Description

Features

- 600V,20A
- $R_{DS(ON)}$ = 0.3Ω (Typ.) @ V_{GS} = 10V, I_D =10A
- Fast Switching
- Improved dv/dt Capability
- 100% Avalanche Tested

Application

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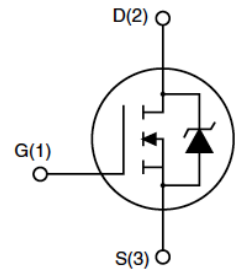- Power Factor Correction (PFC)

| TO-3P | TO-247 | TO-220F | Schematic Diagram |

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

Symbol	Parameter		Max.		Units
			TO-3P/TO-247	TO-220F	
V_{DSS}	Drain-Source Voltage		600		V
V_{GSS}	Gate-Source Voltage		±30		V
I_D	Continuous Drain Current	T_C = 25℃	20		A
		T_C = 100℃	13		A
I_{DM}	Pulsed Drain Current [note1]		80		A
E_{AS}	Single Pulsed Avalanche Energy [note2]		1350		mJ
P_D	Power Dissipation	T_C = 25℃	416	167	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.3	0.75	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		60	90	℃/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	$V_{GS}=0V, I_D=250μA$	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V,$ $T_J= 25℃$	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS} =0V, V_{GS} = ±30V$	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}= V_{GS}, I_D=250μA$	2	3	4	V
$R_{DS(on)}$ note3	Static Drain-Source on-Resistance	$V_{GS} =10V, I_D =10A$	-	0.3	0.45	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	-	2980	-	pF
C_{oss}	Output Capacitance		-	291	-	pF
C_{rss}	Reverse Transfer Capacitance		-	40	-	pF
Q_g	Total Gate Charge	$V_{DD} = 480V, I_D = 20A,$ $V_{GS} = 10V$	-	80	-	nC
Q_{gs}	Gate-Source Charge		-	12	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	34	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 250V, I_D =20A,$ $R_G = 25Ω$	-	37	-	ns
t_r	Turn-on Rise Time		-	66	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	175	-	ns
t_f	Turn-off Fall Time		-	84	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_{SD} = 20A$	-	-	1.4	V
t_{rr}	Reverse Recovery Time	$V_{GS} =0V, I_S=20A,$ $di/dt=100A/μs$	-	450	-	ns
Q_{rr}	Reverse Recovery Charge		-	7.1	-	μC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. $I_{AS} =16A, V_{DD} = 50V, R_G = 25 Ω$, Starting $T_J = 25°C$

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤1%
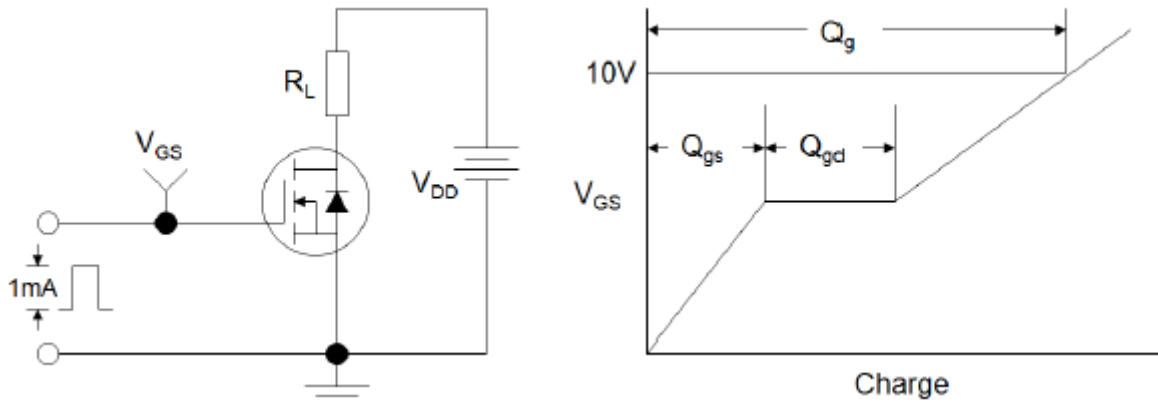
Typical Performance Characteristics

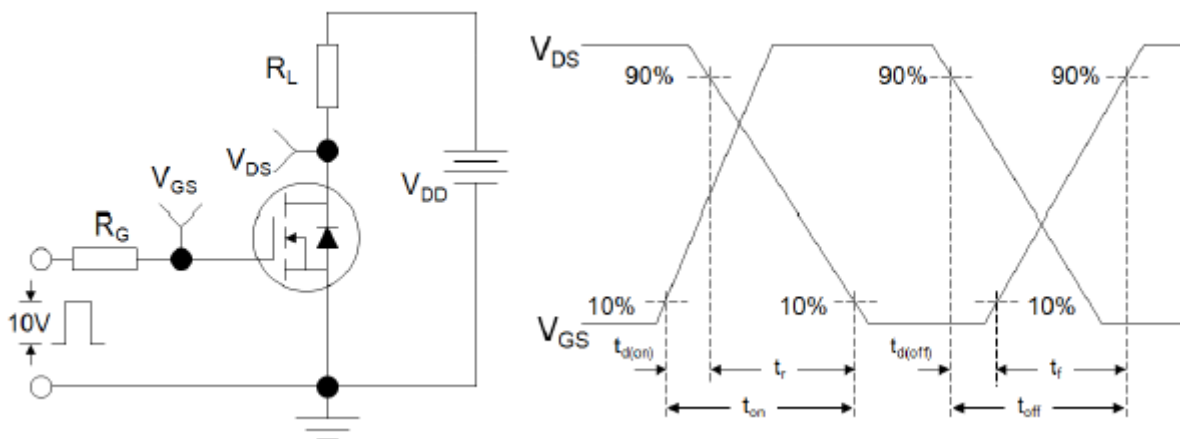**Figure1:Gate Charge Test Circuit & Waveform**

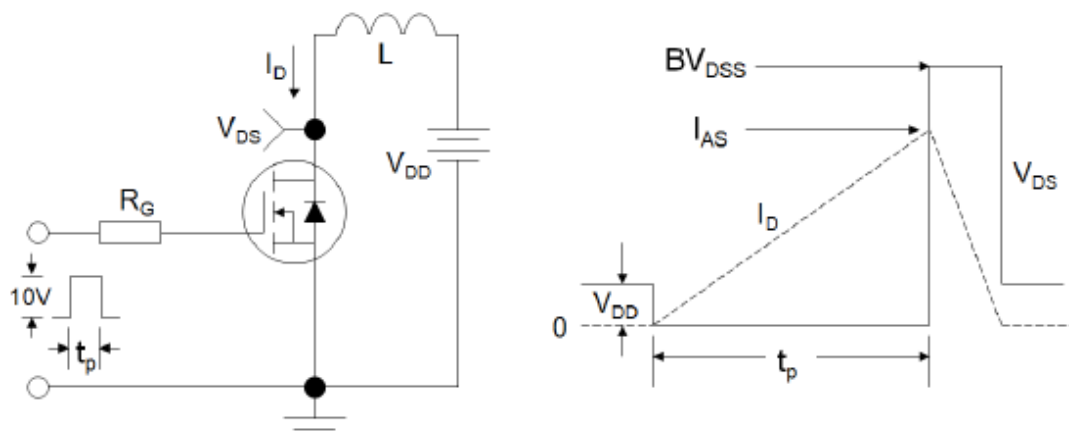**Figure 2: Resistive Switching Test Circuit & Waveforms**

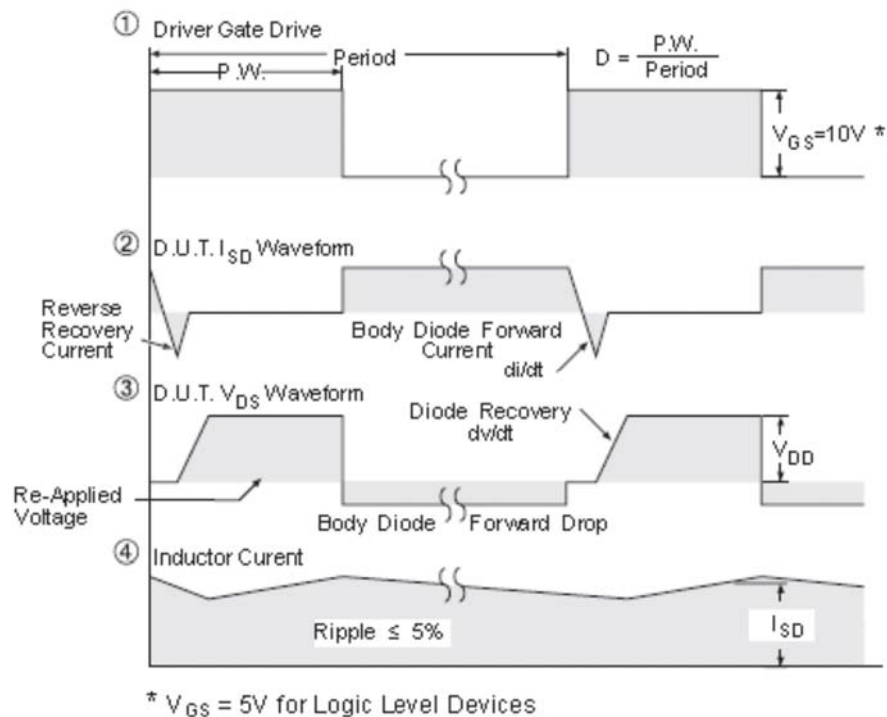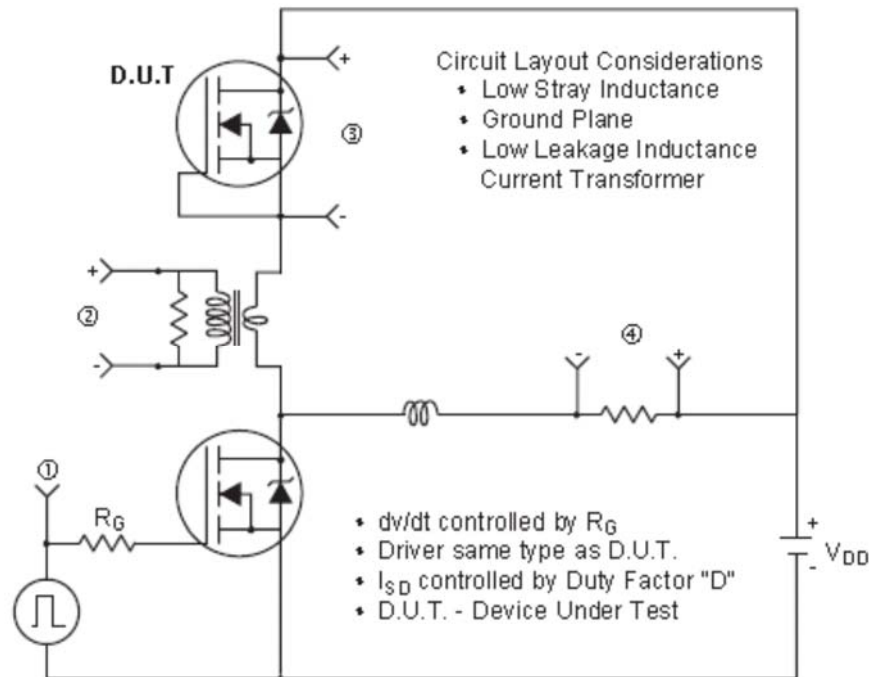**Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms**

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