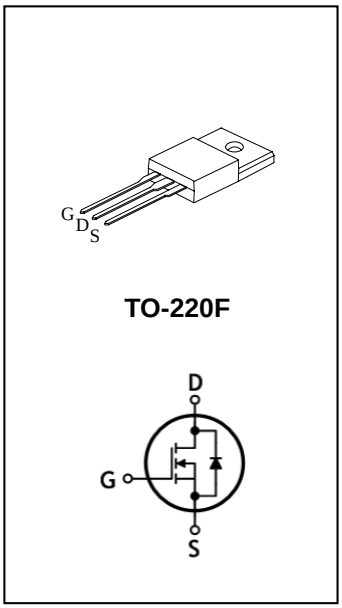
FTK12N65F-A

N-CHANNEL POWER MOSFET



●FEATURES

High Voltage : BV_{DSS} =650V(Min.)

Low reverse transfer capacitance : C_{rss}=14.5pF(Typ.)

Low gate charge : Qg= 38nC(Typ.)

Low drain-source On resistance : $R_{DS(on)}$=0.68Ω(Typ.)

100% avalanche tested

● Ordering Information

Part No	Package	Packing	Finish	Halogen	Packing Unit
FTK12N65F-A	TO-220F	Tube	Sn	Free	5,000ea

● Maximum Ratings (Tc=25°C, unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DSS}		650	V
Gate-source voltage	V_{GSS}		± 30	V
Drain current (DC)*	I_D	Tc = 25°C	12	A
		Tc = 100°C	7.58	
Drain current (Pulsed)*	I_{DM}		48	A
Power Dissipation – TO-220F	P_D		50	W
Avalanche current (Single) (Note 2)	I_{AS}		12	A
Single pulsed avalanche energy (Note 2)	E_{AS}		140	mJ
Avalanche current (Repetitive) (Note 1)	I_{AR}		12	A
Repetitive avalanche energy (Note 1)	E_{AR}		7.6	mJ
Junction temperature	T_J		150	°C
Storage temperature range	T_{stg}		-55~150	

*Limited only maximum junction temperature

● Thermal Characteristic

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 2.7	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62.5	

● Electrical Characteristics (Tc=25°C, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D = 250uA, V_{GS}= 0	650	–	–	V
Gate threshold voltage	$V_{GS(th)}$	I_D = 250uA, V_{DS} = V_{GS}	3	–	5	V
Drain-source cut-off current	I_{DSS}	V_{DS} = 650V, V_{GS} = 0V	–	–	1	uA
Gate leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ± 30V	–	–	± 100	nA
Drain-source on-resistance (Note 4)	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 6.0A	–	0.68	0.80	Ω
Forward transfer conductance (Note 4)	g_{fs}	V_{DS} = 10V, I_D = 6.0A	–	13.5	–	S
Input capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	–	2470	2882	pF
Output capacitance	C_{oss}		–	160	–	
Reverse transfer capacitance	C_{rss}		–	14.5	–	
Turn-on delay time (Note 3,4)	$T_{d(on)}$	V_{DS} = 300V, I_D = 12A, RG = 25Ω	–	38	–	ns
Rise time (Note 3,4)	T_r		–	95	–	
Turn-off delay time (Note 3,4)	$t_{d(off)}$		–	155	–	
Fall time (Note 3,4)	t_f		–	105	–	
Total gate charge (Note 3,4)	Q_g	V_{DS} = 520V,V_{GS} = 10V I_D = 12A	–	38	45	nC
Gate-source charge (Note 3,4)	Q_{gs}		–	15	–	
Gate-drain charge (Note 3,4)	Q_g		–	9	–	

● Source-Drain Diode Ratings and Characteristics (Tc=25°C, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	–	–	12	A
Source current (Pulsed) (Note 1)	I_{SM}		–	–	48	A
Forward voltage (Note 4)	V_{SD}	V_{GS} = 0V, I_S = 12A	–	–	1.4	V
Reverse recovery time	t_{rr}	I_S = 12A, V_{GS} = 0V dIF/dt = 100A/us	–	500	–	ns
Reverse recovery charge	Q_{rr}		–	4.3	–	uC

Note :

1. Repetitive rating : Pulse wid h limited by maximum junction temperature.
2. L=1.8mH, I_{AS}=12A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. Pulse Test : Pulse wid h ≤ 300us, Duty cycle≤ 2%
4. Essentially independent of operating temperature

● Typical Characteristics

Fig. 1 Typical Output Characteristics

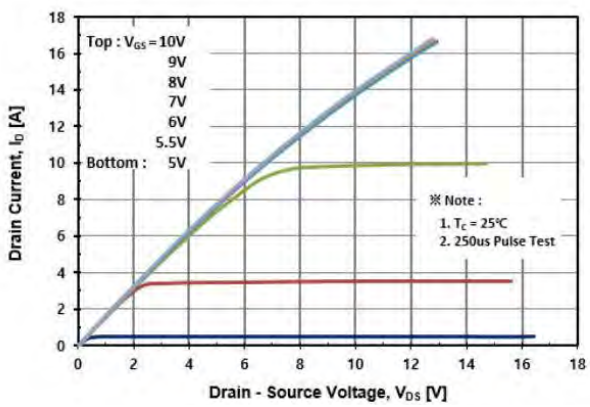


Fig. 2 Typical Output Characteristics

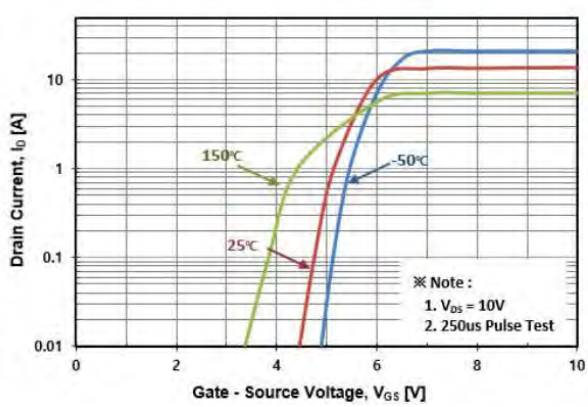


Fig.3 On-Resistance Variation with Drain Current and Gate Voltage

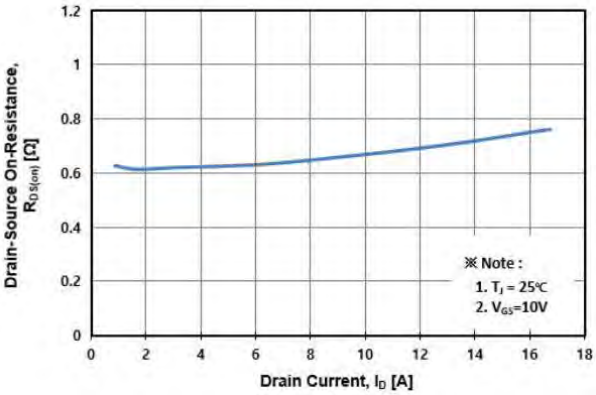


Fig. 4 Body Diode Forward Voltage Variation with Source Current

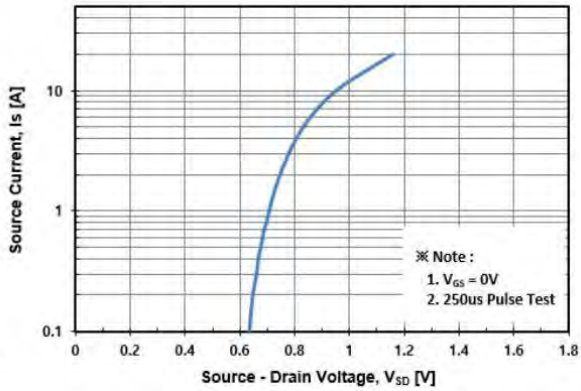


Fig. 5 Typical Capacitance Characteristics

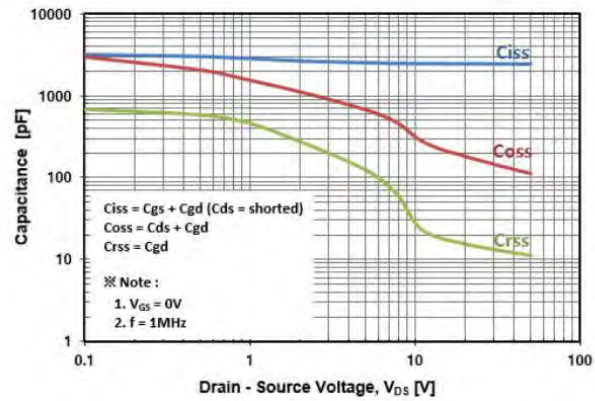
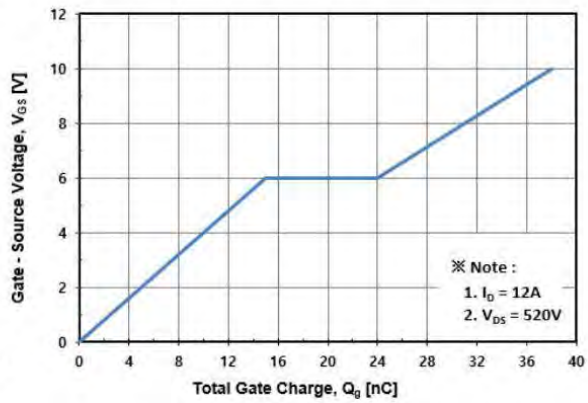


Fig. 6 Typical Total Gate Charge Characteristics



● Typical Characteristics

Fig. 7 Breakdown Voltage Variation vs. Temperature

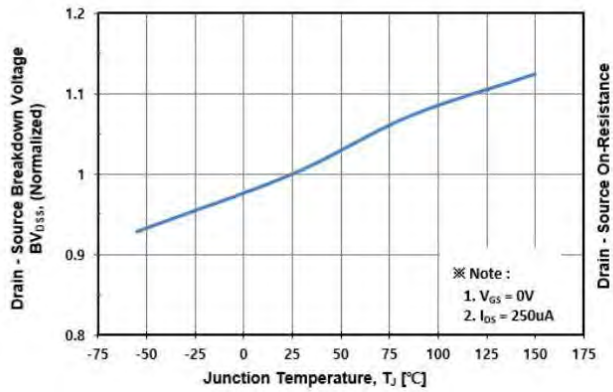


Fig. 8 On-Resistance Variation vs. Temperature

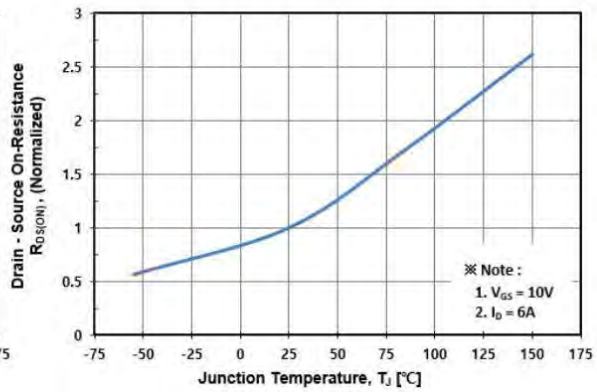


Fig. 9 Maximum Drain Current vs. Case Temperature

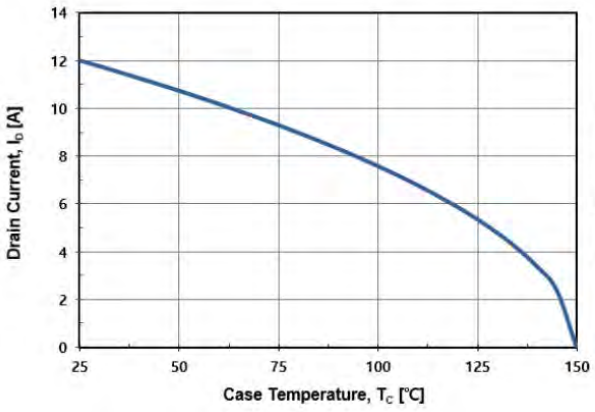


Fig. 10 Maximum Safe Operating Area

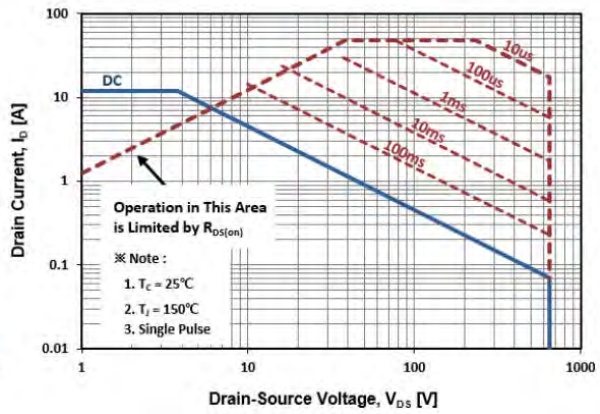


Fig. 11 Transient Thermal Impedance

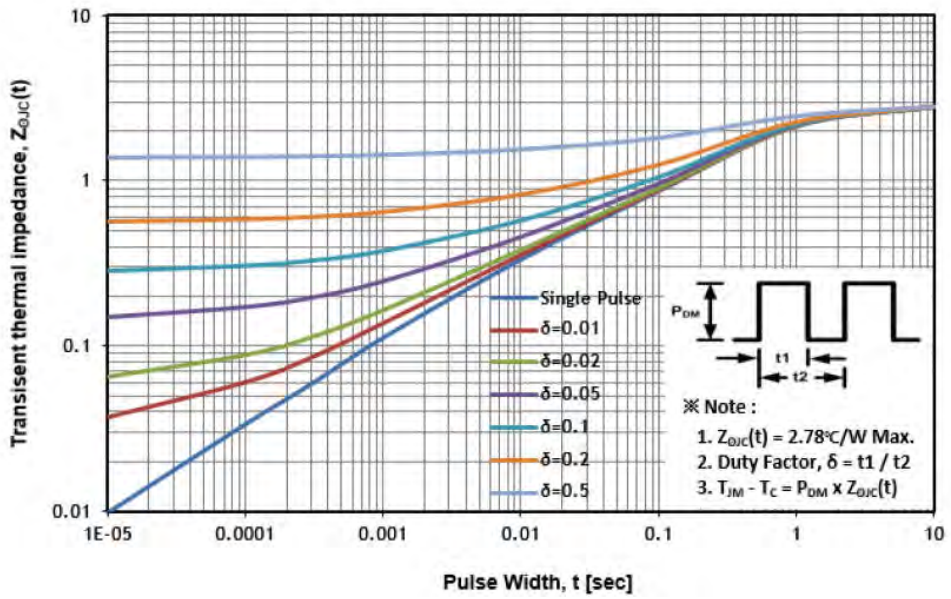


Fig. 12 Gate Charge Test Circuit & Waveform

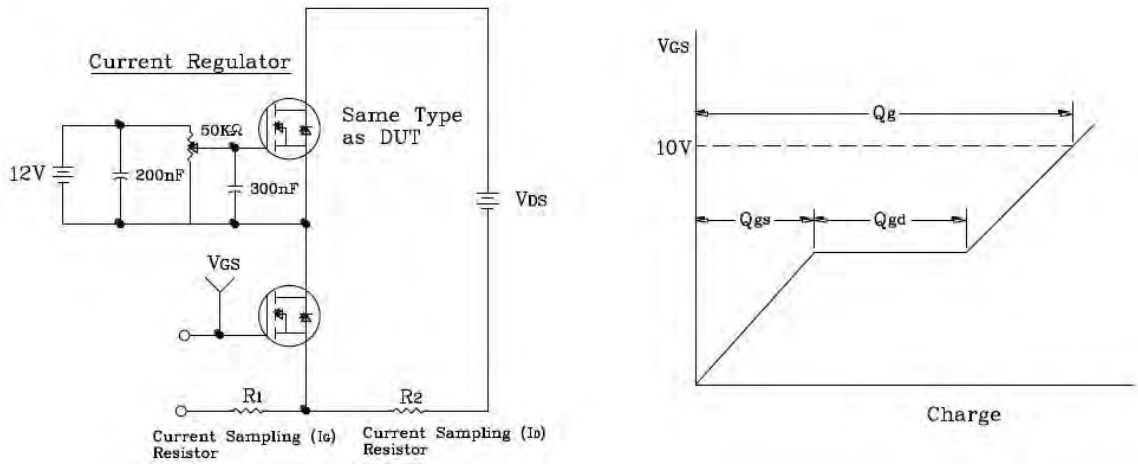


Fig. 13 Resistive Switching Test Circuit & Waveform

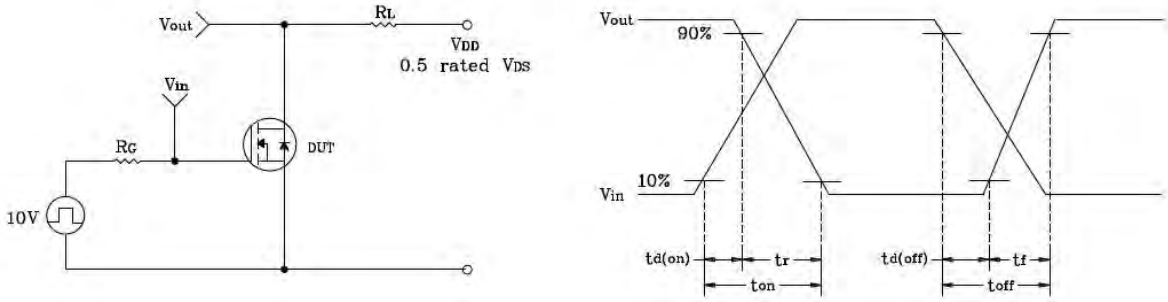


Fig. 14 E_{AS} Test Circuit & Waveform

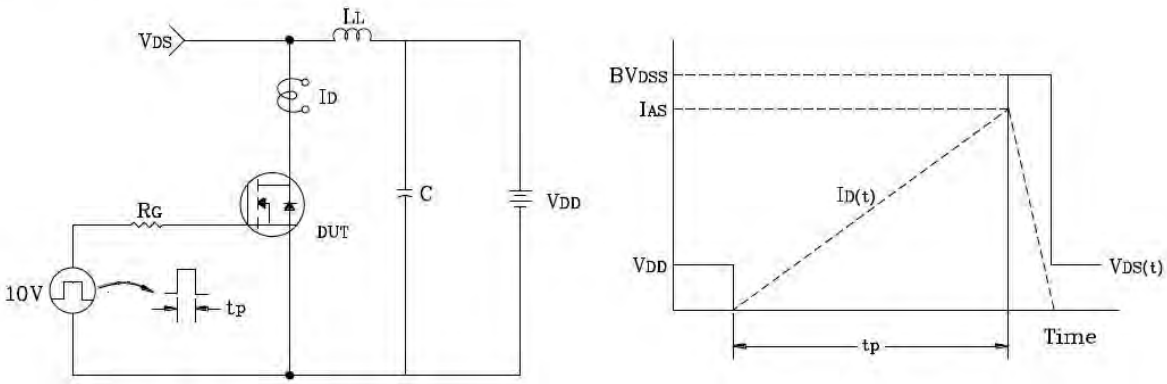
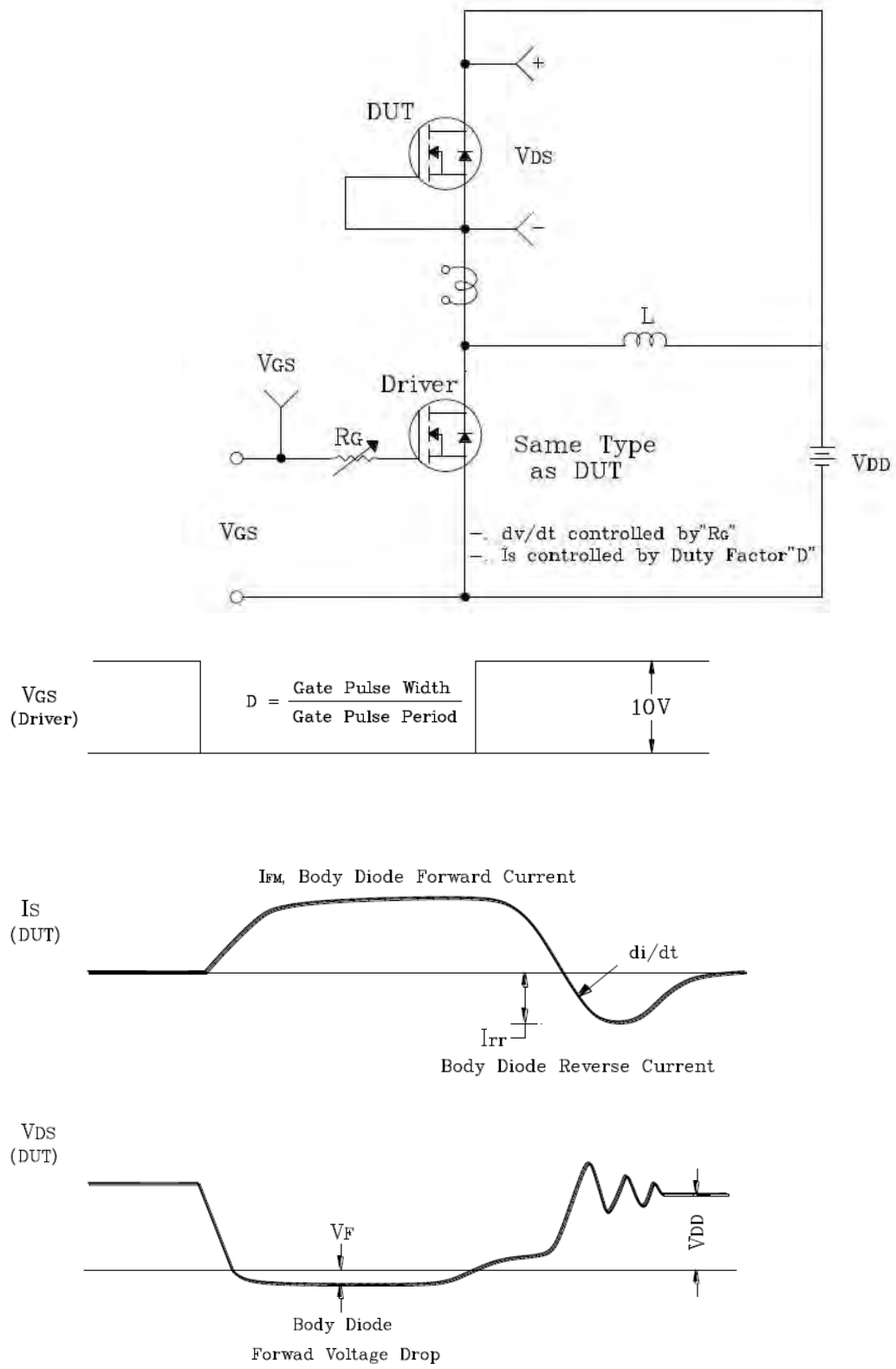


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform



● Package Dimensions

(TO‑220F)