Description

Features

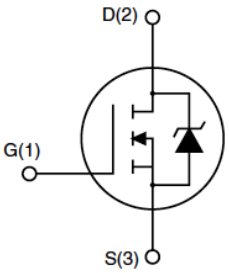
- 600V, 1.3A
- $R_{DS(ON)}$ = 8.5Ω (Typ.) @ V_{GS} = 10V, I_D =0.65A
- Fast Switching
- Improved dv/dt Capability
- 100% Avalanche Tested

Application

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

TO-252

TO-251



Schematic Diagram

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

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		600	V
V_{GSS}	Gate-Source Voltage		±30	V
I_D	Continuous Drain Current	T_C = 25℃	1.3	A
		T_C = 100℃	0.8	A
I_{DM}	Pulsed Drain Current note1		4	A
E_{AS}	Single Pulsed Avalanche Energy note2		20	mJ
dv/dt	Peak Diode Recovery Energy		5	V/ns
P_D	Power Dissipation	T_C = 25℃	45	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.8	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃

*Drain current limited by maximum junction temperature

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
$\triangle V_{(BR)DSS}$ /$\triangle T_J$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=250μA	-	0.6	-	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600V, V_{GS} = 0V, T_J= 25℃	-	-	1	μA
		V_{DS} =480V, V_{GS} = 0V, T_J= 125℃	-	-	10	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	2.0	3.0	4.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS} =10V, I_D =0.65A	-	8.5	10	Ω
g_{FS}	Forward Transconductance	V_{DS} =40V, I_D =0.65A	-	0.9	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	105	-	160	pF
C_{oss}	Output Capacitance		18.8	-	28.2	pF
C_{rss}	Reverse Transfer Capacitance		2.8	-	4.5	pF
Q_g	Total Gate Charge	V_{DS} = 480V, I_D = 1A, V_{GS} = 10V	-	6.1	8	nC
Q_{gs}	Gate-Source Charge		-	1.3	2	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	3.1	4	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS} = 300V, I_D = 1A, R_G = 25Ω	-	10	13	ns
t_r	Turn-on Rise Time		-	10	18	ns
$t_{d(off)}$	Turn-off Delay Time		-	20	26	ns
t_f	Turn-off Fall Time		-	11.5	23	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	1	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	4	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_{SD} = 1A	-	0.82	1	V
t_{rr}	Reverse Recovery Time	V_{DS} =100V, I_F=1.3A, di/dt=100A/μs	-	114	137	ns
Q_{rr}	Reverse Recovery Charge		-	0.63	0.76	μC

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

2. L=60mH,I_{AS} = 1A, V_{DD} = 150V, R_G = 10 Ω, starting T_J = 25°C

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

Typical Performance Characteristics

Figure1: Output Characteristics

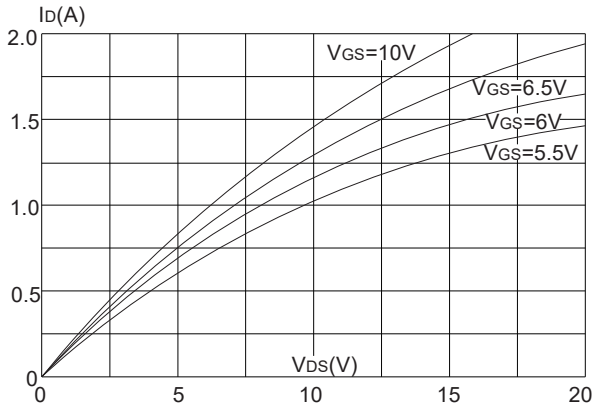


Figure 2: Typical Transfer Characteristics

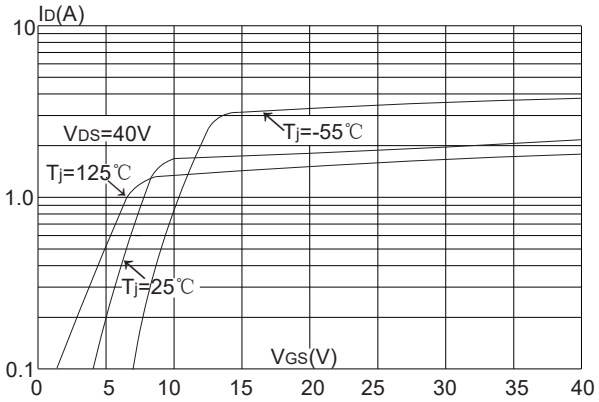


Figure 3: On-resistance vs Drain Current

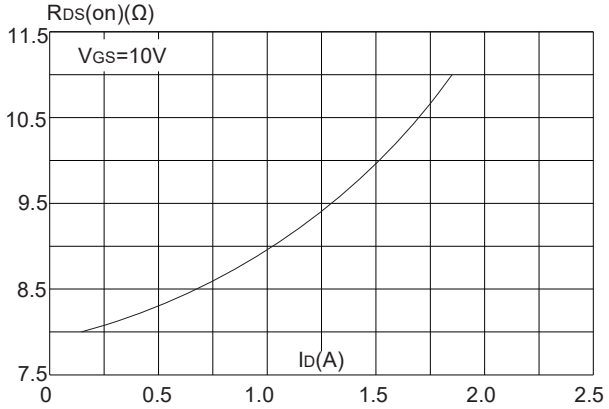


Figure 4: Body-Diode Characteristics

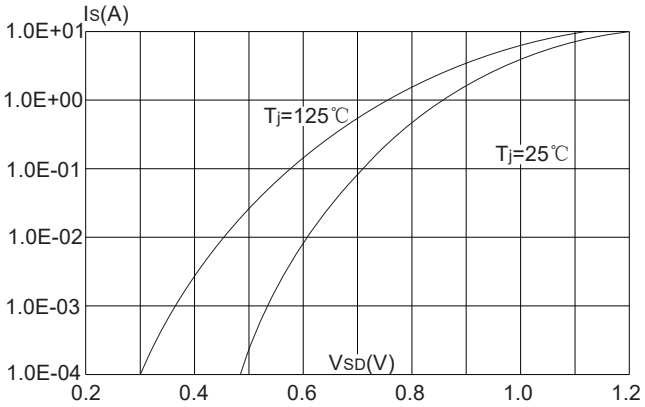


Figure 5: Gate Charge Characteristics

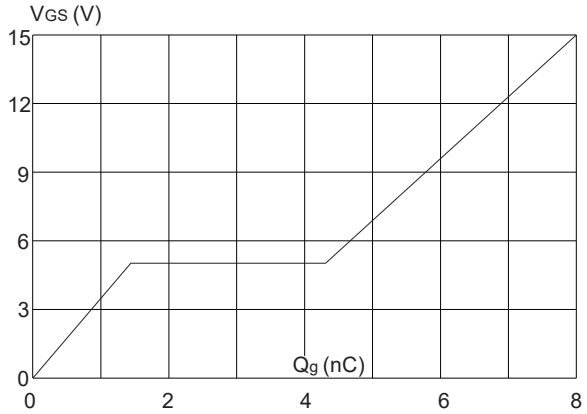


Figure 6: Capacitance Characteristics

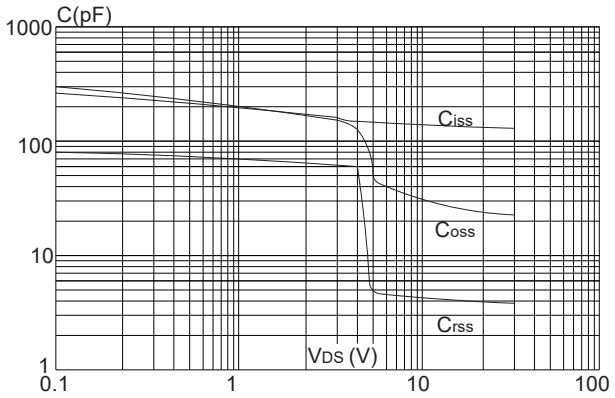


Figure 7: Breakdown Voltage vs Junction Temperature

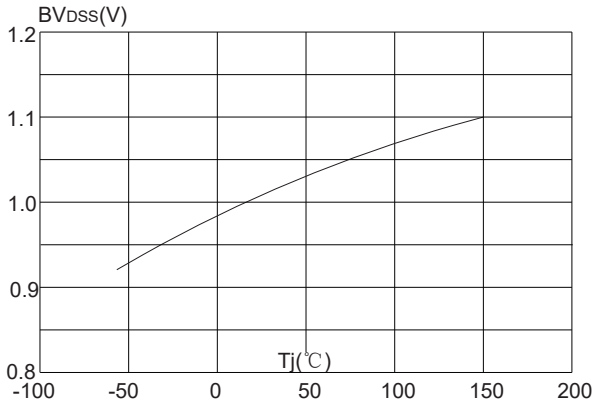


Figure 8: On-Resistance vs Junction Temperature

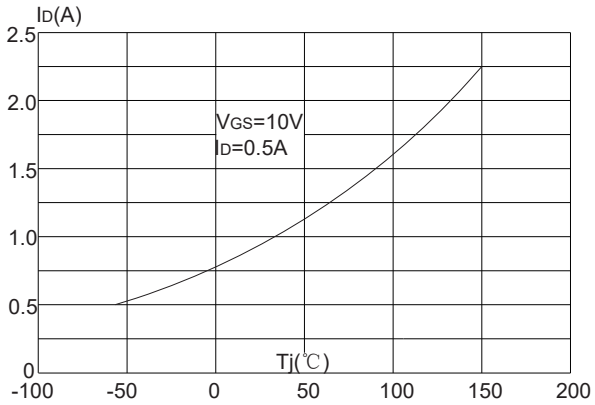


Figure 9: Maximum Safe Operating Area

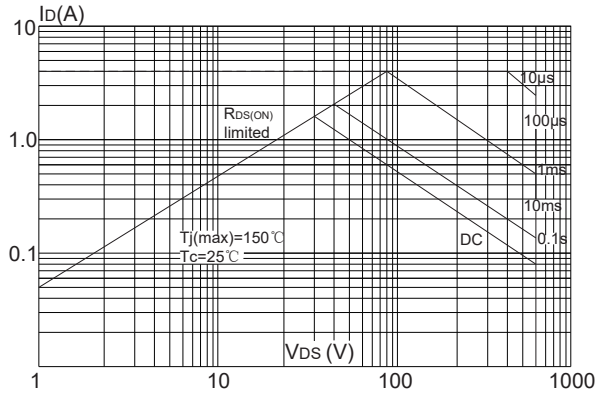


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

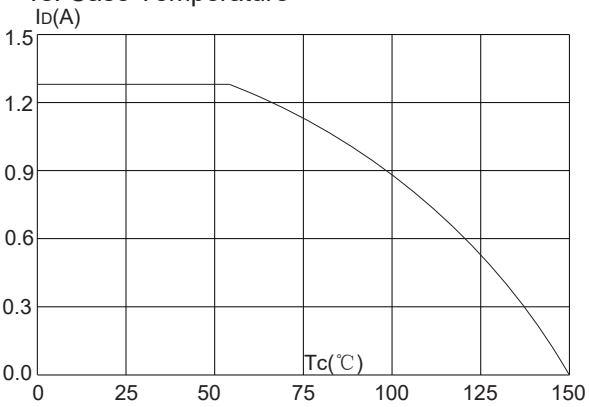
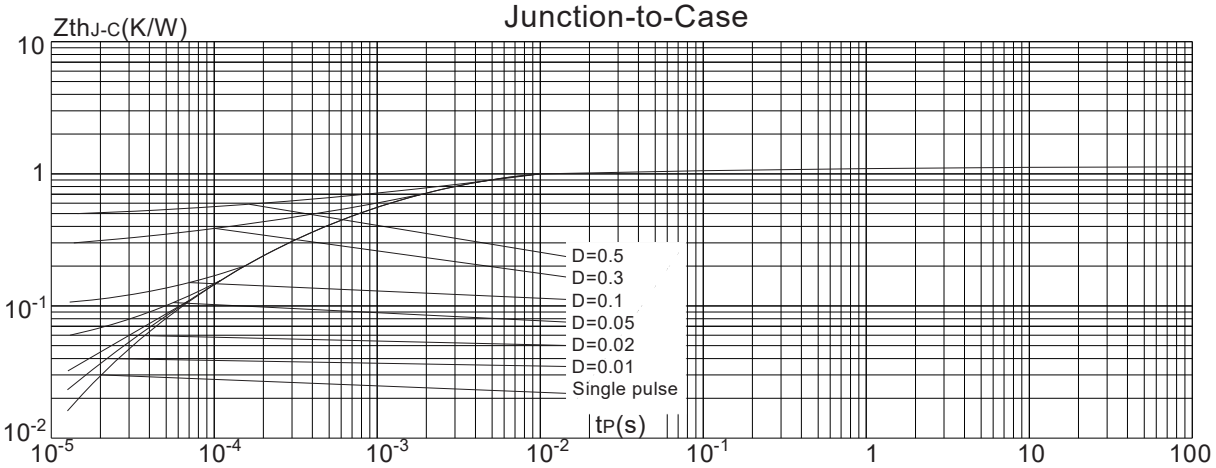


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



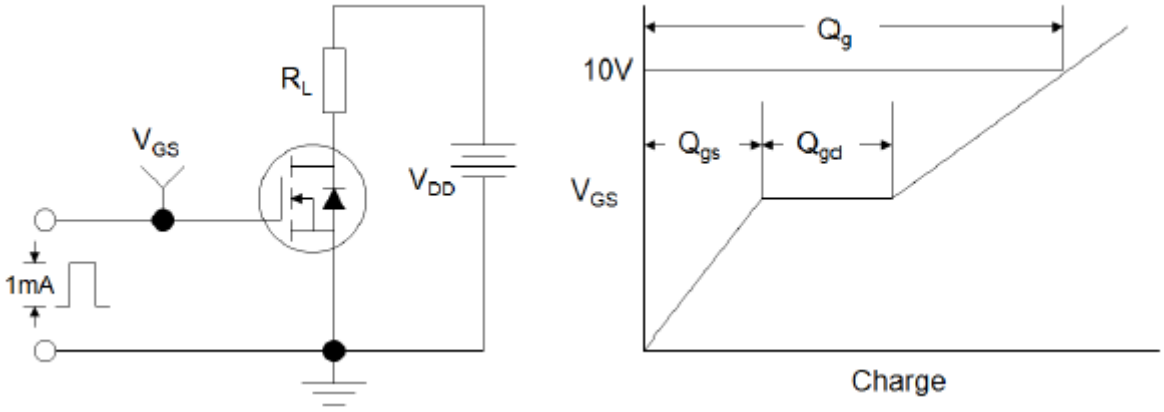


Figure12:Gate Charge Test Circuit & Waveform

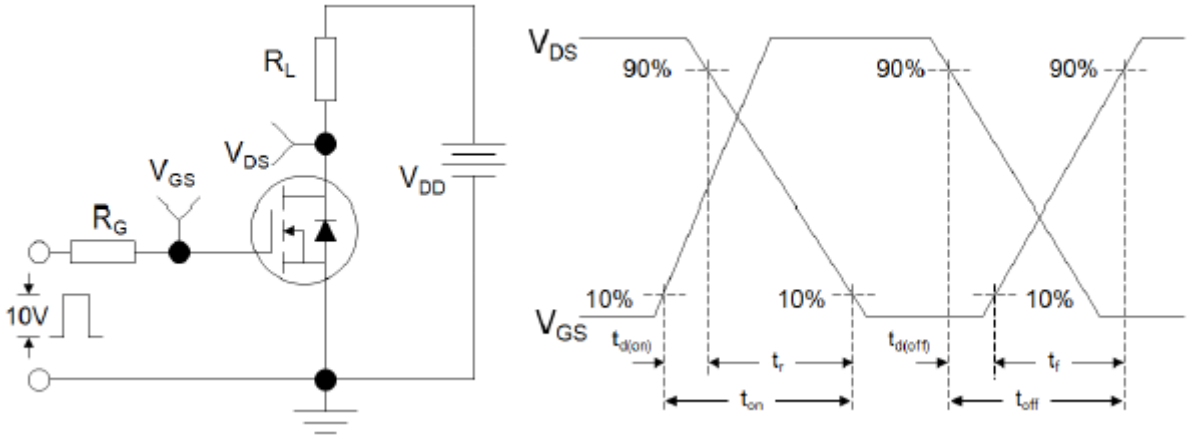


Figure 13: Resistive Switching Test Circuit & Waveforms

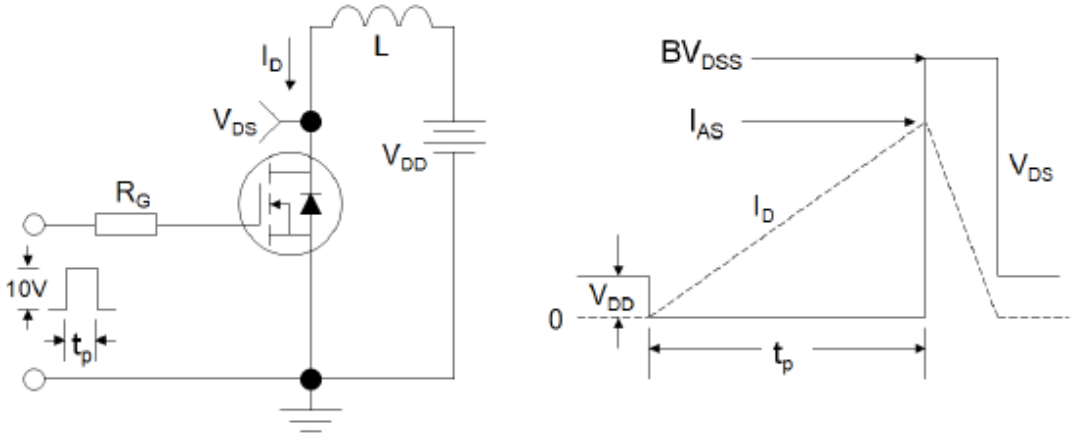


Figure 14:Unclamped Inductive Switching Test Circuit & Waveforms

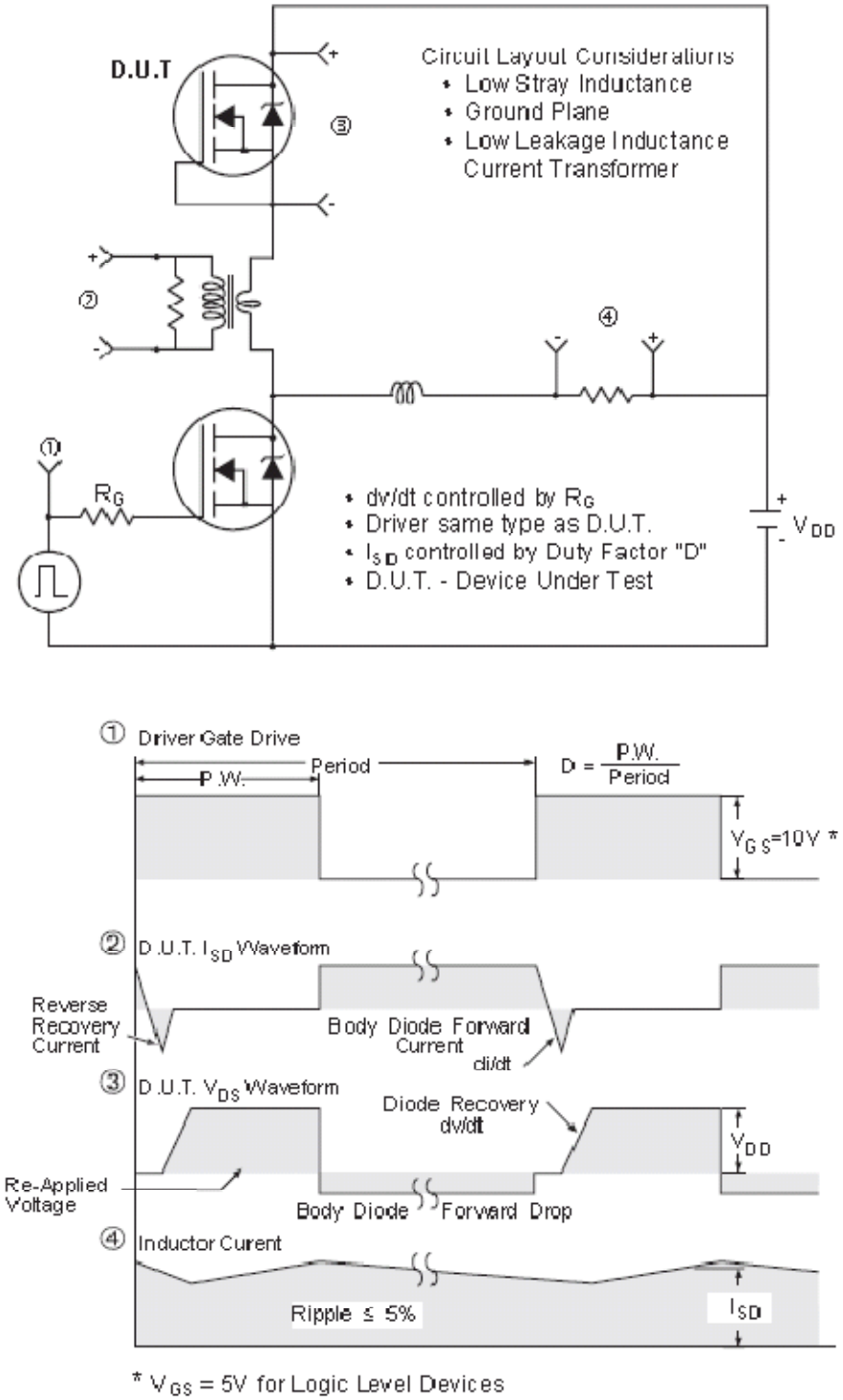


Figure 15:Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)