Industrial model	Poplular name	Package identificattion	Packing method	Quantity per tube	Quantity per box	Quantity per carton
SPT15N65 SPF15N65	15N65 15N65	T: TO-220T F: TO-220F	TUBE	50/tube	1Kpcs/box	5Kpcs

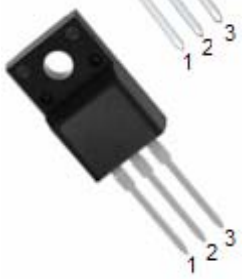
■ APPLICATION
ELECTRONIC BALLAST
ELECTRONIC TRANSFORMER
SWITCH MODE POWER SUPPLY
FEATURES

I_D=15A
BV_{DSS}=650V
$R_{DS(on)}$=0.65Ω

■ LOW ON-RESISTANCE
FAST SWITCHING
HIGH INPUT RESISTANCE
RoHS COMPLIANT
Package: TO-220T & TO-220F

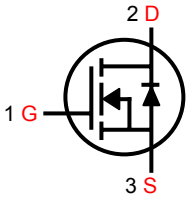
SPF/T15N65 Series Pin Assignment

3-Lead Plastic TO-220T
Package Code:
Pin 1: Gate
Pin 2 & Tab: Drain
Pin 3: Source



3-Lead Plastic TO-220F
Package Code: F
Pin 1: Gate
Pin 2: Drain
Pin 3: Source

Series Symbol:



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V_{DSS}	650	V
Gate to Source Voltage		V_{GSS}	±30	V
Continuous Drain Current	Continuous	I_D	15	A
	Pulsed (Note 2)	I_{DM}	60	A
Avalanche Current (Note 2)		I_{AR}	6.4	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	205	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.45	V/ns
Power Dissipation	TO-220	P_D	250	W
	TO-220F		54	W
	TO-220F1/TO-220F2		52	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating : Pulse width limited by maximum junction temperature.
3. L=10mH, I_{AS}=6.4A, V_{DD}= 50V, R_G=25Ω, Starting T_J=25°C
4. I_{SD} ≤15A, di/dt ≤200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C.

■ THERMAL DATA

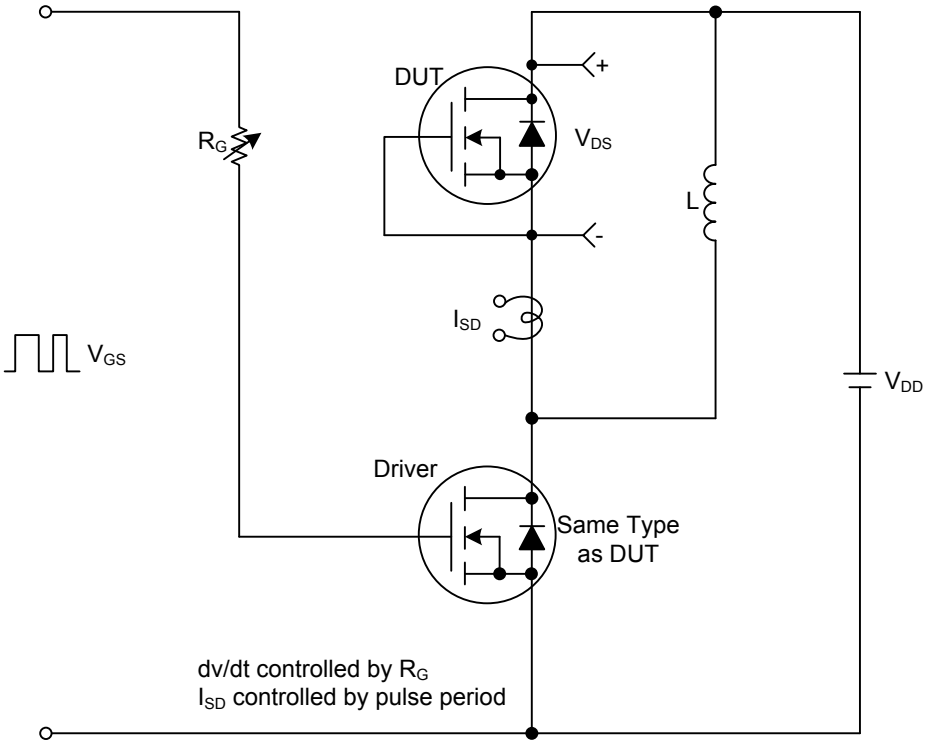
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2	θ_{JA}	62.5	°C/W
Junction to Case	TO-220	θ_{JC}	0.5	°C/W
	TO-220F		2.3	°C/W
	TO-220F1/TO-220F2		2.4	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

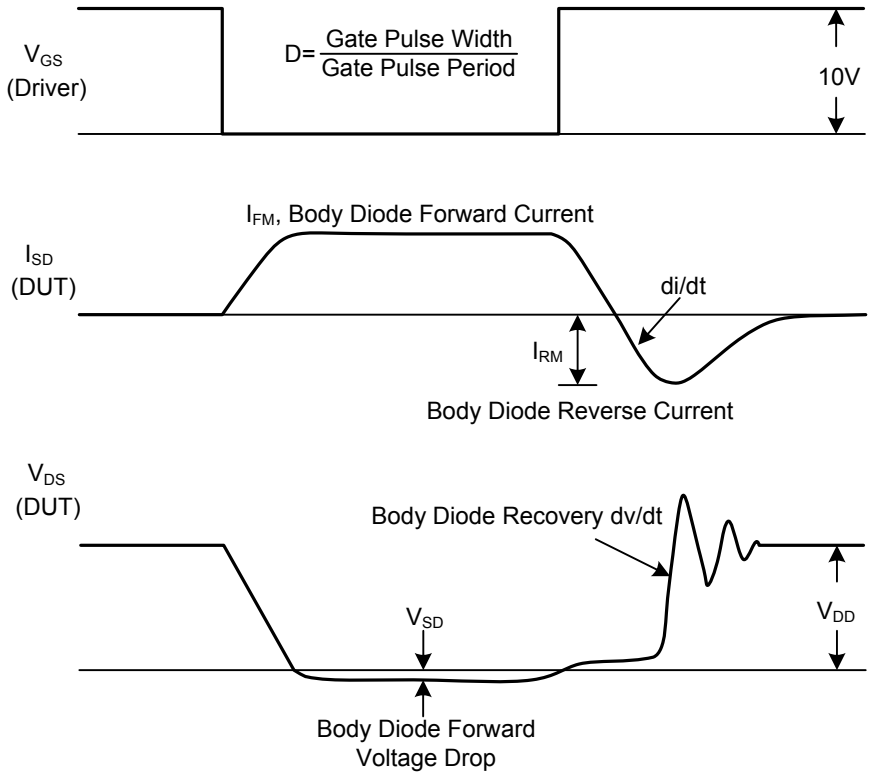
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	650			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=650V, V_{GS}=0V			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=7.5A			0.65	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1.0MHz		2600		pF
Output Capacitance		C_{OSS}			260		pF
Reverse Transfer Capacitance		C_{RSS}			22		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=50V, V_{GS}=10V, I_D=1.3A, I_G = 100mA (Note 1, 2)		155		nC
Gate-Source Charge		Q_{GS}			14		nC
Gate-Drain Charge		Q_{GD}			28		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD} =30V, V_{GS}=10V, I_D =0.5A, R_G=25Ω (Note 1, 2)		105		ns
Turn-ON Rise Time		t_R			115		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			600		ns
Turn-OFF Fall Time		t_F			120		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				15	A
Maximum Body-Diode Pulsed Current		I_{SM}				60	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S =15A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S =15A, V_{GS}=0V, dI_F/dt=100A/μs		510		ns
Body Diode Reverse Recovery Charge		Q_{rr}			8.2		μC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

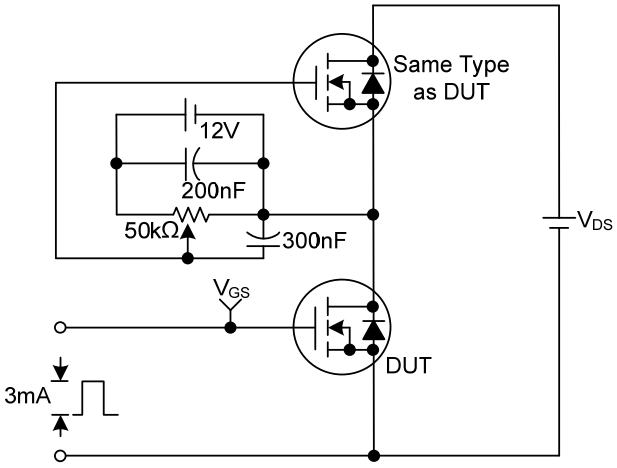
■ TEST CIRCUITS AND WAVEFORMS



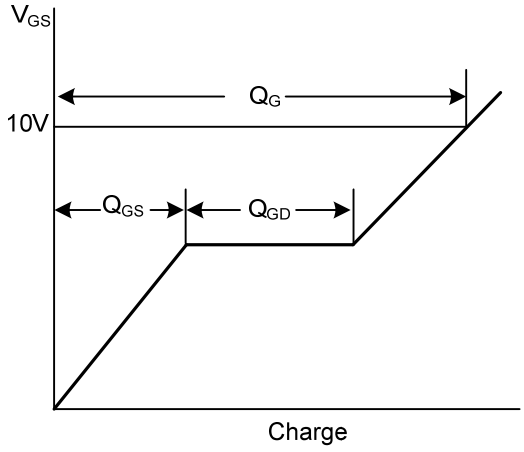
Peak Diode Recovery dv/dt Test Circuit & Waveforms



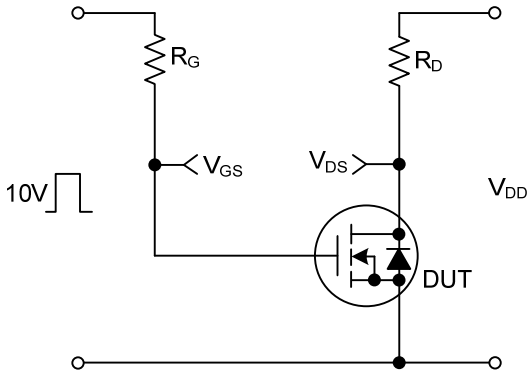
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



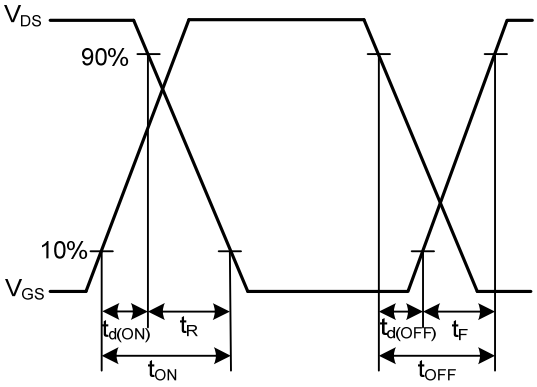
Gate Charge Test Circuit



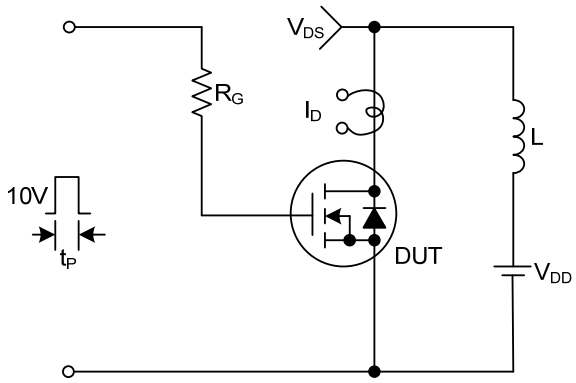
Gate Charge Waveforms



Resistive Switching Test Circuit

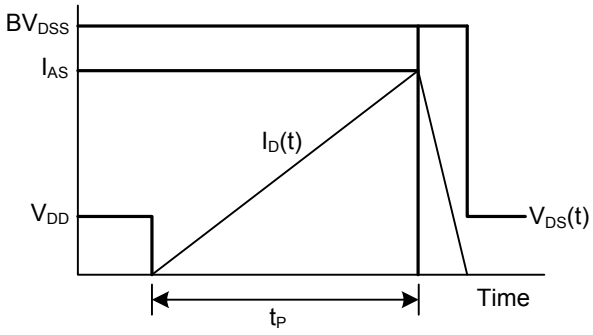


Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit

$$E_{AS}=\frac{1}{2}LI_{AS}^{2}\frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS