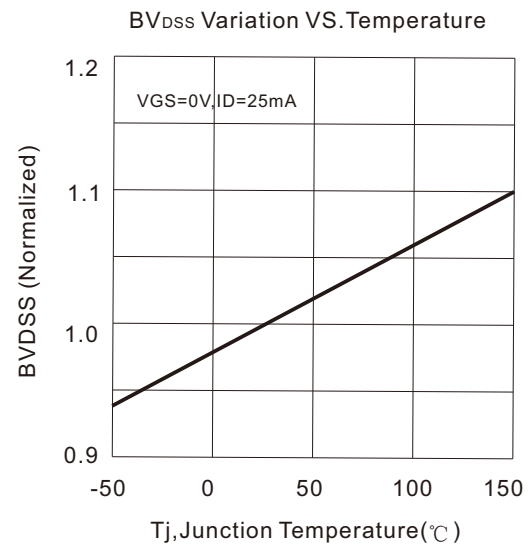
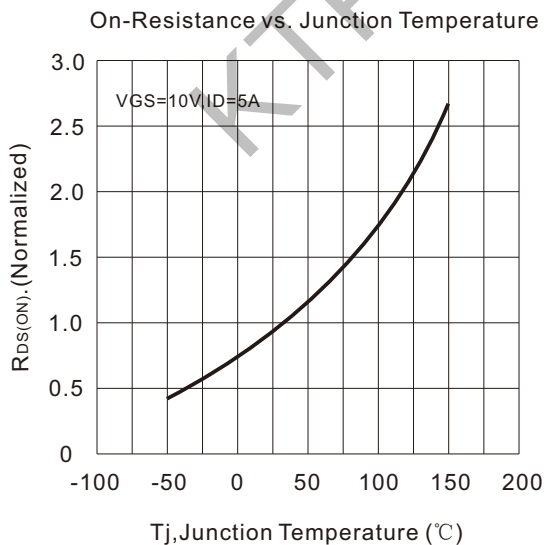
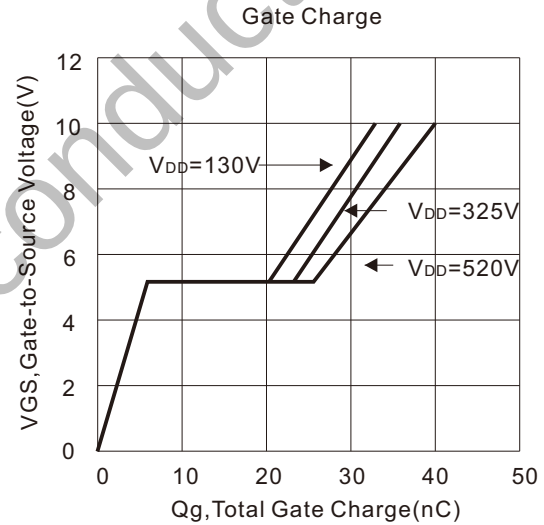
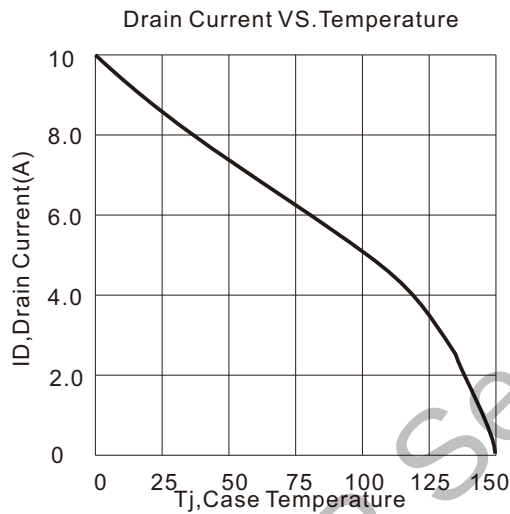
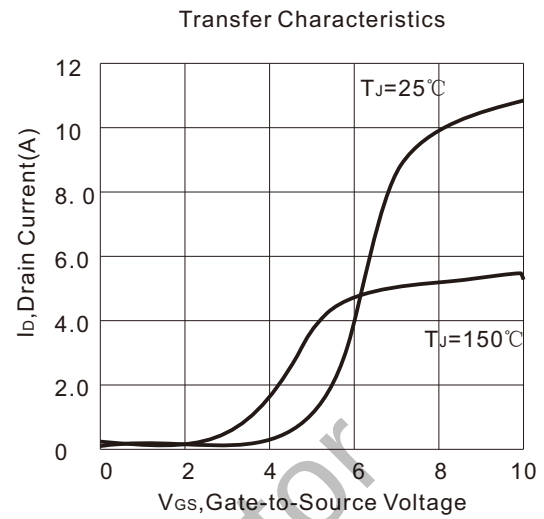
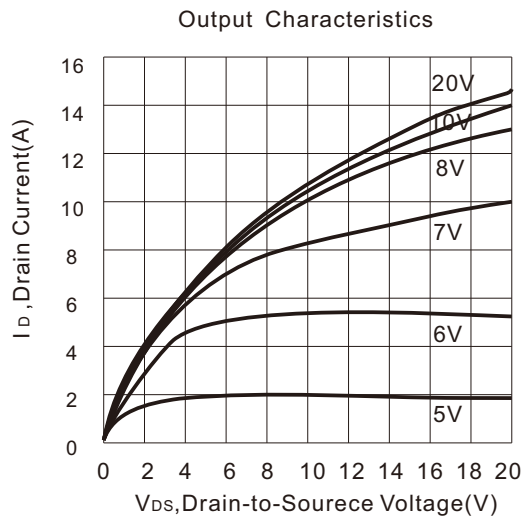
Notes : 1, L=0.5mH, IAS= 10A, VDD=50V, RG=25 Ω , Starting T_J =25°C

2, Repetitive Rating : Pulse width limited by maximum junction temperature

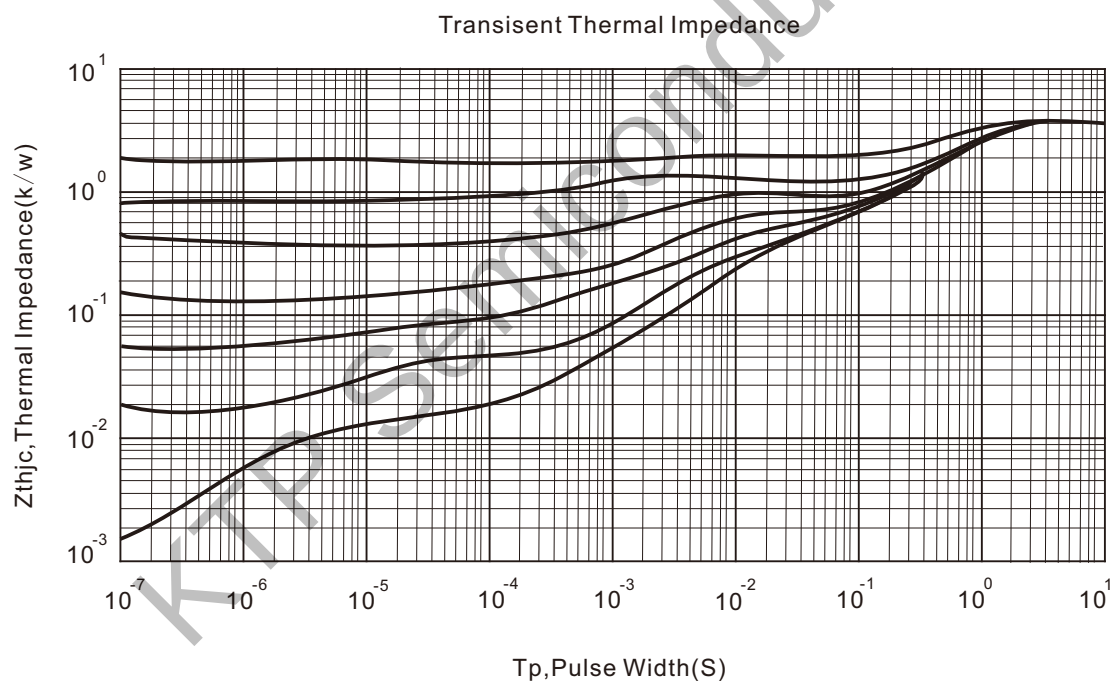
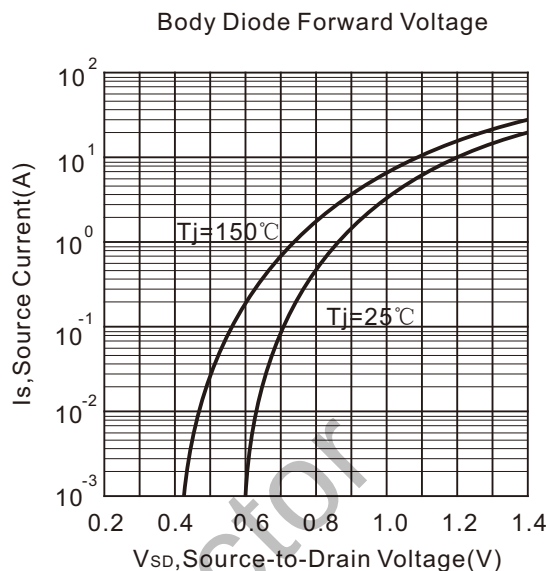
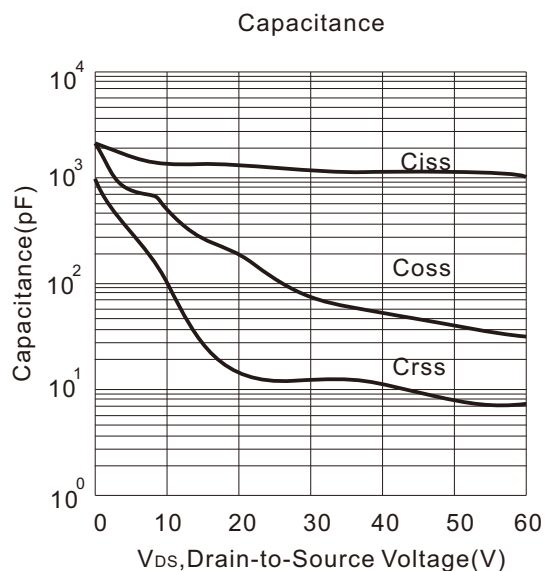
3, Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

4, Essentially Independent of Operating Temperature

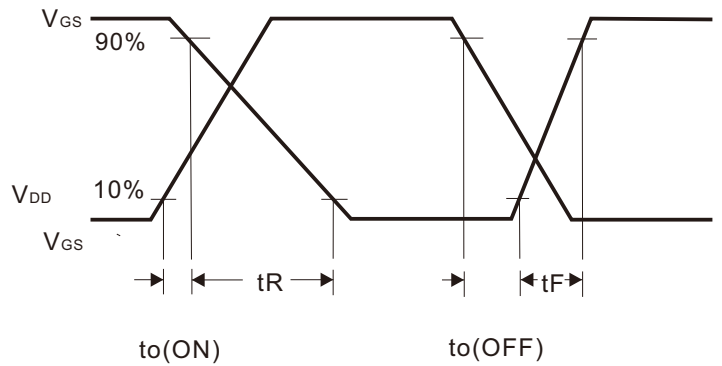
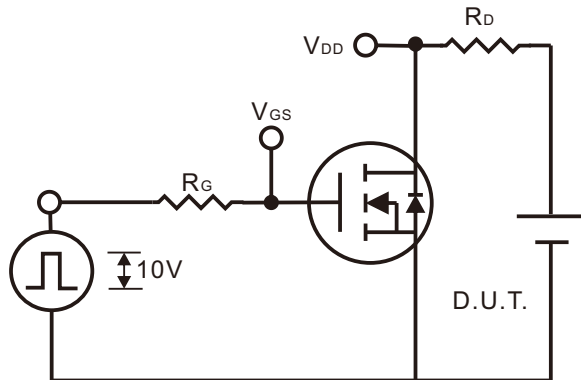
Typical Characteristics



Typical Characteristics (Continued)

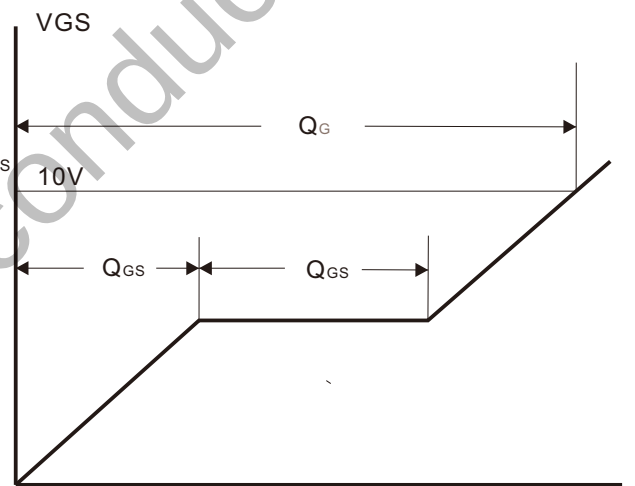
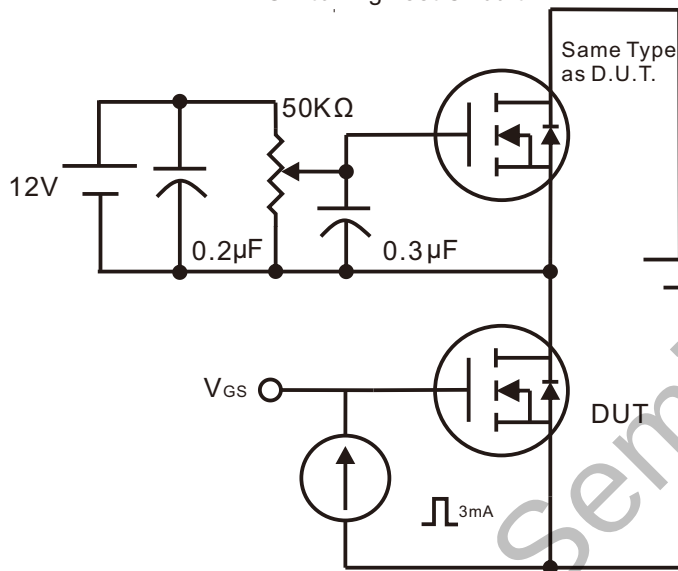


Gate Charge Test Circuit & Waveform



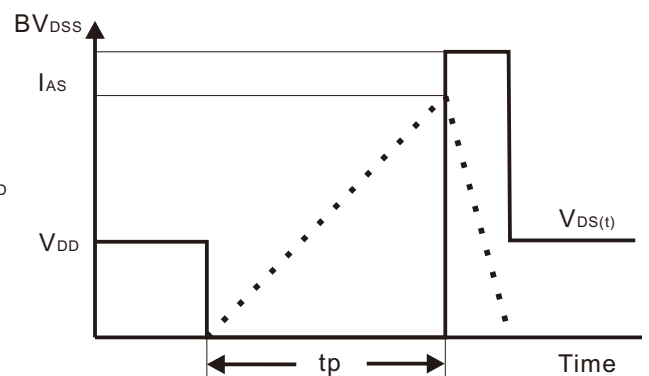
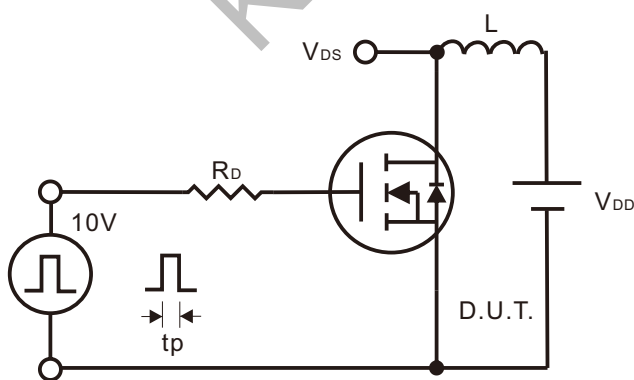
Switching Test Circuit

Switching Waveforms



Gate Charge Test Circuit

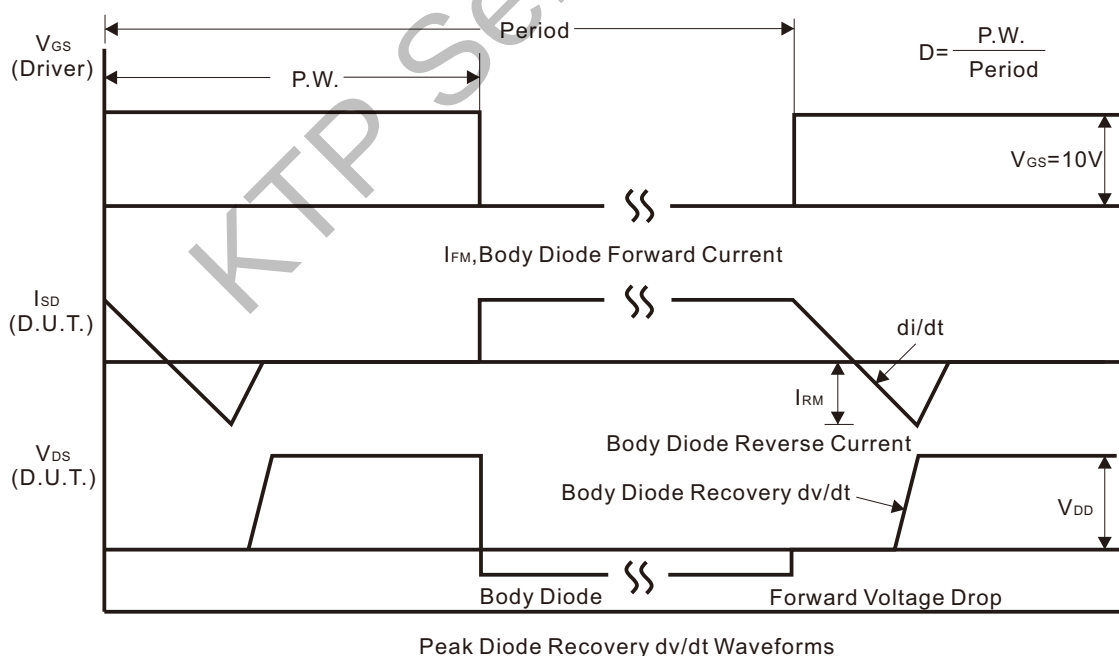
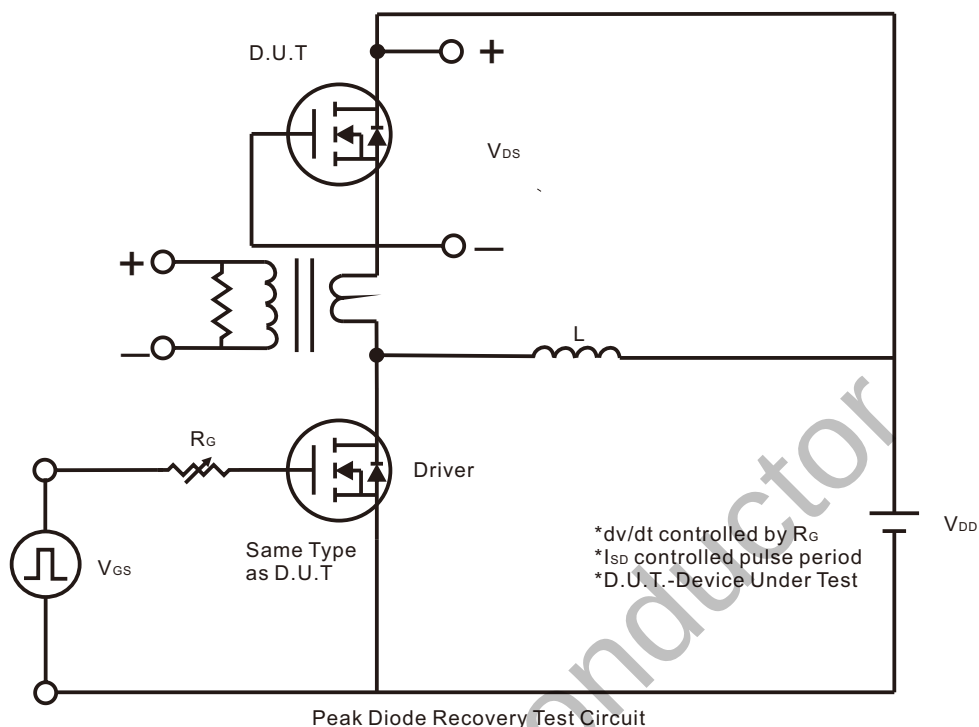
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

Peak Diode Recovery dv/dt Test Circuit & Waveform



Package Dimension

TO-220F

Unit: mm

