

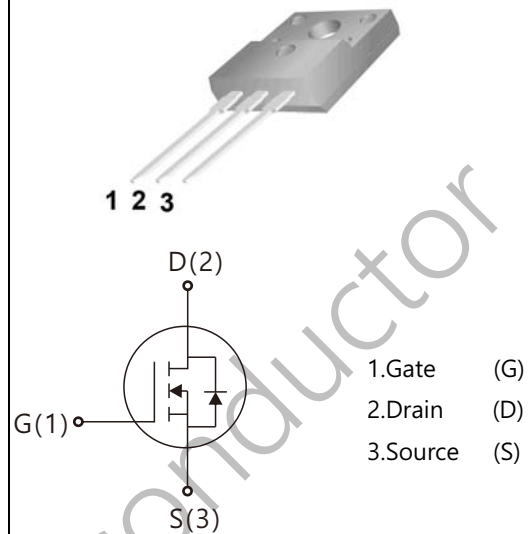


WGF4N65SE

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg=14nC (Typ.).
- BVDS=650 V, I_D=4A
- R_{DS(on)} : 2.50Ω (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	4.0
		T _j =100°C	2.7
V _{GS(TH)}	Gate Threshold Voltage	30	V
E _{AS}	Single Pulse Avalanche Energy (note1)	120	mJ
I _{AR}	Avalanche Current (note2)	4.0	A
P _D	Power Dissipation (T _j =25°C)	50	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	$I_D=250\mu A, V_{GS}=0$	650	-	-	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D=250\mu A$, Reference to 25°C	-	0.67	-	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V$	-	-	10	μA
		$V_{DS}=520V, T_J=125^\circ C$			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						
$V_{GS(TH)}$	Gate Threshold Voltage	$I_D=250\mu A, V_{DS}=V_{GS}$	2	-	4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$I_D=2.0A, V_{GS}=10V$	-	-	2.5	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0, f=1.0MHz$	-	560	-	pF
C_{oss}	Output Capacitance		-	48	-	
C_{rss}	Reverse Transfer Capacitance		-	5.4	-	
Switching Characteristics						
$T_d(on)$	Turn-On Delay Time	$V_{DD}=325V, I_D=4A, R_G=25\Omega$ (Note 3,4)	-	25		nS
T_r	Turn-On Rise Time		-	45		
$T_d(off)$	Turn-Off Delay Time		-	25		
T_f	Turn-Off Rise Time		-	35		
Q_g	Total Gate Charge	$V_{DS}=520V, V_{GS}=10V, I_D=4A$ (Note3,4)	-	14.3		nC
Q_{gs}	Gate-Source Charge		-	2.8	-	
Q_{gd}	Gate-Drain Charge		-	4.5	-	
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Max. Diode Forward Current	-		-	4	A
I_{SM}	Max. Pulsed Forward Current	-		-	16	
V_{SD}	Diode Forward Voltage	$I_D=4A$	-	-	1.4	V
T_{rr}	Reverse Recovery Time	$I_S=4A, V_{GS}=0V, diF/dt=100A/\mu s$	-	393	-	nS
Q_{rr}	Reverse Recovery Charge	(Note3)	-	1.5	-	μC

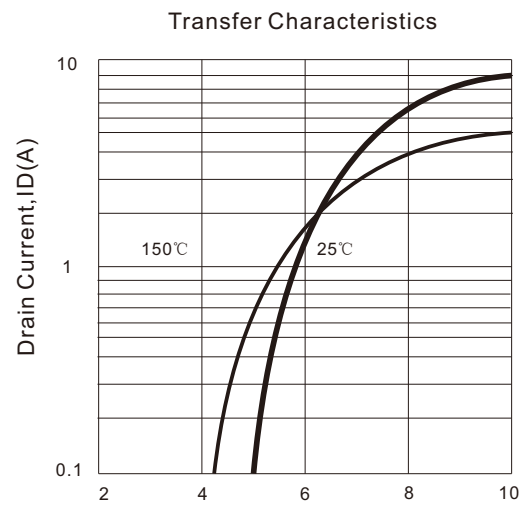
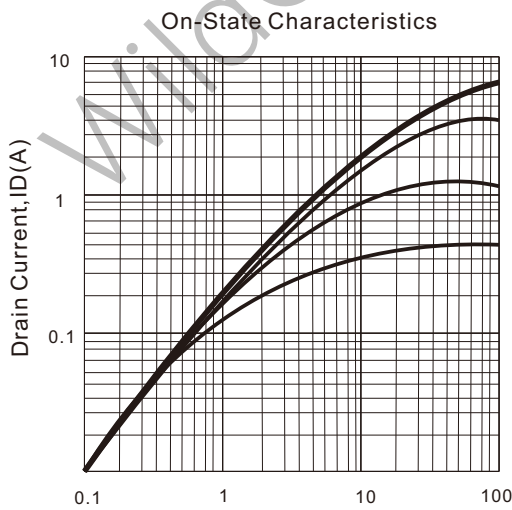
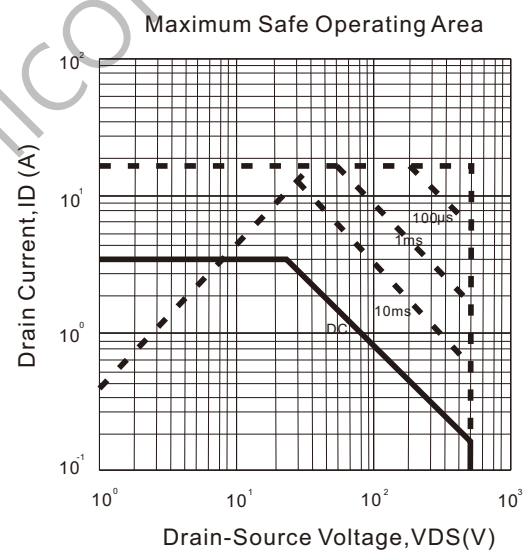
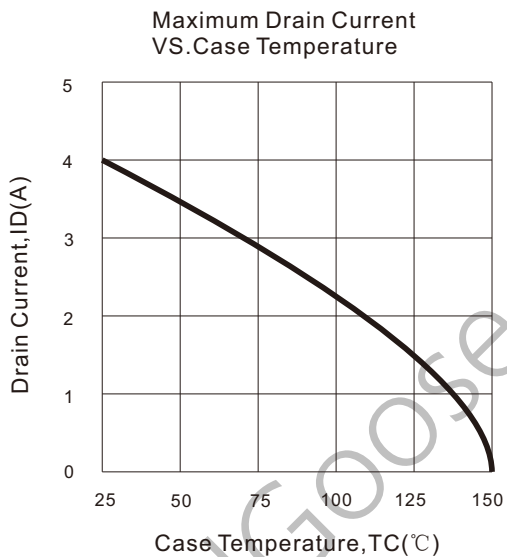
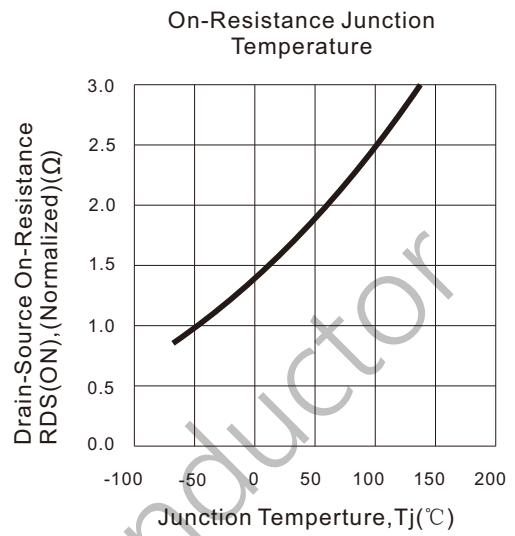
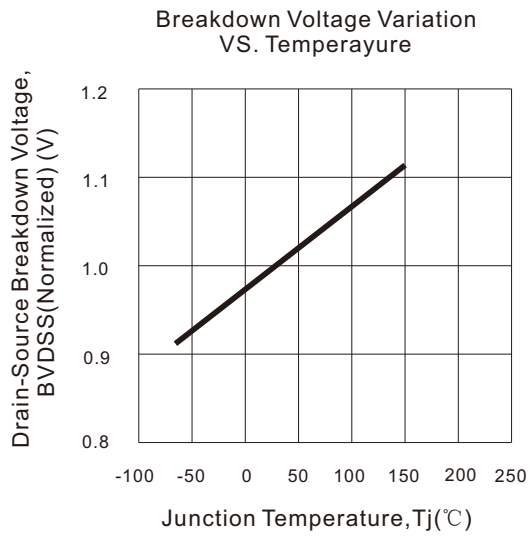
Notes : 1, L=0.5mH, IAS= 4A, VDD=50V, RG=25 Ω , Starting T_J =25°C

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

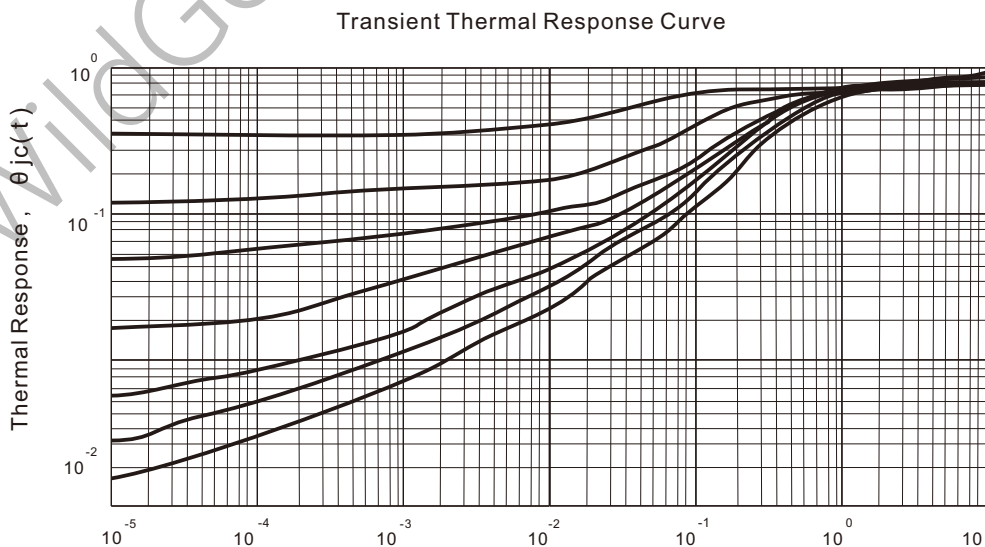
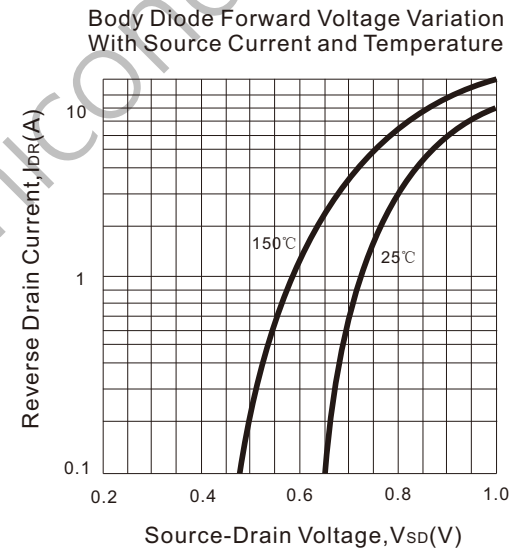
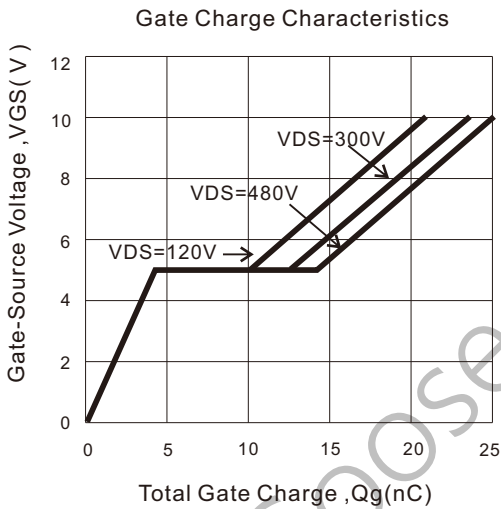
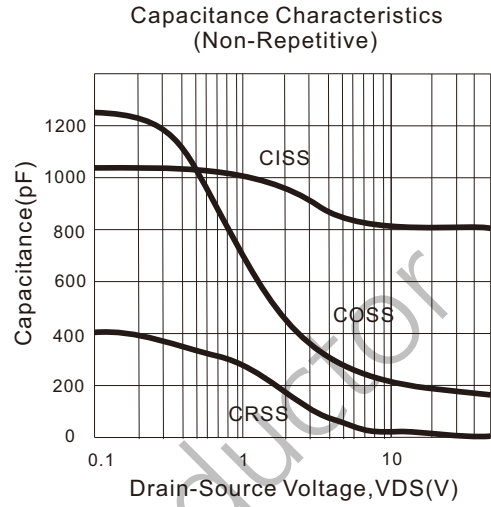
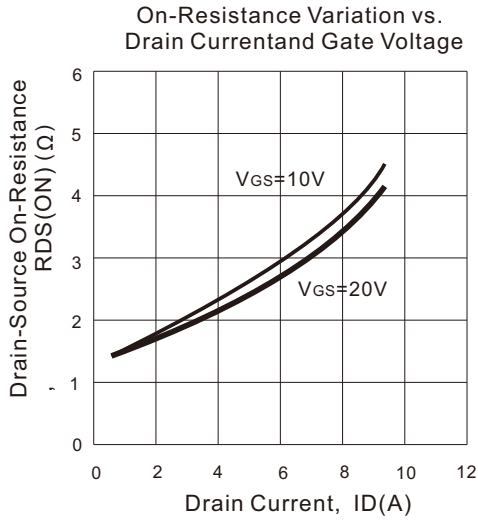
3, Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

4, Essentially Independent of Operating Temperature

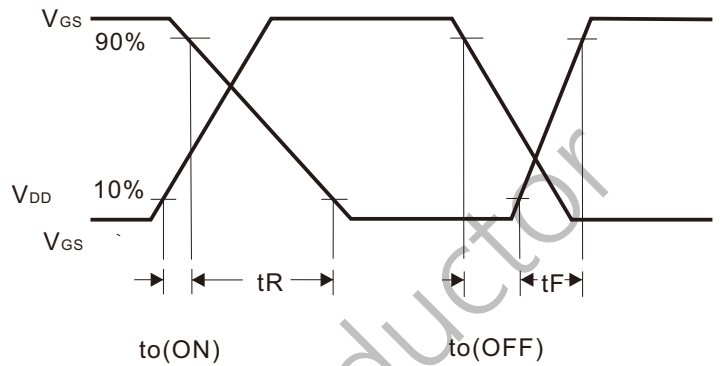
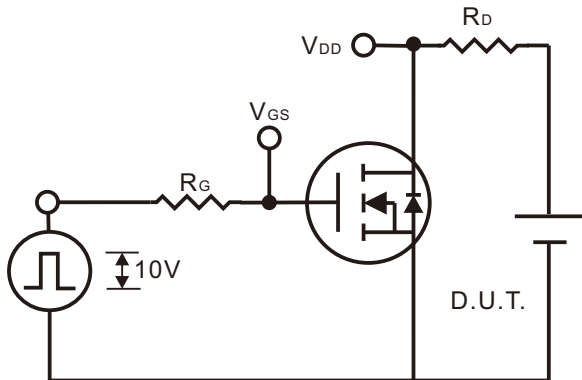
Typical Characteristics



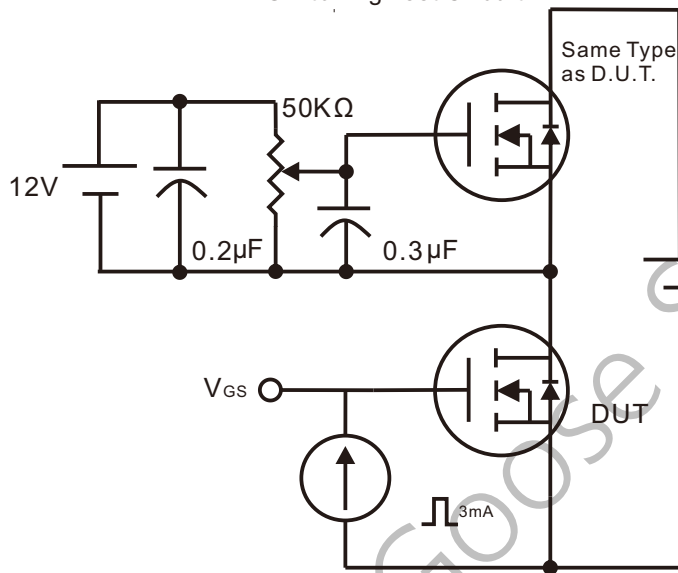
Typical Characteristics (Continued)



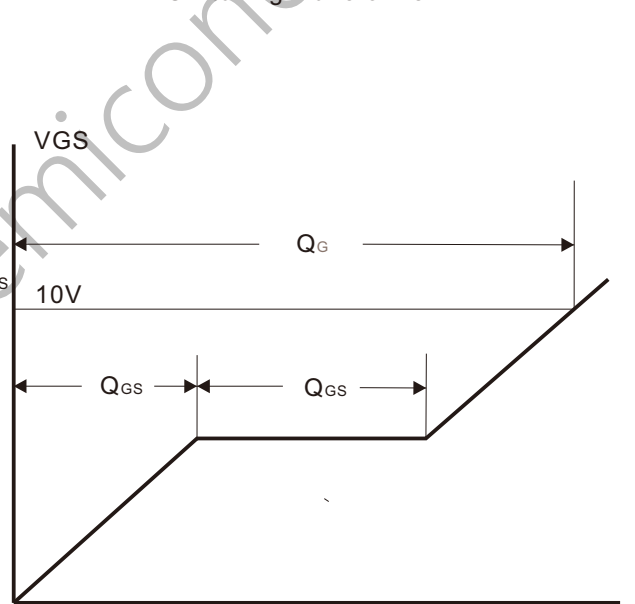
Gate Charge Test Circuit & Waveform



Switching Test Circuit

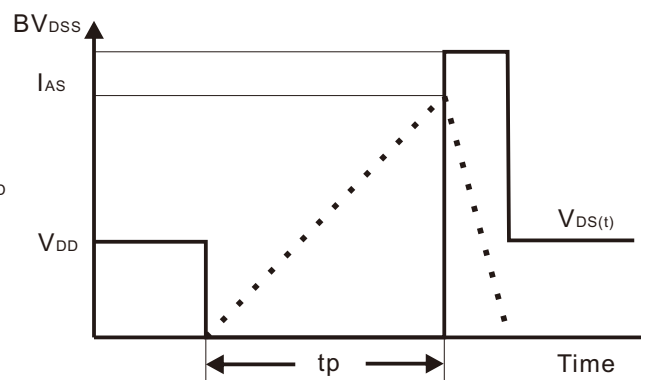
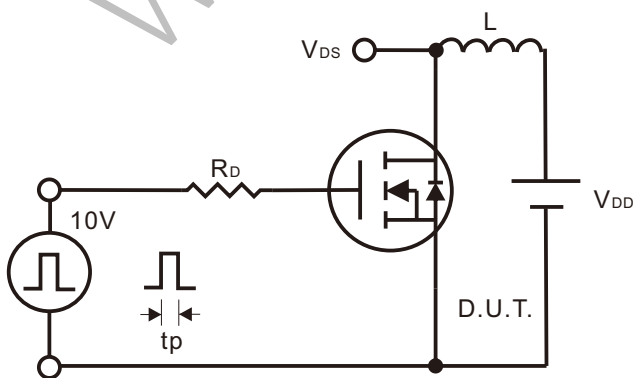


Switching Waveforms



Gate Charge Test Circuit

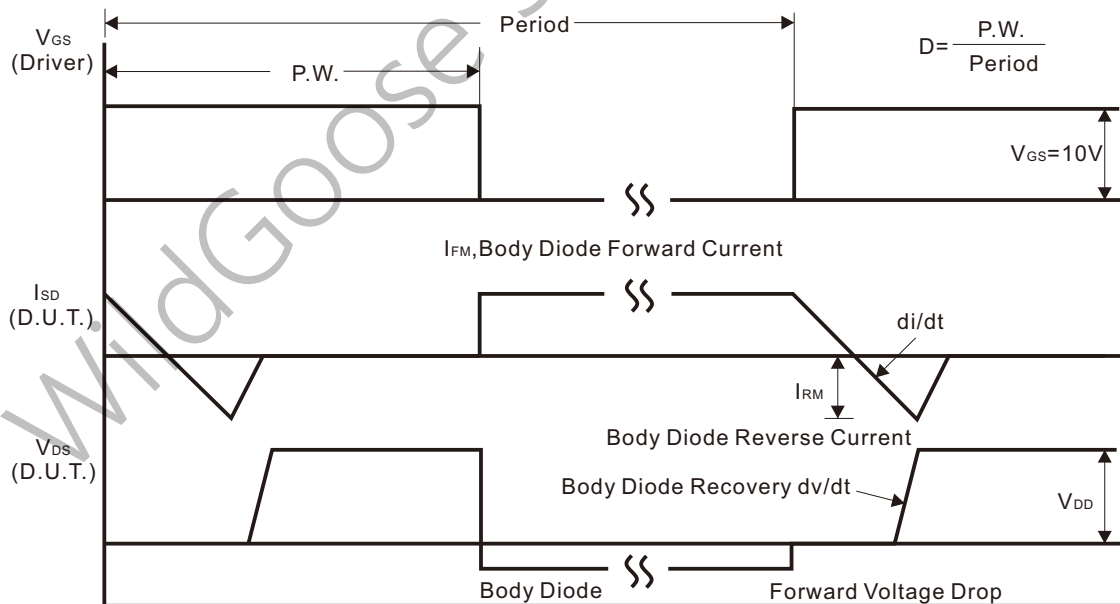
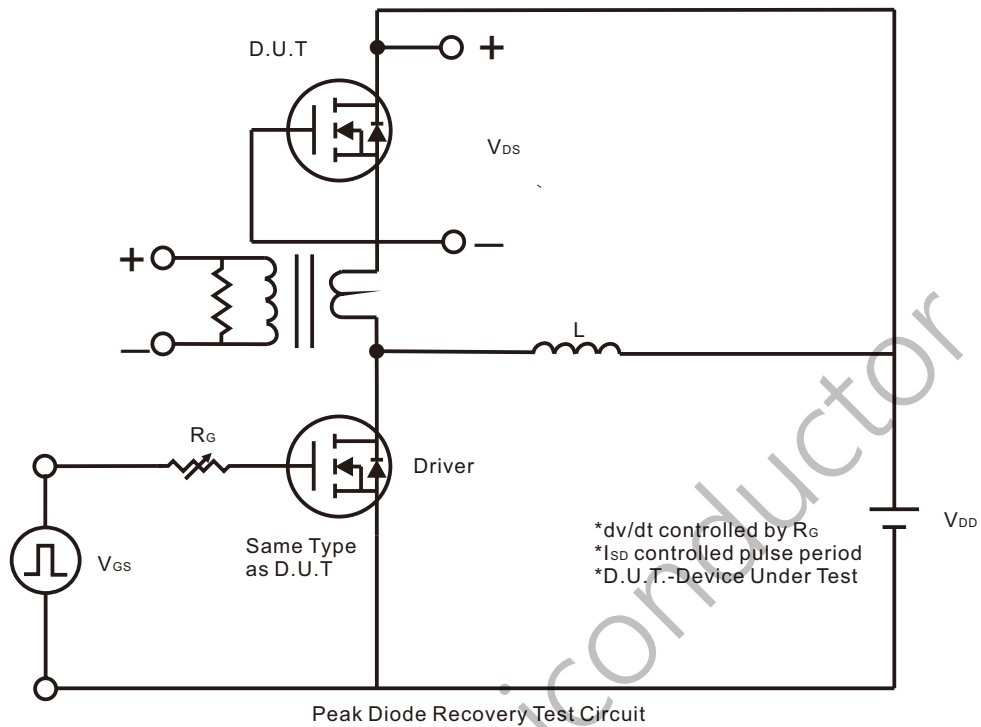
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

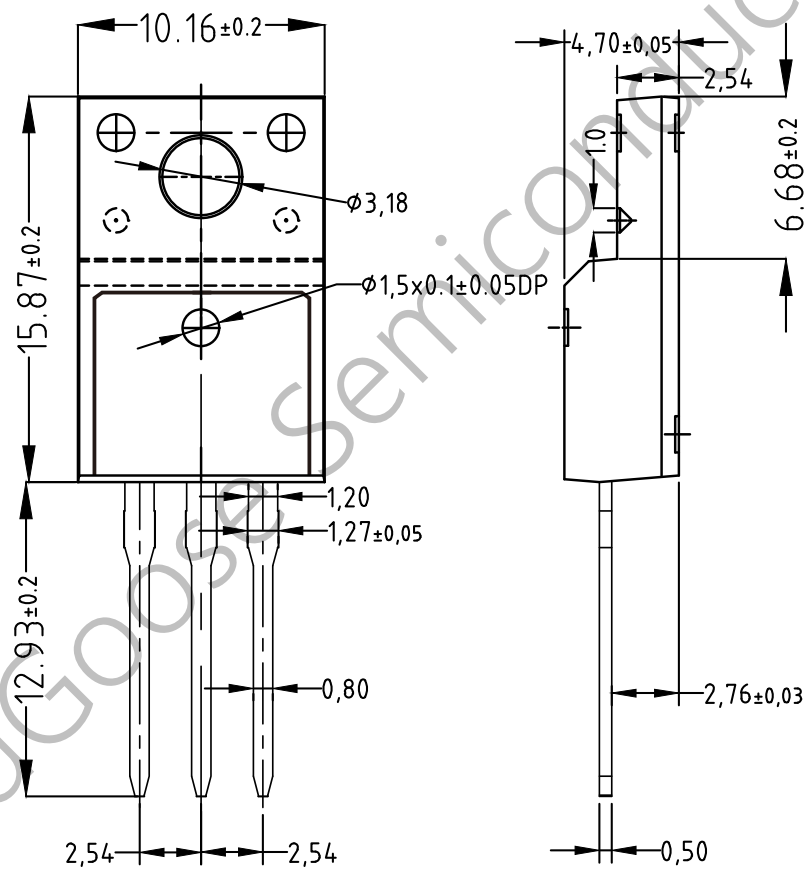
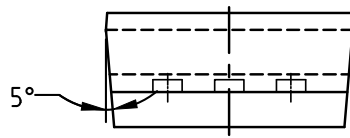
Peak Diode Recovery dv/dt Test Circuit & Waveform



Package Dimension

TO-220F

Unit: mm



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