

## N-Channel MOSFET

 **Lead Free Package and Finish**

### Applications:

- Adaptor
- Charger
- SMPS

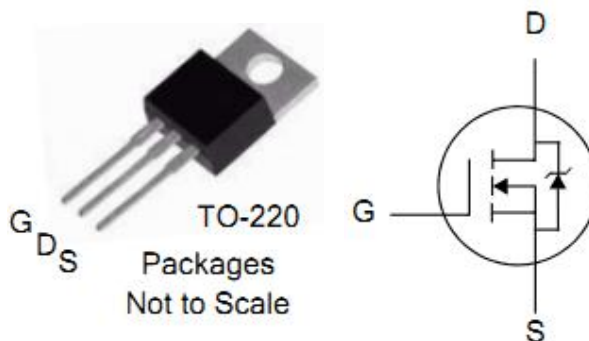
### Features:

- RoHS Compliant
- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves

### Ordering Information

PART NUMBER	PACKAGE	BRAND
FTP05N06N	TO-220	IPS

$V_{DSS}$	$R_{DS(ON)}(Typ.)$	$I_D$ (Silicon limited current)
60V	3.1m $\Omega$	150A



### Absolute Maximum Ratings $T_C=25^{\circ}C$ unless otherwise specified

Symbol	Parameter	FTP05N06N	Units
$V_{DSS}$	Drain-to-Source Voltage	60	V
$I_D$	Continuous Drain Current	150	A
	Continuous Drain Current $T_C = 100^{\circ}C$	95	A
$I_{DM}$	Pulsed Drain Current (NOTE *1)	600	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy(NOTE *2)	1213	mJ
$T_L$	Maximum Temperature for Soldering	300	$^{\circ}C$
$T_J$ and $T_{STG}$	Operating Junction and Storage Temperature Range	150, -55 to 150	



# FTP05N06N

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	60	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	1	$\mu A$	$V_{DS}=60V, V_{GS}=0V$ $T_a=25^\circ\text{C}$
		--	--	500		$V_{DS}=48V, V_{GS}=0V$ $T_a=125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	--	--	+100	nA	$V_{GS}=+20V$
	Gate-to-Source Reverse Leakage	--	--	-100		$V_{GS}= -20V$

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	3.1	4.5	m $\Omega$	$V_{GS}=10V, I_D=40A$
$V_{GS(TH)}$	Gate Threshold Voltage	2	3	4	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Pulse width $\leq 300\mu s$ ; duty cycle $\leq 2\%$						

## Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_g$	Gate Resistance	--	0.9	--	$\Omega$	$f=1\text{MHz}, V_{GS}=0V,$ $V_{DS}=0V$
$C_{iss}$	Input Capacitance	--	4500	--	pF	$V_{GS}=0V, V_{DS}=25V$ $f=1.0\text{MHz}$
$C_{oss}$	Output Capacitance	--	796	--		
$C_{rss}$	Reverse Transfer Capacitance	--	617	--		
$Q_g$	Total Gate Charge	--	109.8	--	nC	$I_D=25A, V_{DD}=48V$ $V_{GS}=10V$
$Q_{gs}$	Gate-to-Source Charge	--	18.3	--		
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	--	49.8	--		

## Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	30.3	--	ns	$V_{DD}=40V, I_D=25A,$ $V_G=10V, R_G=6\Omega$
$t_{rise}$	Rise Time	--	33.5	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	87.2	--		
$t_{fall}$	Fall Time	--	49	--		



# FTP05N06N

## Source-Drain Diode Characteristics $T_c=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	--	--	150	A	T <sub>C</sub> =25°C
I <sub>SM</sub>	Maximum Pulsed Current (Body Diode)	--	--	600	A	
V <sub>SD</sub>	Diode Forward Voltage	--	--	1.2	V	I <sub>SD</sub> =30A, V <sub>GS</sub> =0V
t <sub>rr</sub>	Reverse Recovery Time	--	55.6	--	ns	I <sub>F</sub> =20A di/dt=100A/us
Q <sub>rr</sub>	Reverse Recovery Charge	--	83.2	--	nC	
Pulse width ≤300μs; duty cycle ≤ 2%						

### Notes:

\*1. Repetitive rating; pulse width limited by maximum junction temperature.

\*2.  $L=0.5\text{mH}$ ,  $I_D=69.7\text{A}$ , Start  $T_J=25^{\circ}\text{C}$

## Test Circuits and Waveforms

Figure 14. Gate Charge Test Circuit

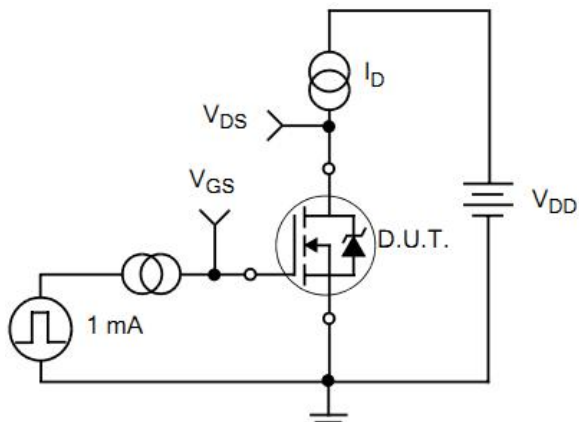


Figure 15. Gate Charge Waveforms

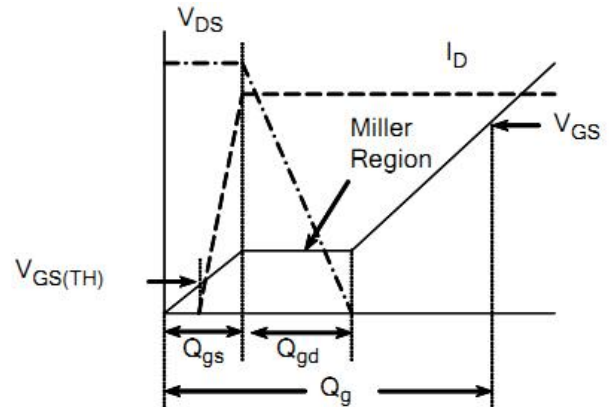


Figure 16. Resistive Switching Test Circuit

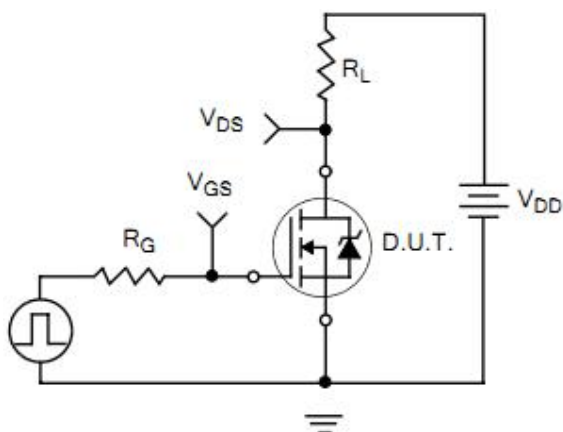


Figure 17. Resistive Switching Waveforms

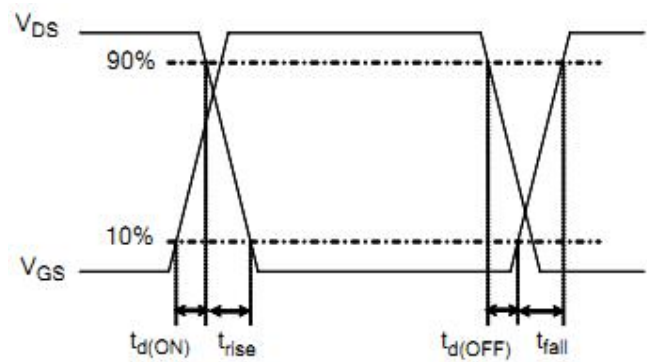


Figure 18. Diode Reverse Recovery Test Circuit

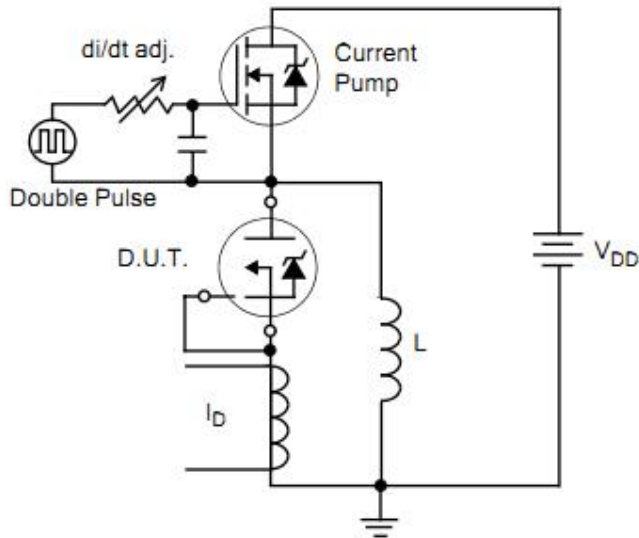


Figure 19. Diode Reverse Recovery Waveform

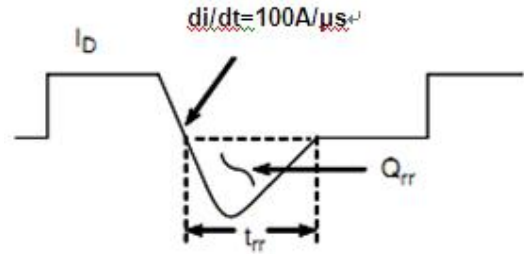


Figure20.Unclamped Inductive Switching Test Circuit

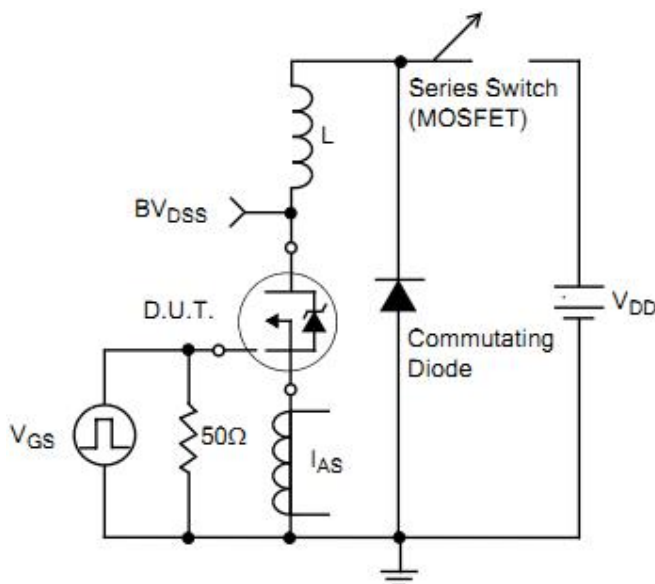
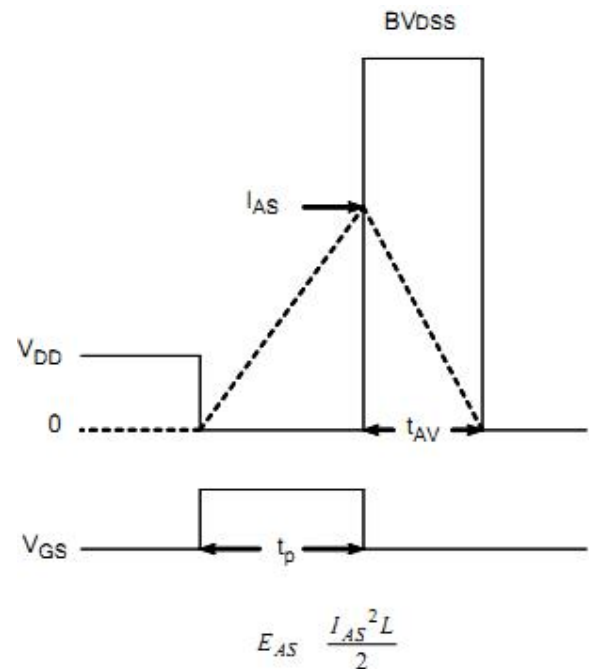


Figure21.Unclamped Inductive Switching Waveform



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