Description

Features

- 500V, 9A
- $R_{DS(ON)}$ =0.67Ω (Typ.) @ V_{GS} =10V, I_D =4.5A
- Fast Switching
- 100% Avalanche Tested
- Improved dv/dt Capability

Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

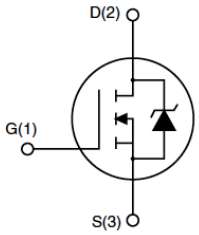

TO-251


TO-252


TO-220F


TO-263


TO-220C



Schematic Diagram

Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter		Max.					Units
			TO-220C	TO-263	TO-220F	TO-252	TO-251	
V_{DSS}	Drain-Source Voltage		500					V
V_{GSS}	Gate-Source Voltage		±30					V
I_D	Continuous Drain Current	T_C = 25℃	9					A
		T_C = 100℃	5.4					A
I_{DM}	Pulsed Drain Current note1		36					A
E_{AS}	Single Pulsed Avalanche Energy note2		198					mJ
P_D	Power Dissipation	T_C = 25℃	150	150	63	100	100	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.83	0.83	1.98	1.25	1.25	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		62.5	62.5	62.5	100	100	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150					℃

Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V,I_D = 250μA	500	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 500V, V_{GS} = 0V, T_J = 25℃	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{GS} =0V, V_{GS} = ±30V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS},I_D = 250μA	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance note3	V_{GS} =10V, I_D =4.5A	-	0.67	0.84	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	891	-	pF
C_{oss}	Output Capacitance		-	110	-	pF
C_{rss}	Reverse Transfer Capacitance		-	14	-	pF
Q_g	Total Gate Charge	V_{DD}=400V, I_D =9A, V_{GS} =10V	-	22	-	nC
Q_{gs}	Gate-Source Charge		-	4.3	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	13	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 250V, I_D =9A, R_G =25Ω	-	15	-	ns
t_r	Turn-On Rise Time		-	18	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	80	-	ns
t_f	Turn-Off Fall Time		-	35	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	9	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	36	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_{SD}=9A, T_J = 25℃	-	-	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_S =9A, di/dt =100A/μs	-	300	-	ns
Q_{rr}	Reverse Recovery Charge		-	4.1	-	μC

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. I_{AS} = 4.5A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Performance Characteristics

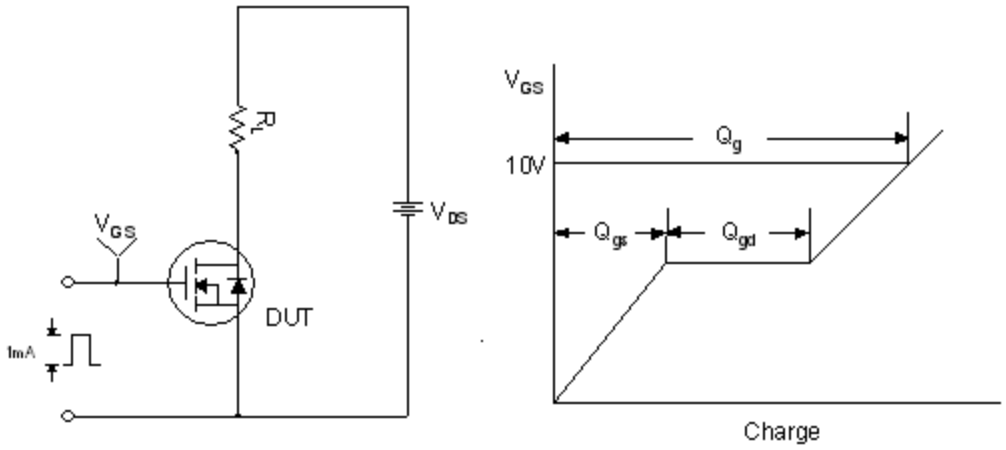


Figure 1. Gate Charge Test Circuit & Waveform

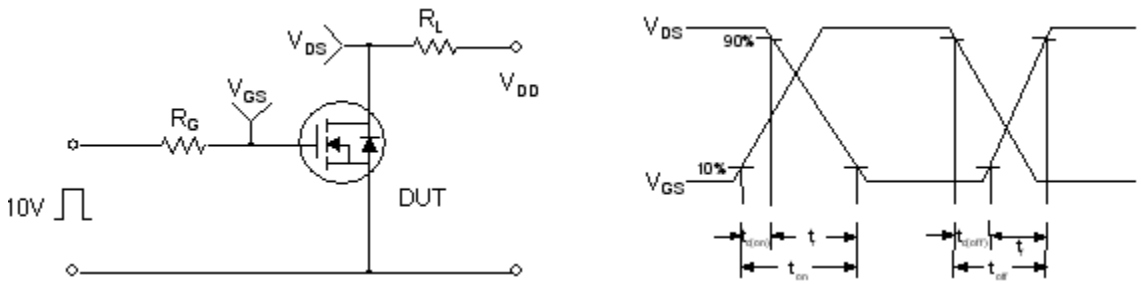


Figure 2. Resistive Switching Test Circuit & Waveforms

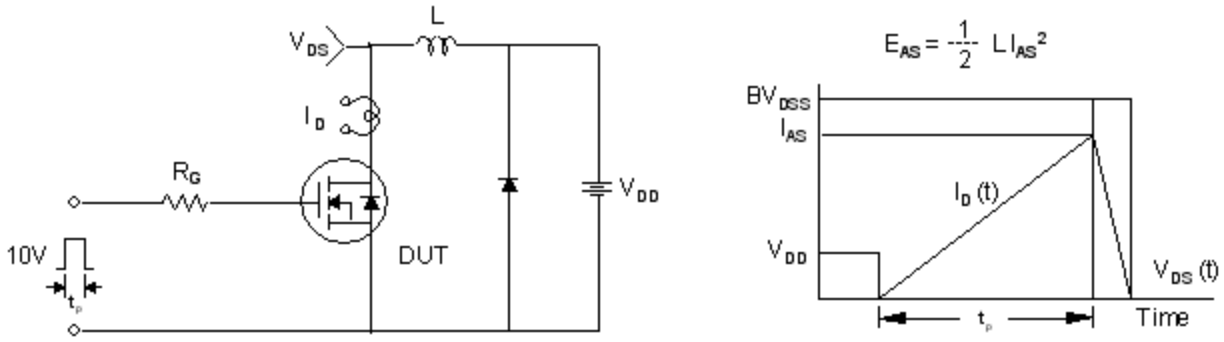


Figure 3. Unclamped Inductive Switching Test Circuit & Waveforms

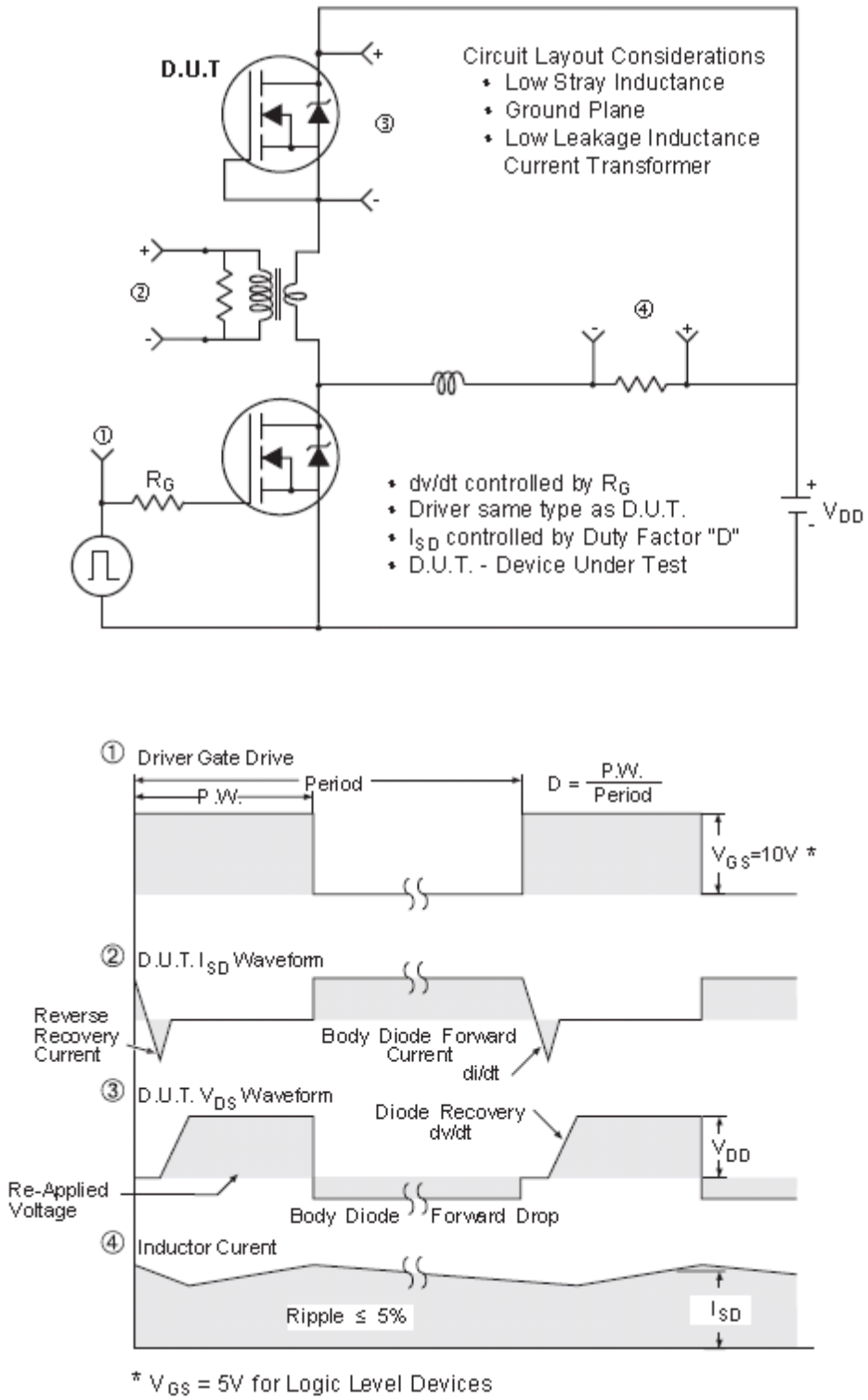


Figure 4. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)