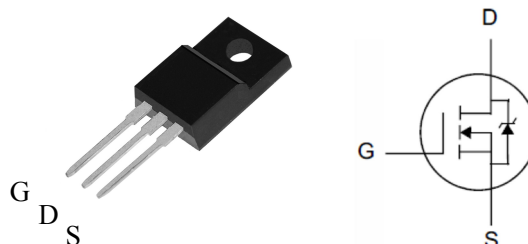


General Features

- Advanced Planar Process
- $R_{DS(ON),typ.}=370m\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Rugged Poly silicon Gate Structure

Applications

- BLDC Motor Driver
- Electric Welder
- High Efficiency SMPS



TO-220F Package

Absolute Maximum Ratings

$T_C=25^{\circ}C$ unless otherwise specified

Symbol	Parameter	SWF25N65	Unit
V_{DSS}	Drain-to-Source Voltage	650	V
V_{GSS}	Gate-to-Source Voltage	± 30	
I_D	Continuous Drain Current	26	A
	Continuous Drain Current @ $T_C=100^{\circ}C$	17	
I_{DM}	Pulsed Drain Current at $V_{GS}=10V^{[2,4]}$	104	
E_{AS}	Single Pulse Avalanche Energy	1000	mJ
dv/dt	Peak Diode Recovery $dv/dt^{[3]}$	5.0	V/ns
P_D	Power Dissipation	82	W
	Derating Factor above $25^{\circ}C$	0.66	W/ $^{\circ}C$
T_L T_{PAK}	Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	300 260	$^{\circ}C$
$T_J \& T_{STG}$	Operating and Storage Temperature Range	-55 to 150	

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	SWF25N65	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.52	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	



SWF25N65

650V N-Channel MOSFET

Electrical Characteristics

OFF Characteristics $T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	650	--	--	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS}=650V, V_{GS}=0V$
		--	--	125		$V_{DS}=520V, V_{GS}=0V, T_J=125^\circ\text{C}$
I_{GSS}	Gate-to-Source Leakage Current	--	--	+100	nA	$V_{GS}=+30V, V_{DS}=0V$
		--	--	-100		$V_{GS}=-30V, V_{DS}=0V$

ON Characteristics

$T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	370	420	m Ω	$V_{GS}=10V, I_D=13A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	--	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{FS}	Forward Transconductance	--	32	--	S	$V_{DS}=25V, I_D=13A$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	4.20	--	nF	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$
C_{rss}	Reverse Transfer Capacitance	--	0.20	--		
C_{oss}	Output Capacitance	--	1.40	--		
Q_g	Total Gate Charge	--	78	--	nC	$V_{DD}=325V, I_D=25A, V_{GS}=0 \text{ to } 10V$
Q_{gs}	Gate-to-Source Charge	--	21	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	20	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	30	--	nS	$V_{DD}=325V, I_D=13A, V_{GS}=10V, R_G=10\Omega$
t_{rise}	Rise Time	--	60	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	55	--		
t_{fall}	Fall Time	--	65	--		



SWF25N65

650V N-Channel MOSFET

Source-Drain Body Diode Characteristics

$T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
I_{SD}	Continuous Source Current ^[2]	--	--	25	A	Integral PN-diode in MOSFET
I_{SM}	Pulsed Source Current ^[2]	--	--	104		
V_{SD}	Diode Forward Voltage	--	--	1.5	V	$I_S=25\text{A}$, $V_{GS}=0\text{V}$
trr	Reverse recovery time	--	600	--	ns	$V_{GS}=0\text{V}$, $I_F=25\text{A}$, $di_F/dt=100\text{A}/\mu\text{s}$
Qrr	Reverse recovery charge	--	5.5	--	uC	

Typical Characteristics

Figure 1. Maximum Transient Thermal Impedance

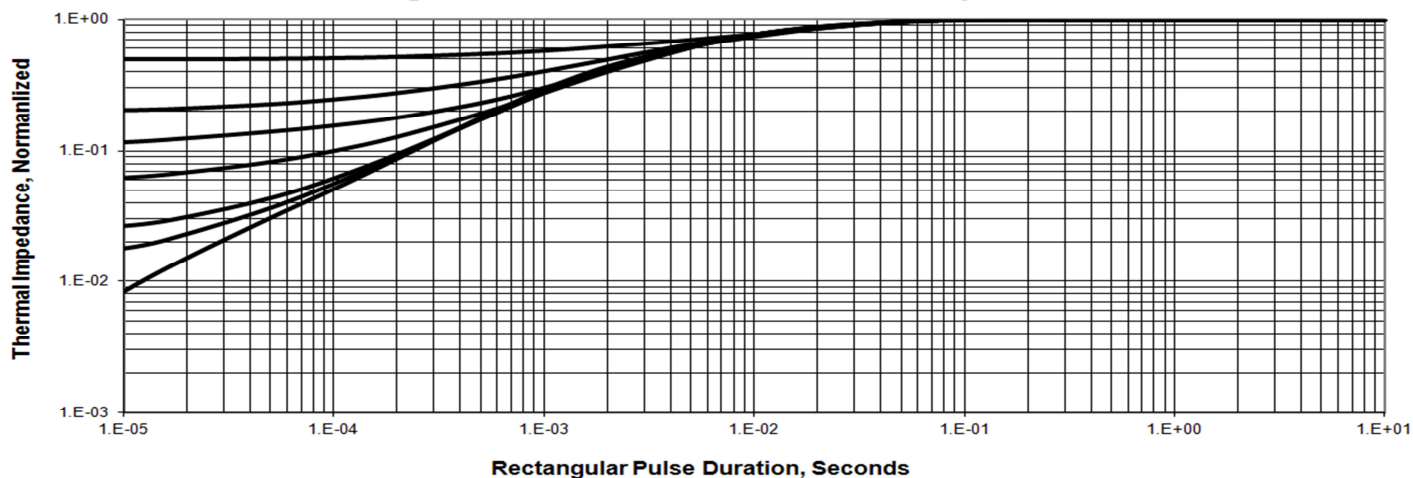


Figure 2 . Max. Power Dissipation vs Case Temperature

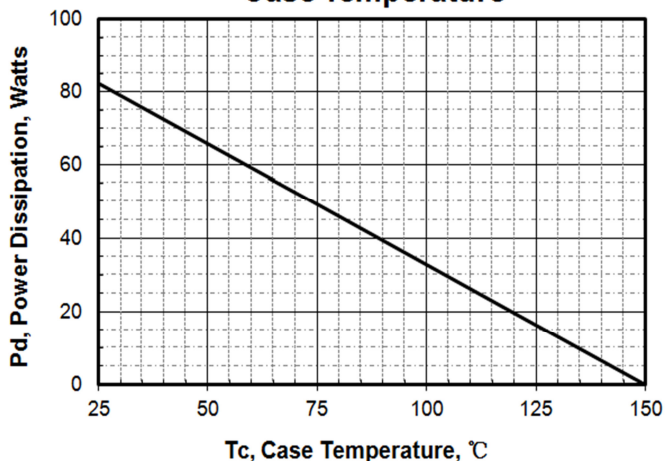


Figure 3 .Maximum Continuous Drain Current vs Tc

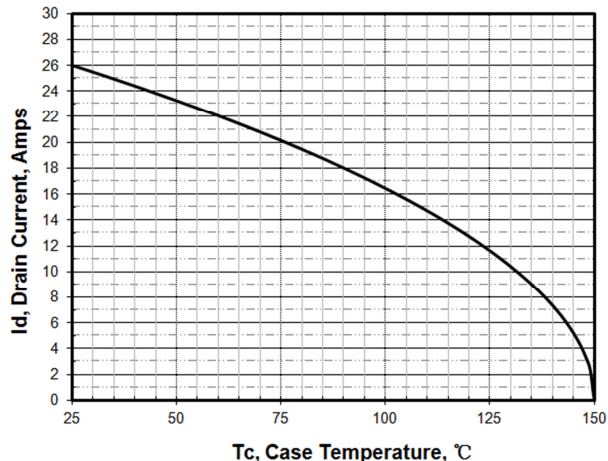


Figure 4. Output Characteristics

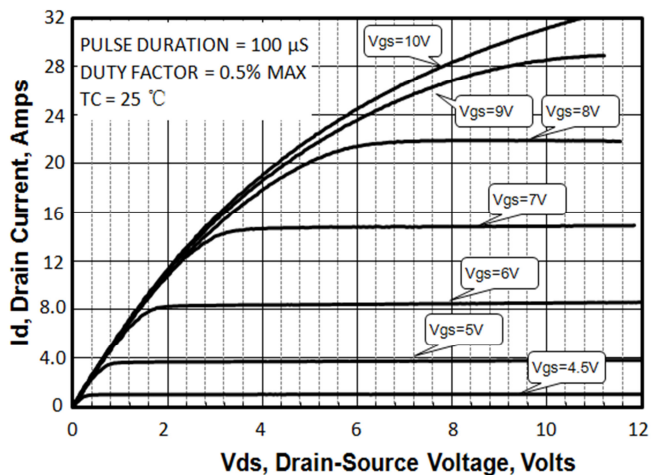
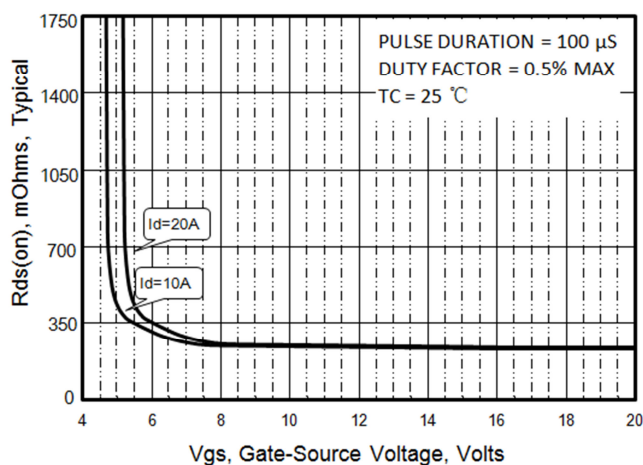


Figure 5. Rdson vs Gate Voltage



Typical Characteristics(Cont.)

Figure 6. Peak Current Capability

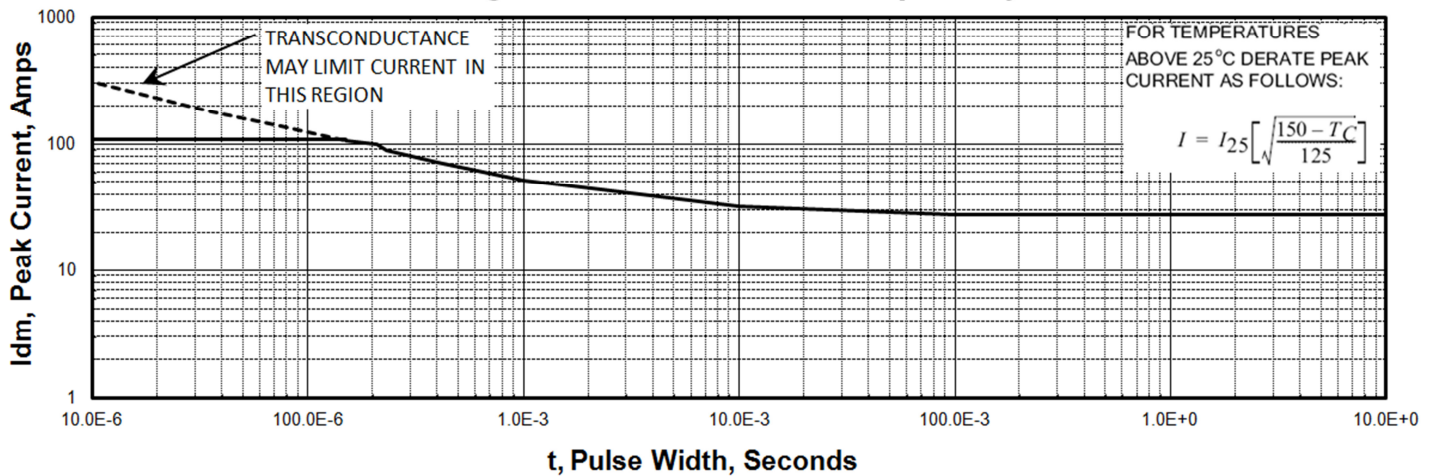


Figure 7. Transfer Characteristics

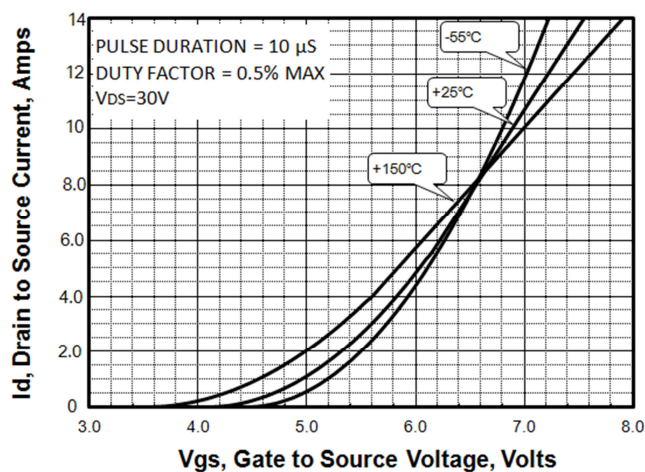


Figure 8. Unclamped Inductive Switching Capability

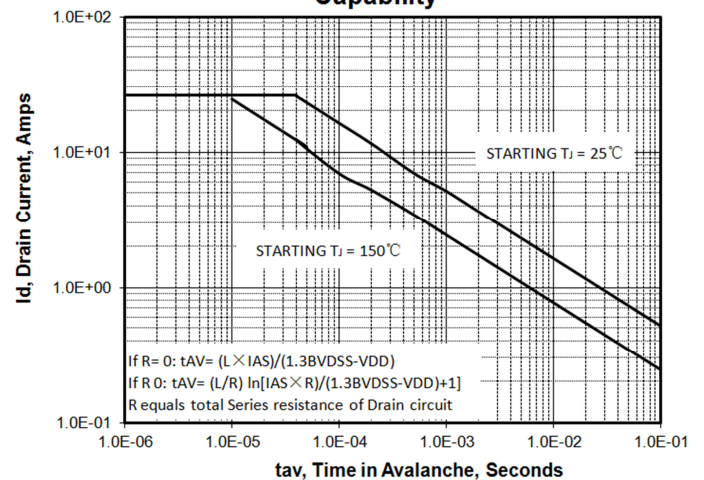


Figure 9. Drain to Source ON Resistance vs Drain Current

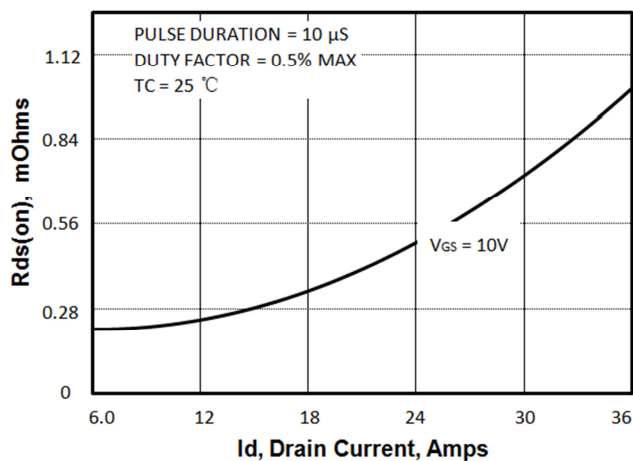
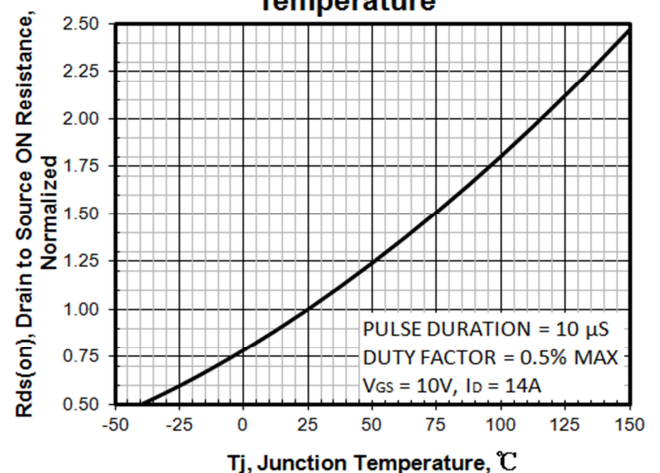


Figure 10. Rds(on) vs Junction Temperature



Typical Characteristics(Cont.)

Figure 11. Breakdown Voltage vs Temperature

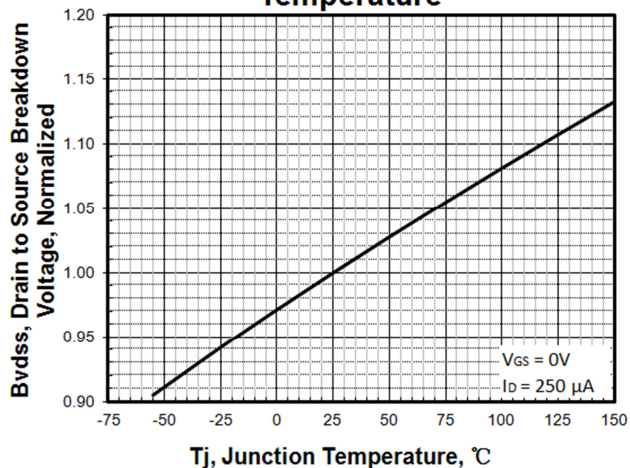


Figure 12. Threshold Voltage vs Temperature

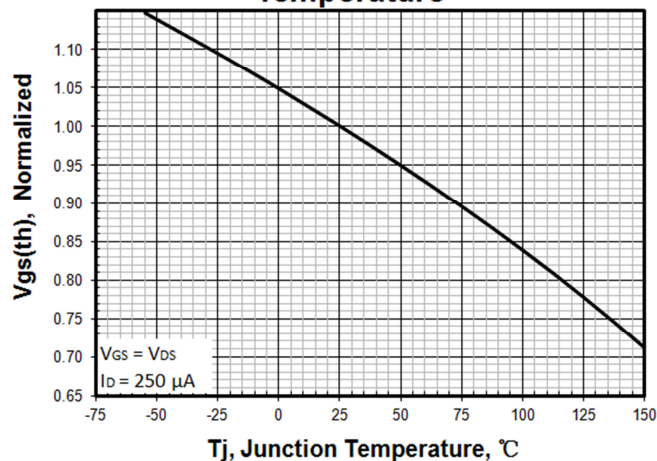


Figure 13 . Maximum Safe Operating Area

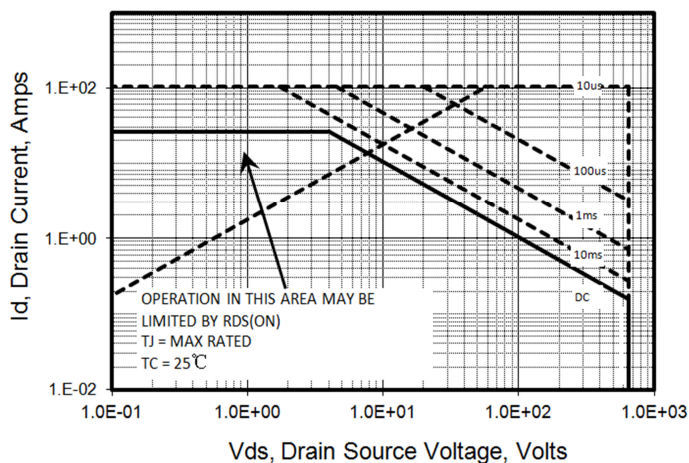


Figure 14. Capacitance vs Vds

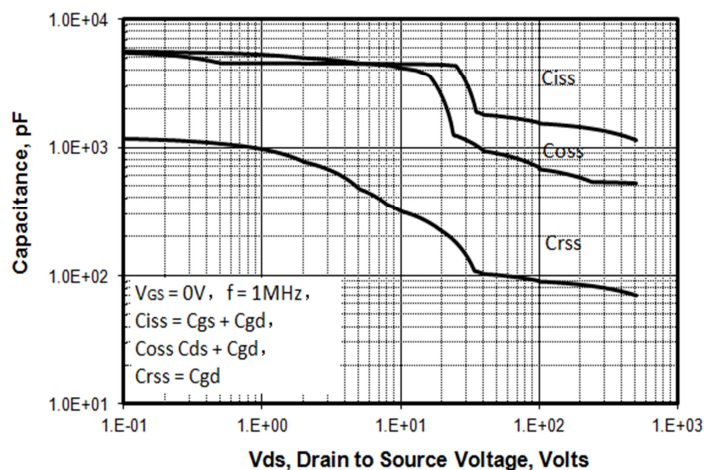


Figure 15 . Typical Gate Charge

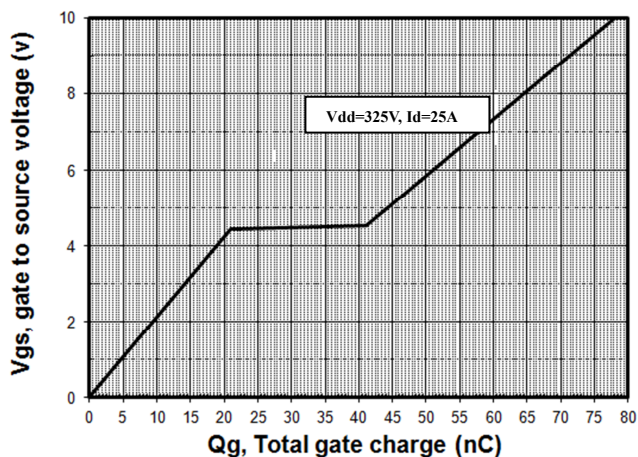
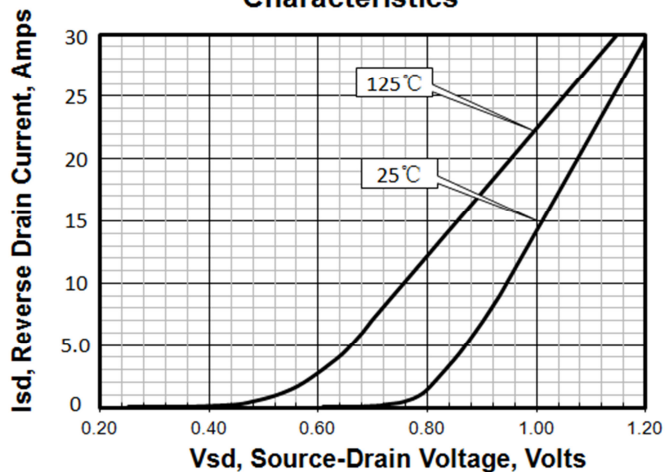


Figure 16. Body Diode Transfer Characteristics



Test Circuits and Waveforms

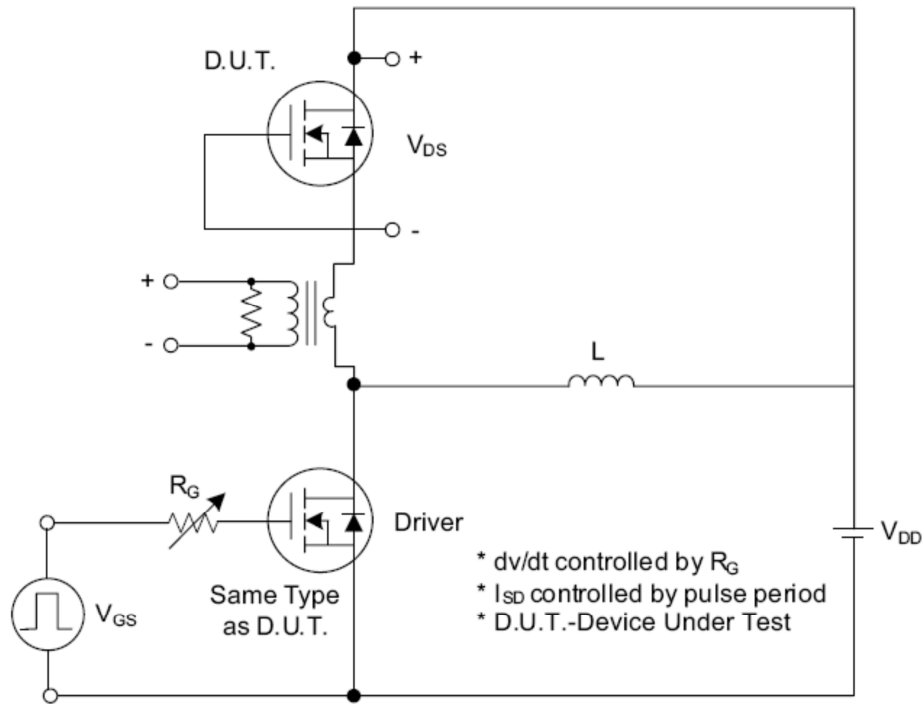


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

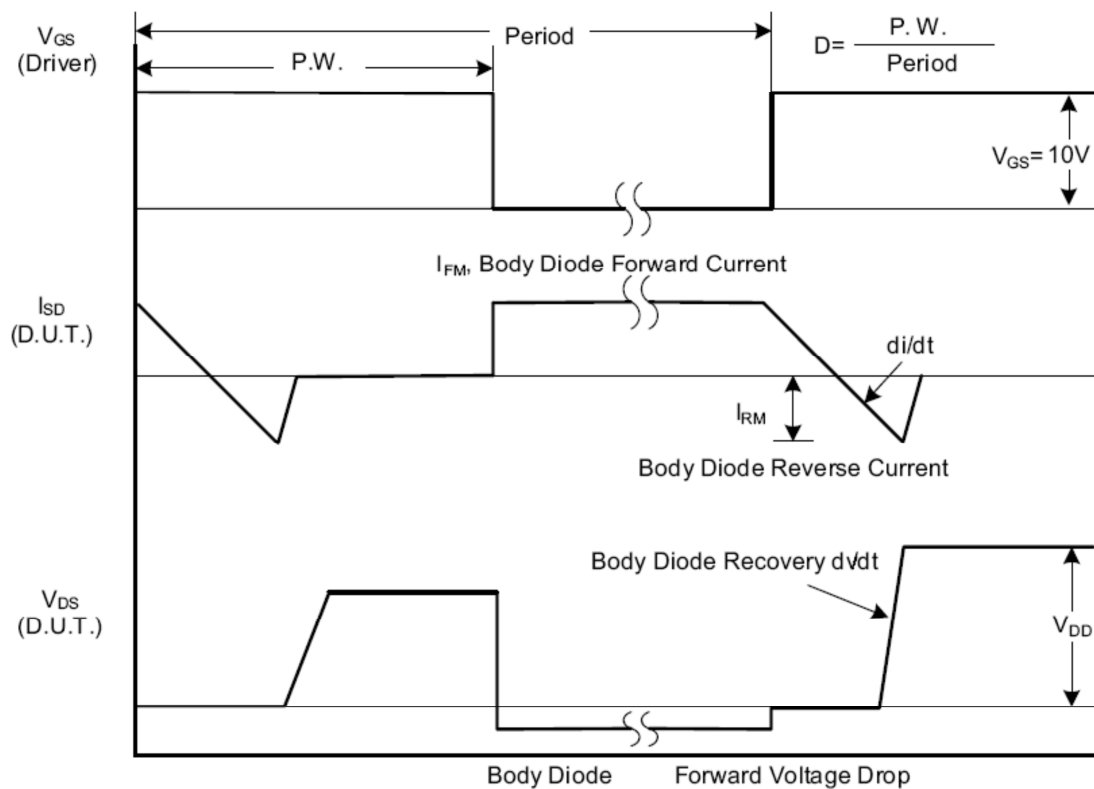


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms (Cont.)

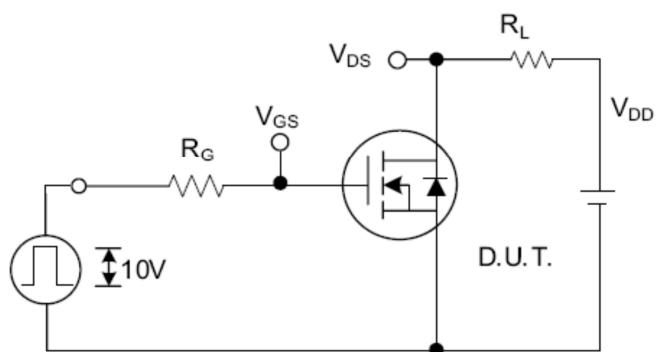


Fig. 2.1 Switching Test Circuit

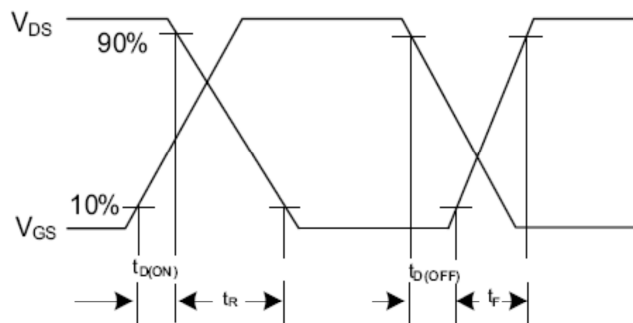


Fig. 2.2 Switching Waveforms

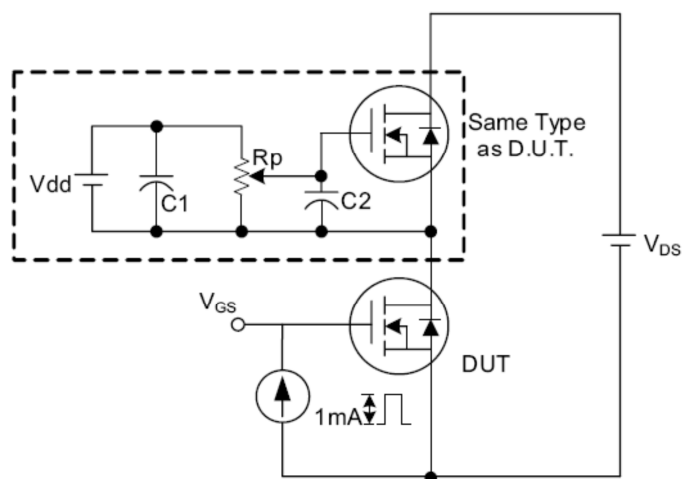


Fig. 3.1 Gate Charge Test Circuit

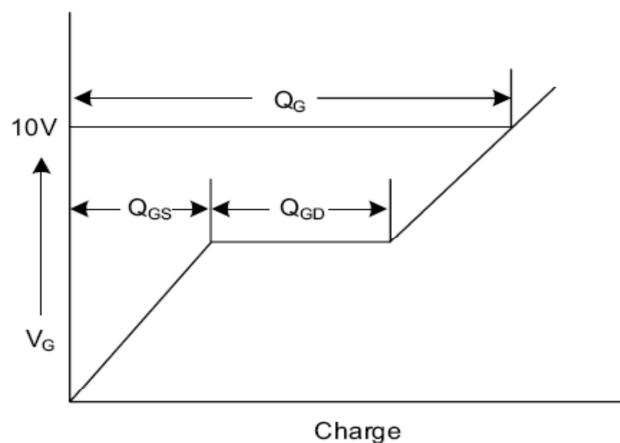


Fig. 3.2 Gate Charge Waveform

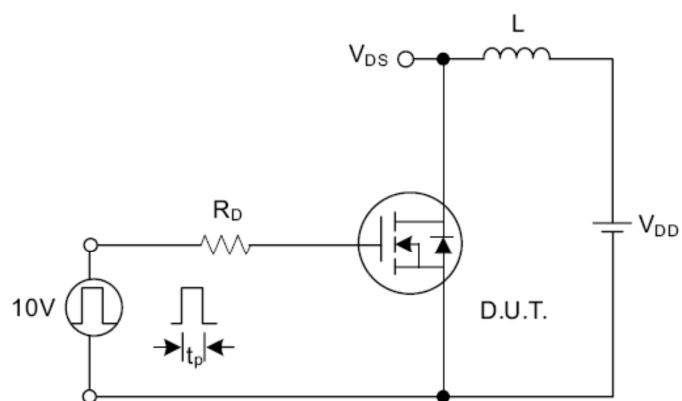


Fig. 4.1 Unclamped Inductive Switching Test Circuit

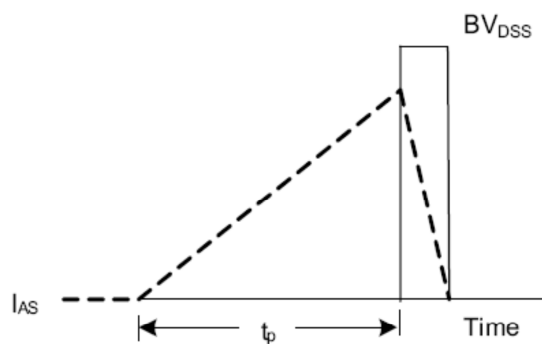
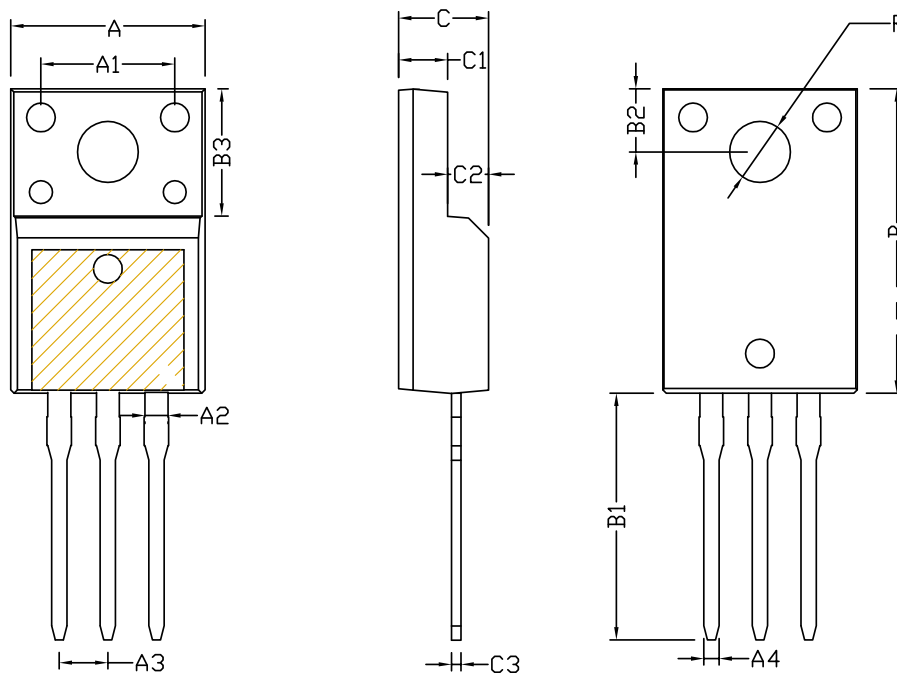


Fig. 4.2 Unclamped Inductive Switching Waveforms

Package Mechanical Data(TO-220F)



标注	最小	标准	最大	标注	最小	标准	最大	标注	最小	标准	最大
A	10.03	10.13	10.23	B	15.81	15.91	16.01	C	4.62	4.7	4.78
A1	6.5	7.0	7.5	B1	12.79	12.89	12.99	C1	2.5	2.55	2.6
A2	1.20	1.28	1.36	B2	3.0	3.3	3.6	C2	2.1	2.15	2.2
A3		2.54		B3	6.6	6.65	6.7	C3		0.5	
A4	0.7	0.8	0.9	R		3.18					