

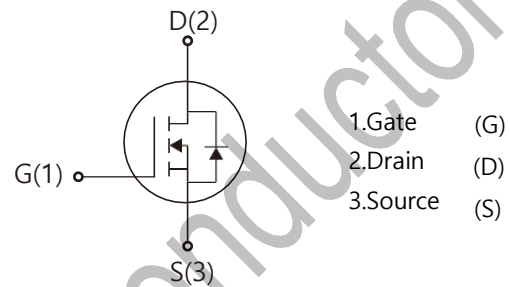
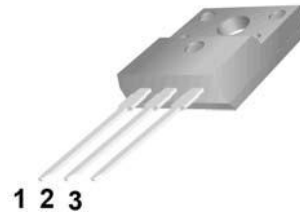


WGF65R850

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge : $Q_g=12\text{ nC(Typ.)}$.
- ☐ $V_{DS}=650\text{ V}, I_D=6\text{ A}$
- ☐ $R_{DS(on)} : 0.85\ \Omega\ (\text{Max})\ @V_G=10\text{ V}$
- ☐ 100% Avalanche Tested

TO-220F



Absolute Maximum Ratings ($T_a=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	650	V
I_D	Drain Current $T_j=25^\circ\text{C}$	6.0	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy (note1)	120	mJ
I_{DM}	Pulsed Drain Current (note2)	18	A
P_D	Power Dissipation ($T_j=25^\circ\text{C}$)	26	W
T_j	Junction Temperature(Max)	150	$^\circ\text{C}$
T_{stg}	Storage Temperature	$-55\sim+150$	$^\circ\text{C}$
dv/dt	MOSFET dv/dt ruggedness, $V_{DS}=0\text{V}\dots 480\text{V}$	50	V/nS

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction to Case	-	3.13	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	-	70	$^\circ\text{C/W}$

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
$\Delta BVDSS/ \Delta T_J$	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	$I_D=3A, V_{GS}=10V$	-	0.78	0.85	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0, f=1.0MHz$	-	350	-	pF
C_{oss}	Output Capacitance		-	350	-	
C_{rss}	Reverse Transfer Capacitance			20	-	
Switching Characteristics						
$T_d(on)$	Turn-On Delay Time	$V_{DD}=300V, I_D=3A, R_G=25\Omega$ (Note 3,4)	-	17		nS
T_r	Turn-on Rise Time		-	22		
$T_d(off)$	Turn-Off Delay Time		-	30		
T_f	Turn-Off Rise Time		-	30		
Q_g	Total Gate Charge	$V_{DS}=300V, V_{GS}=10V, I_D=6A$ (Note3,4)	-	12		nC
Q_{gs}	Gate-Source Charge		-	3.5	-	
Q_{gd}	Gate-Drain Charge		-	5.6	-	
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Max. Diode Forward Current	-		-	6	A
I_{SM}	Max. Pulsed Forward Current	-		-	18	
V_{SD}	Diode Forward Voltage	$I_D=6A$	-	-	1.5	V
T_{rr}	Reverse Recovery Time	$I_S=6A, V_{GS}=0V, diF/dt=100A/\mu s$	-	290	-	nS
Q_{rr}	Reverse Recovery Charge	(Note3)	-	2.2	-	μC

Notes : 1, L=0.5mH, IAS= 6A, 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

Fig.1 Power Dissipation Derating Curve

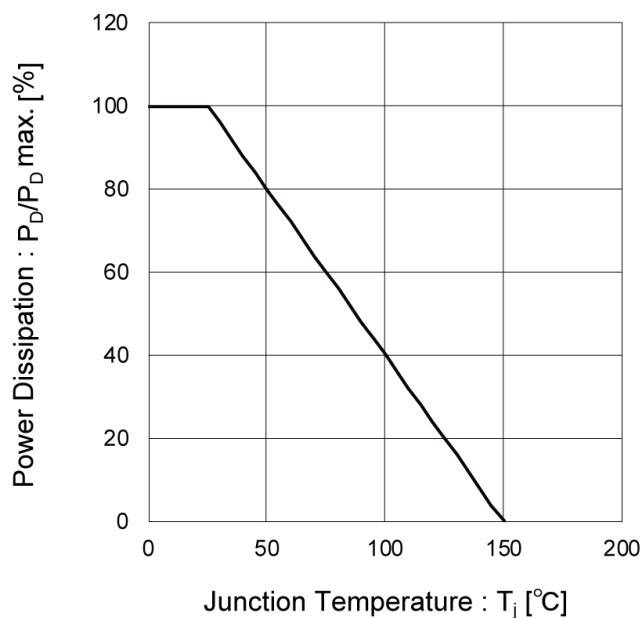


Fig.2 Drain Current Derating Curve

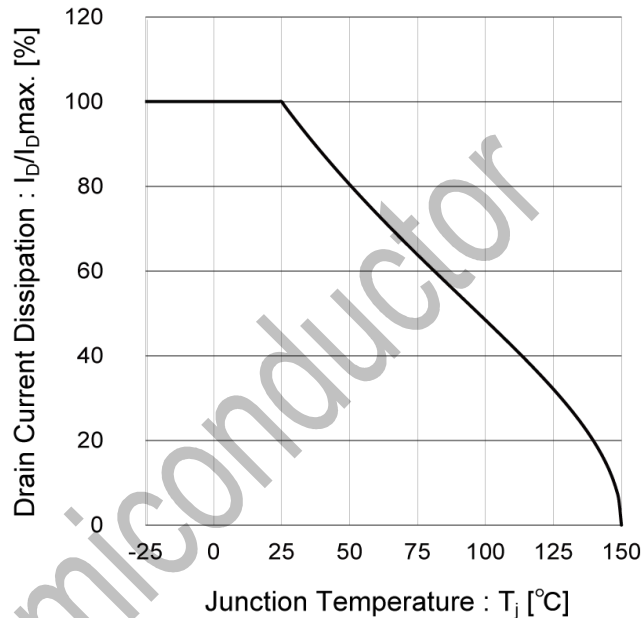


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

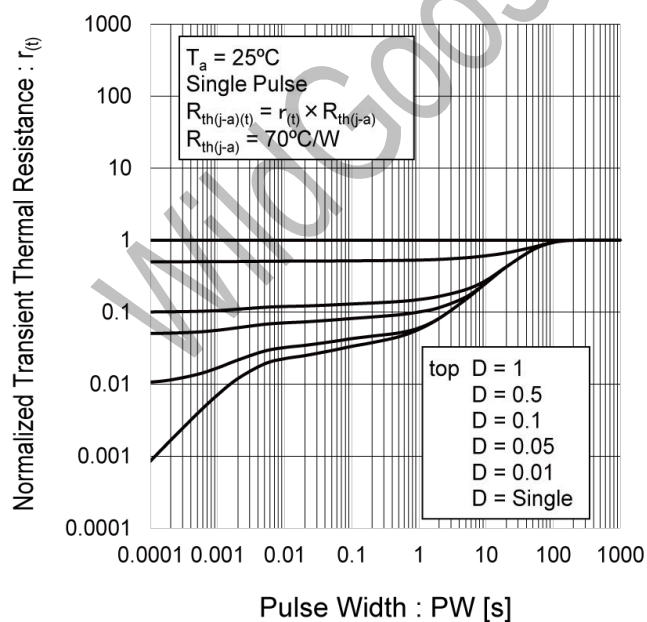
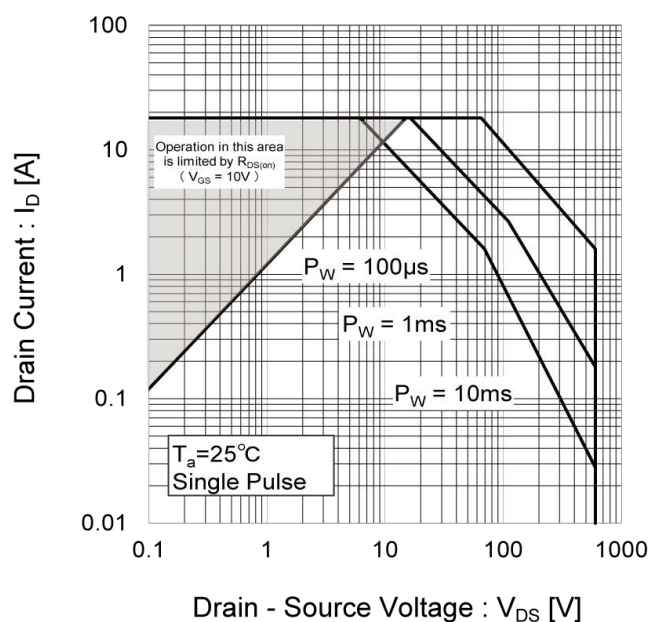


Fig.4 Maximum Safe Operating Area



Typical Characteristics (Continued)

Fig.5 Avalanche Energy Drating Curve vs. Junction Tempreture

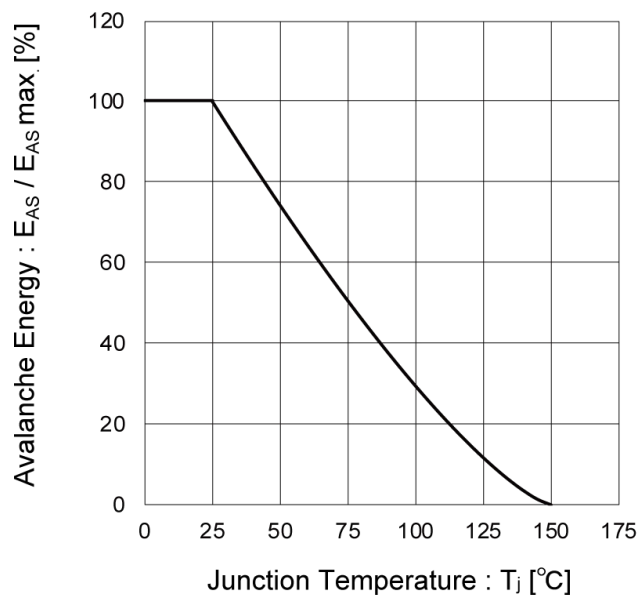


Fig.6 Breakdown Voltage vs. Junction Temperature

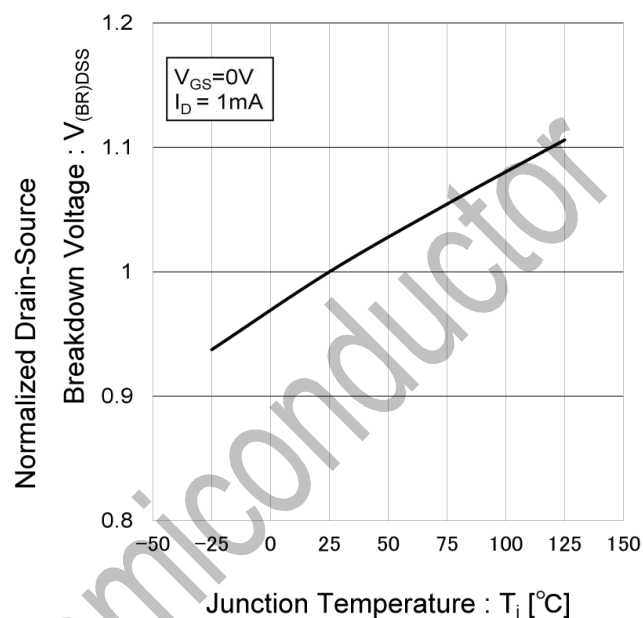


Fig.7 Typical Output Characteristics(I)

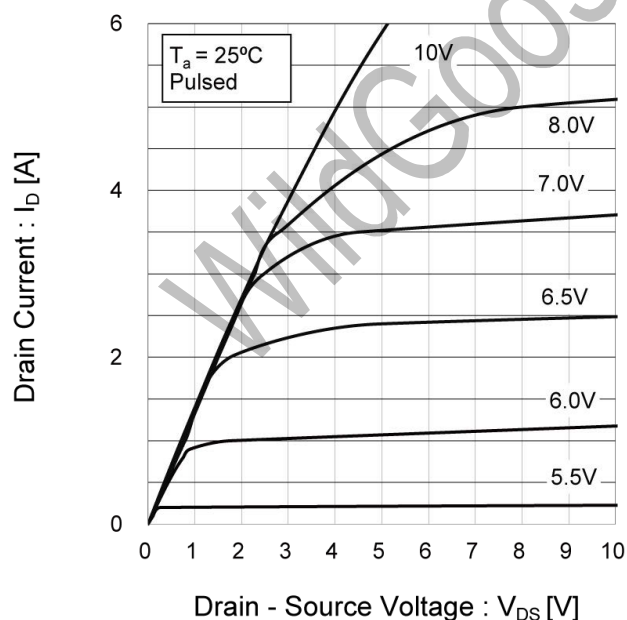


Fig.8 Typical Output Characteristics(II)

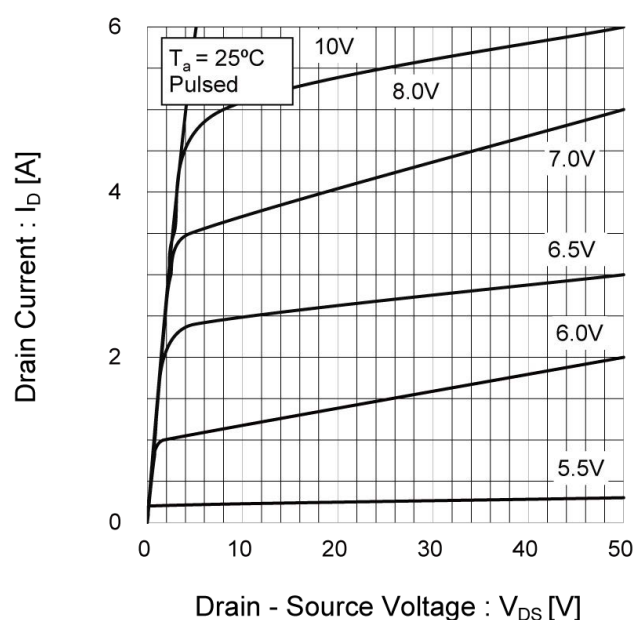


Fig.9 Typical Transfer Characteristics

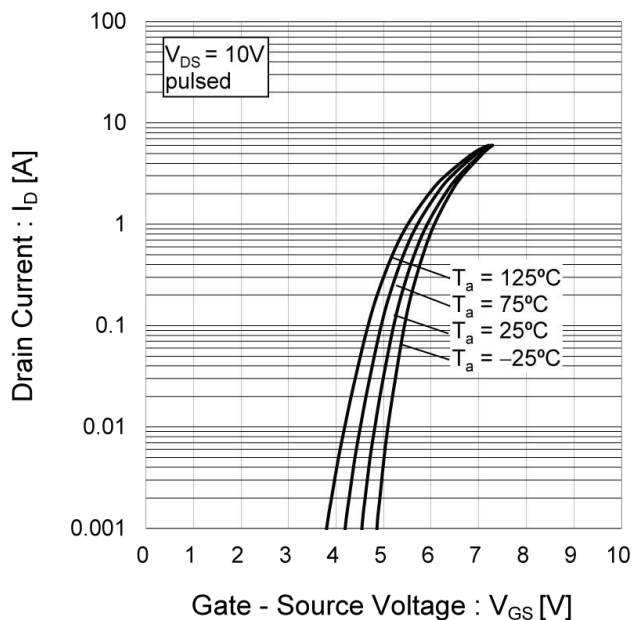


Fig.10 Gate Threshold Voltage vs. Junction Temperature

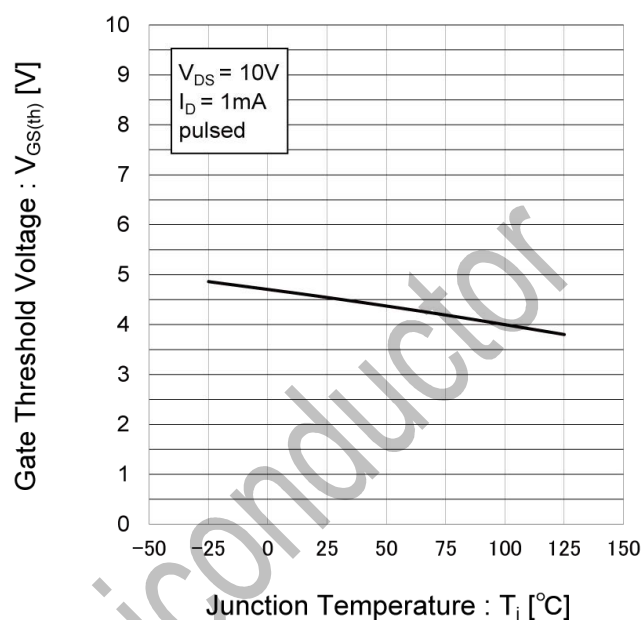


Fig.11 Static Drain - Source On - State Resistance vs. Drain Current

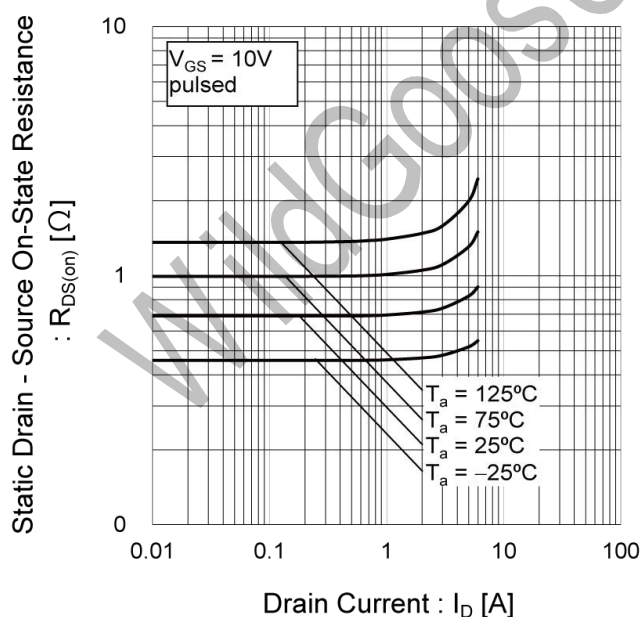


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage

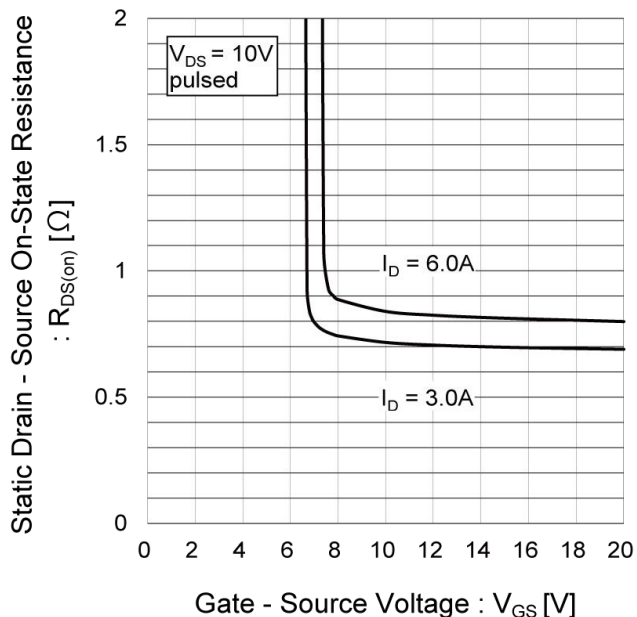


Fig.13 Static Drain - Source
On - State Resistance
vs. Junction Temperature

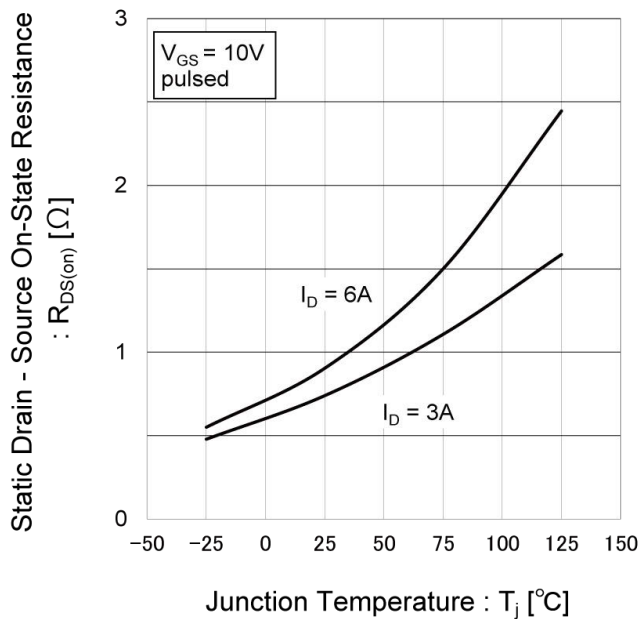


Fig.14 Typical Capacitance vs.
Drain - Source Voltage

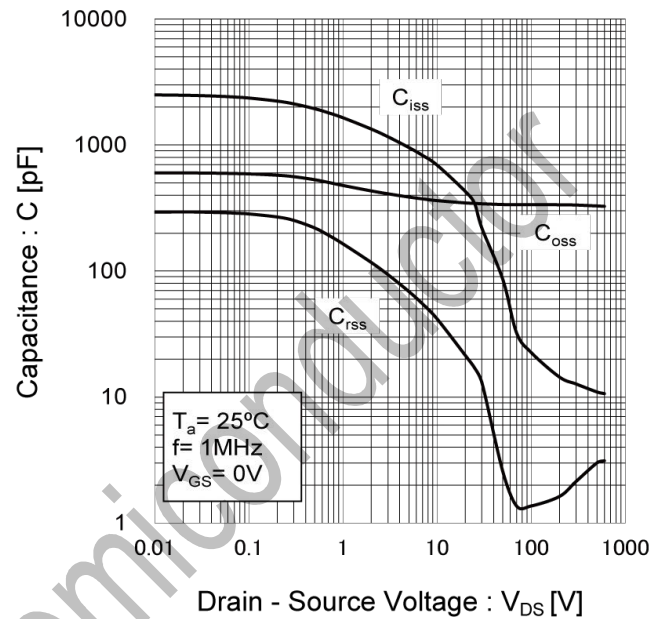


Fig.15 Switching Characteristics

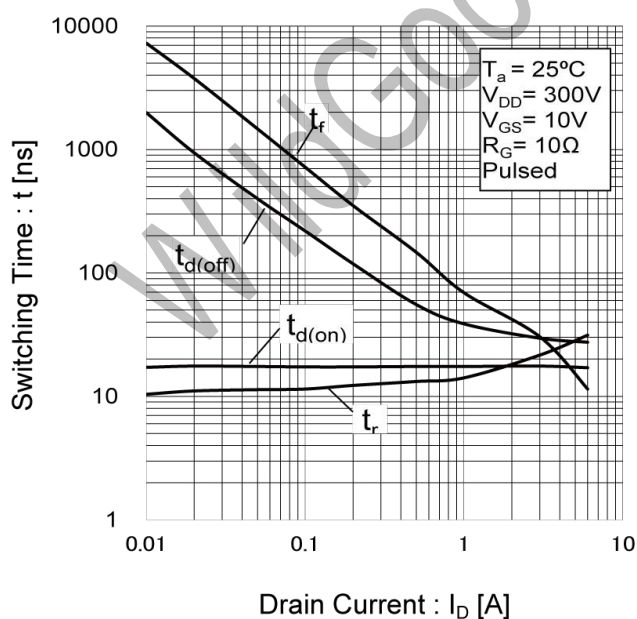


Fig.16 Typical Gate Charge

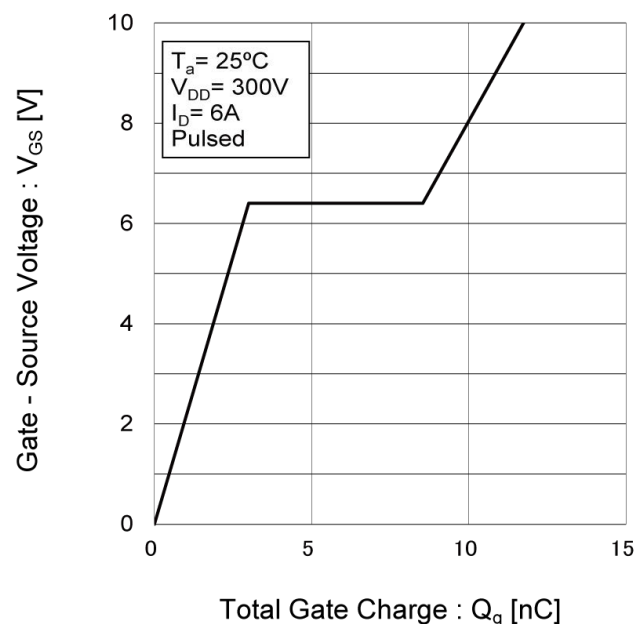


Fig.17 Source Current
vs. Source - Drain Voltage

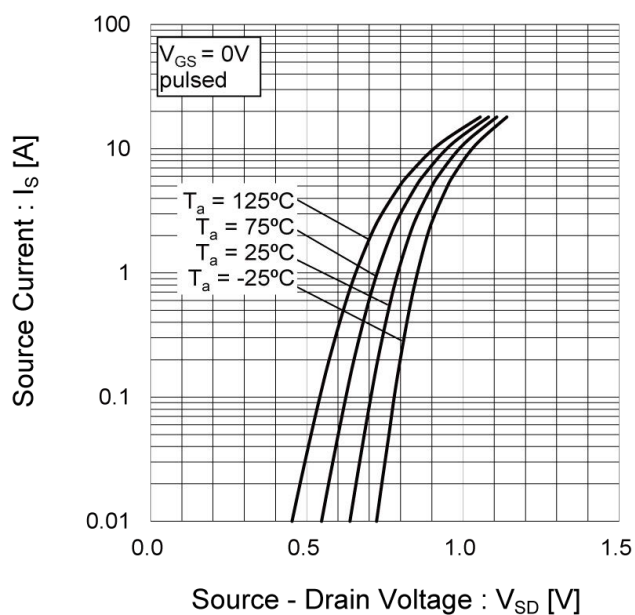
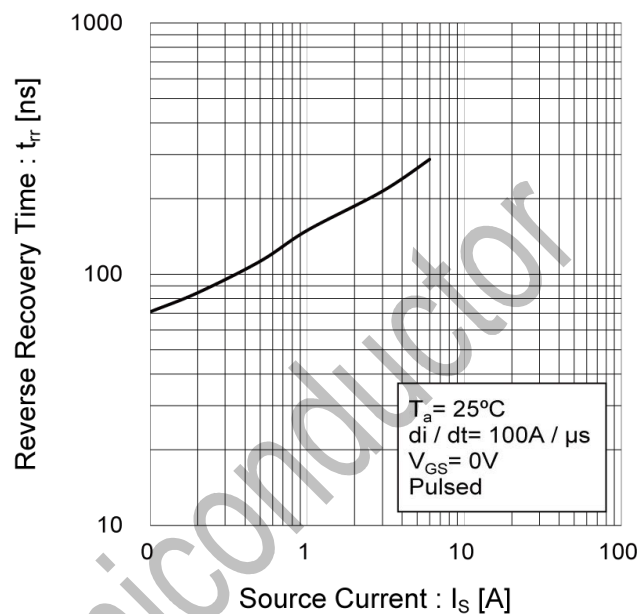


Fig.18 Reverse Recovery Time vs.
Source Current



Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

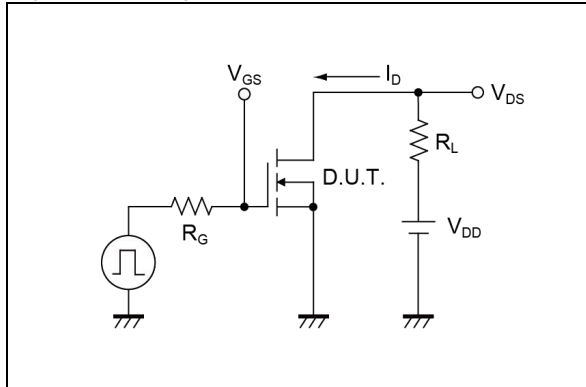


Fig.1-2 Switching Waveforms

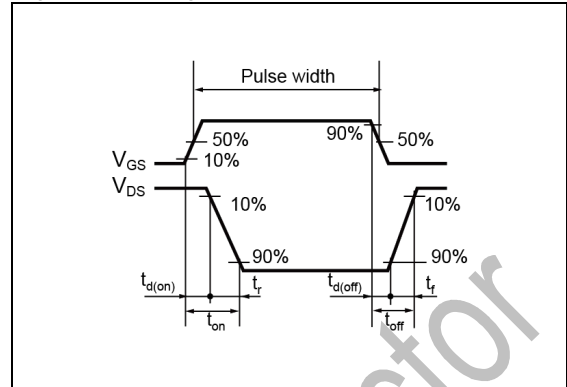


Fig.2-1 Gate Charge Measurement Circuit

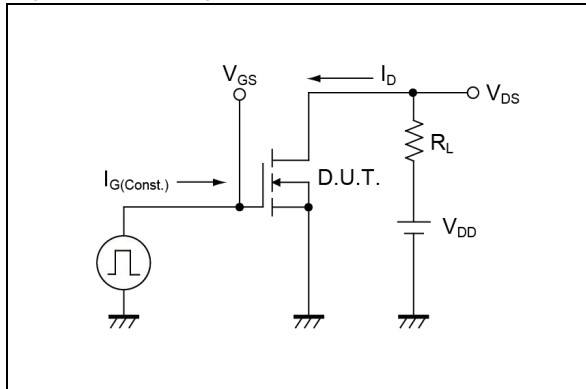


Fig.2-2 Gate Charge Waveform

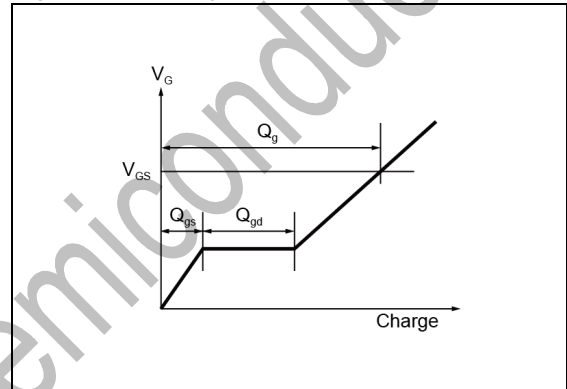


Fig.3-1 Avalanche Measurement Circuit

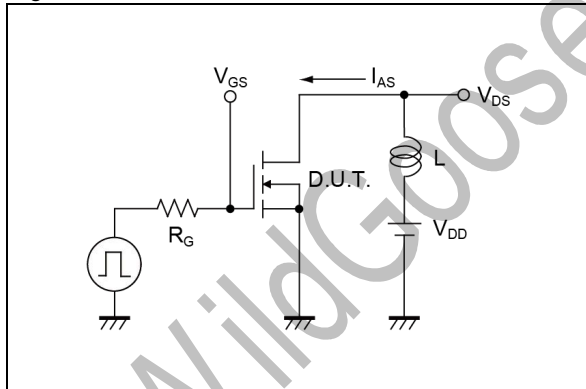


Fig.3-2 Avalanche Waveform

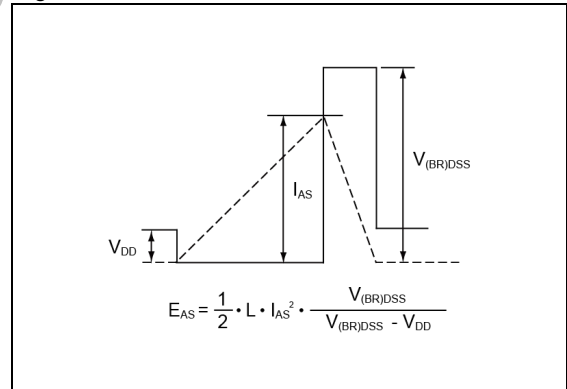


Fig.4-1 trr Measurement Circuit

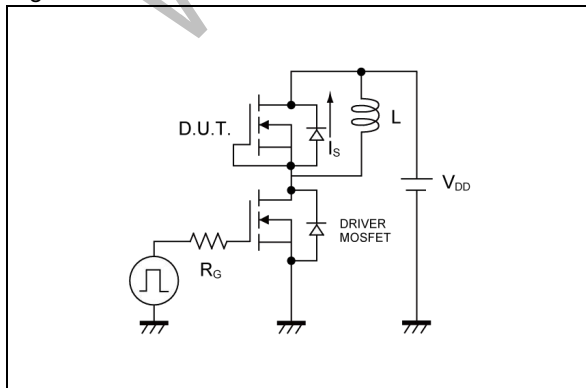
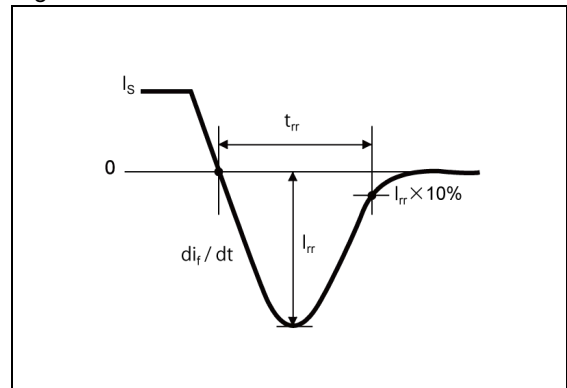


Fig.4-2 trr Waveform



Package Dimension

TO-220F

Unit: mm

