Description

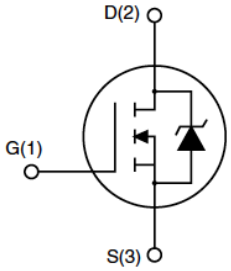
Features

- 100V, 33A
- $R_{DS(ON)}$=30mΩ @ V_{GS} = 10V
- Fast Switching
- 100% Avalanche Tested
- Improved dv/dt Capability

Application

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

TO-220C



Schematic Diagram

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

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		100	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25℃	33	A
		T_C = 100℃	23	A
I_{DM}	Pulsed Drain Current note1		110	A
E_{AS}	Single Pulsed Avalanche Energy note2		185	mJ
P_D	Power Dissipation	T_C = 25℃	130	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.15	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		62	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

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	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 100V,V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{GS} = ±20V	-	-	±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 = 16A	-	30	44	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	1960	-	pF
C_{oss}	Output Capacitance		-	250	-	pF
C_{rss}	Reverse Transfer Capacitance		-	40	-	pF
Q_g	Total Gate Charge	V_{DS} = 80V, I_D =16A, V_{GS} = 10V	-	-	71	nC
Q_{gs}	Gate-Source Charge		-	-	14	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	-	21	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50V, I_D =16A, R_G = 5.1Ω, V_{GS} = 10V	-	11	-	ns
t_r	Turn-On Rise Time		-	35	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	39	-	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		-	-	33	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	110	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_{SD}= 16A, T_J = 25℃	-	-	1.2	V
t_{rr}	Reverse Recovery Time	T_J = 25℃, I_F = 16A, di/dt =100A/μs	-	115	170	ns
Q_{rr}	Reverse Recovery Charge		-	505	760	uC

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

2. I_{AS} =16A, L=1.5mH, R_G =25Ω Starting T_J = 175°C

3. Pulse Test: Pulse width ≤ 400μs, Duty Cycle ≤ 2%

Typical Performance Characteristics

Figure1: Output Characteristics

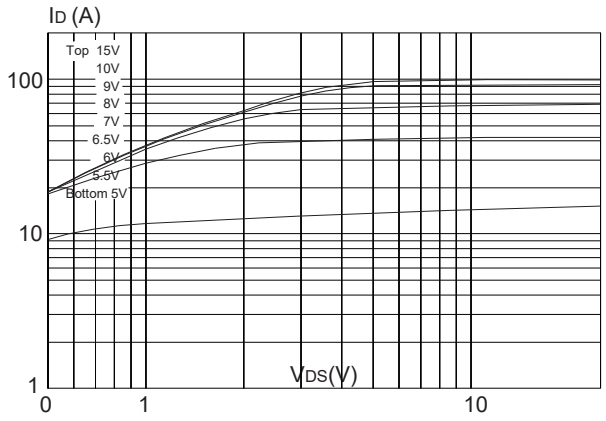


Figure 2: Typical Transfer Characteristics

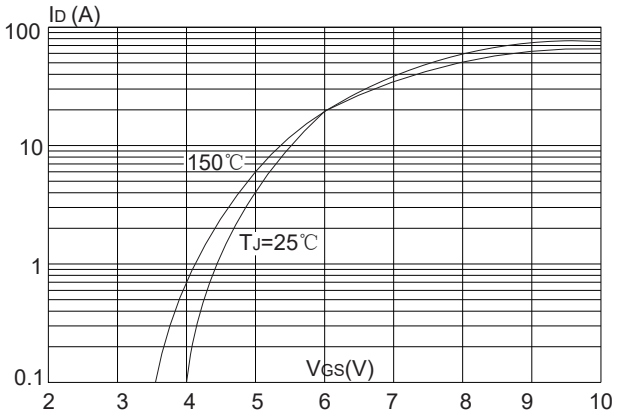


Figure 3: On-resistance vs. Drain Current

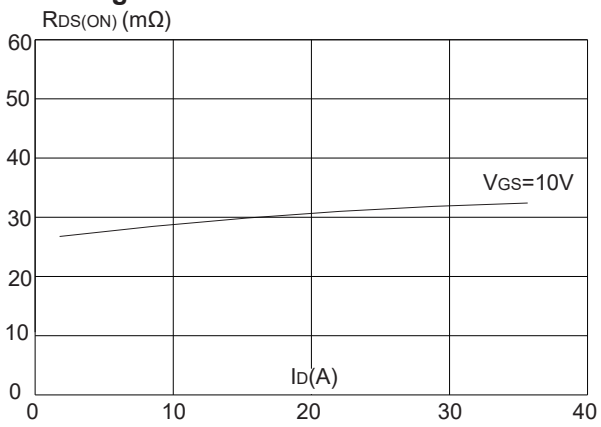


Figure 4: Body Diode Characteristics

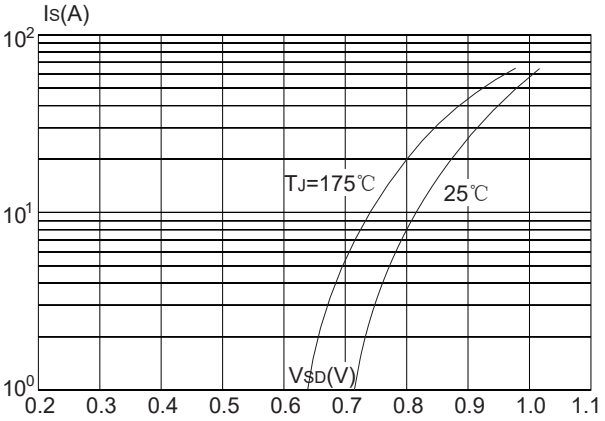


Figure 5: Gate Charge Characteristics

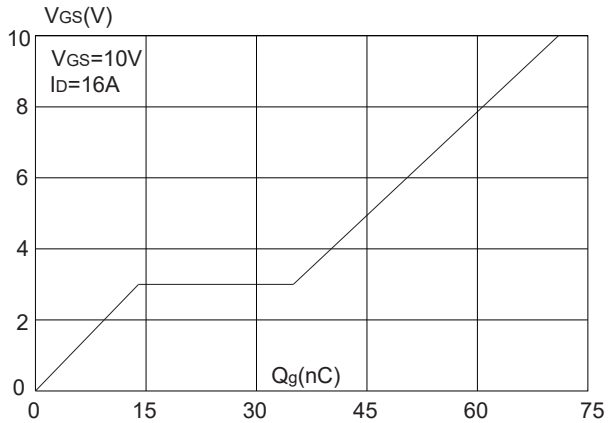


Figure 6: Capacitance Characteristics

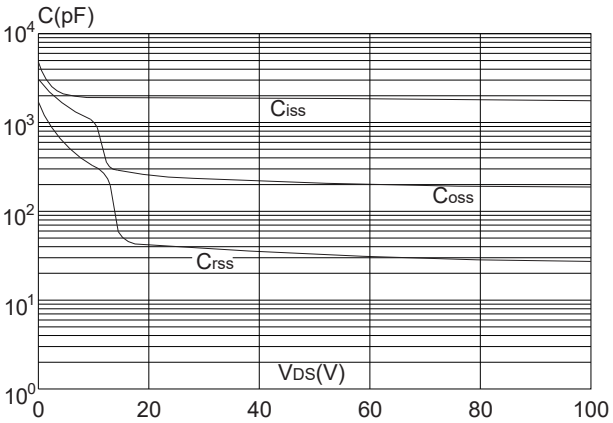


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

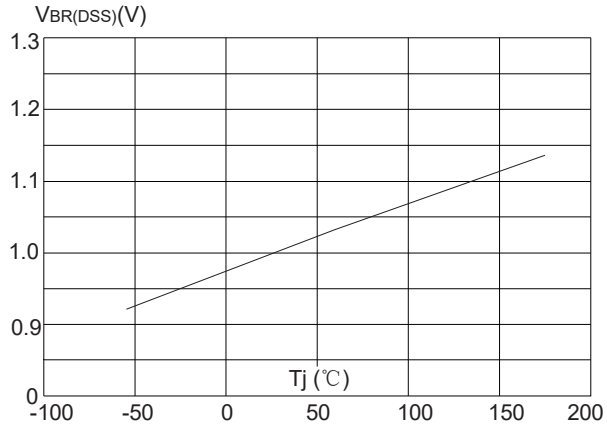


Figure 8: Normalized on Resistance vs. Junction Temperature

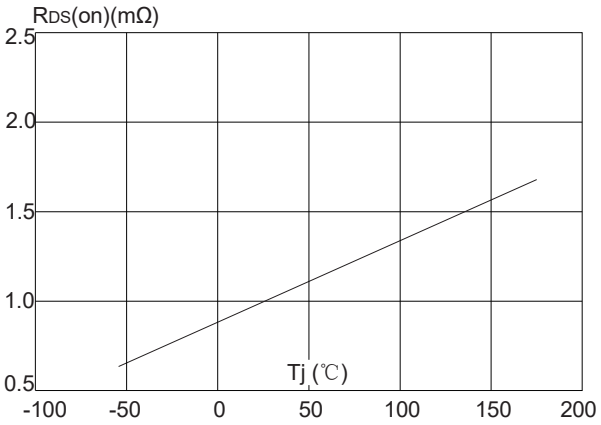


Figure 9: Maximum Safe Operating Area

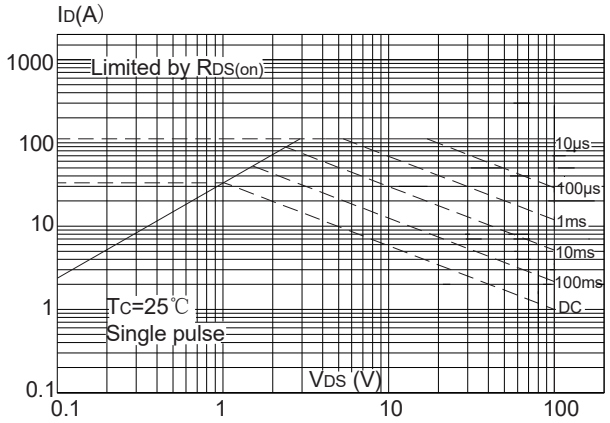


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

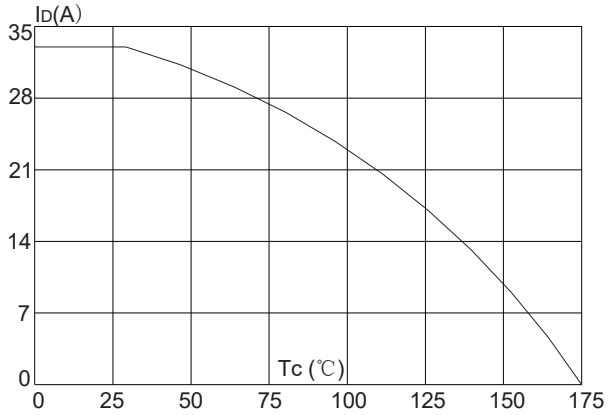
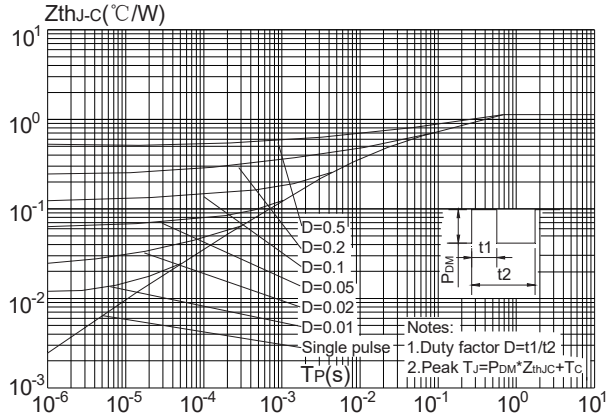


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220C,TO-263)



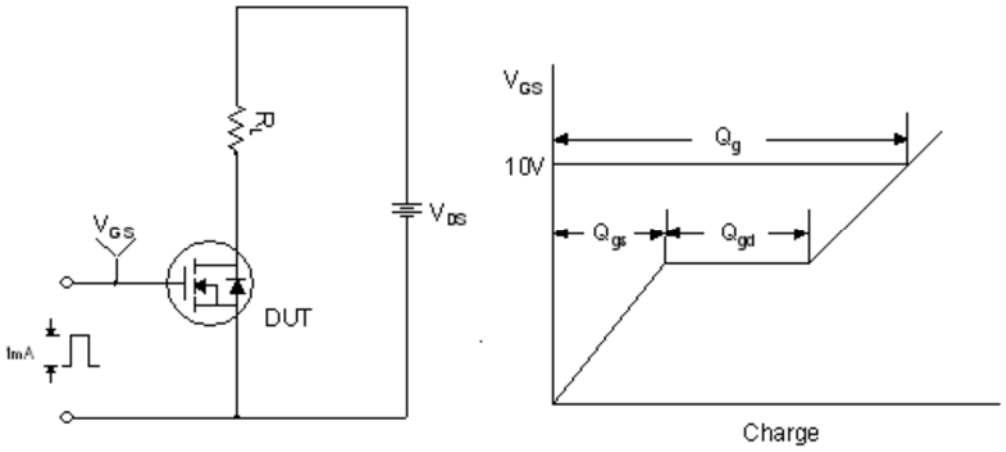


Figure 1. Gate Charge Test Circuit & Waveform

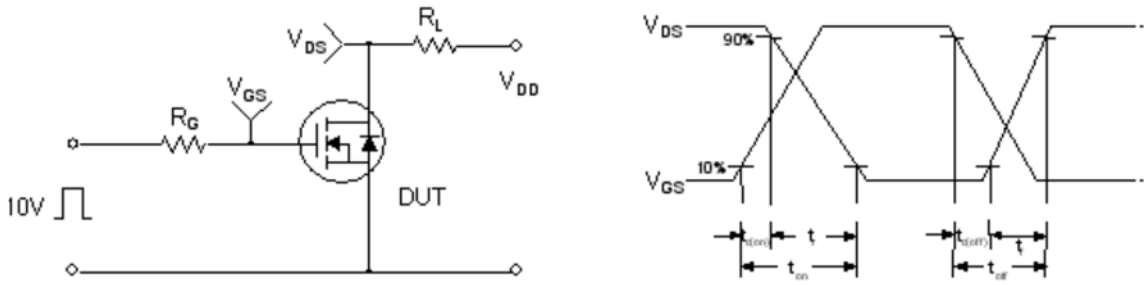


Figure 2. Resistive Switching Test Circuit & Waveforms

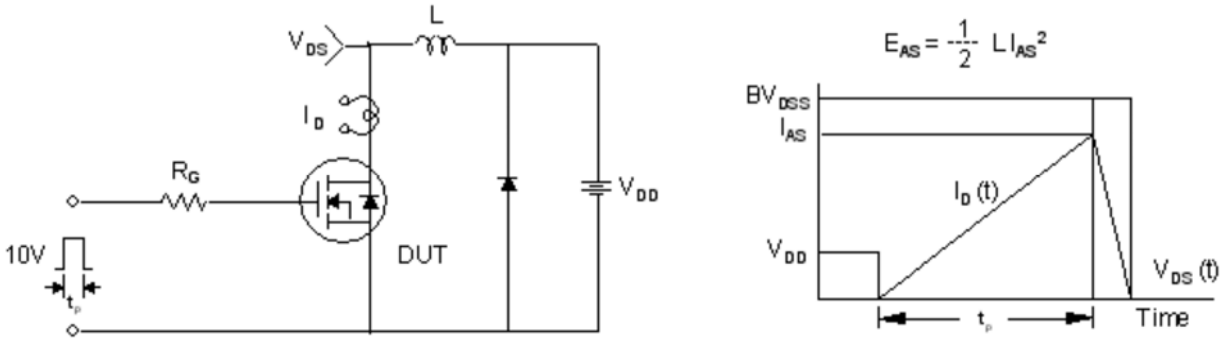


Figure 3. Unclamped Inductive Switching Test Circuit & Waveforms

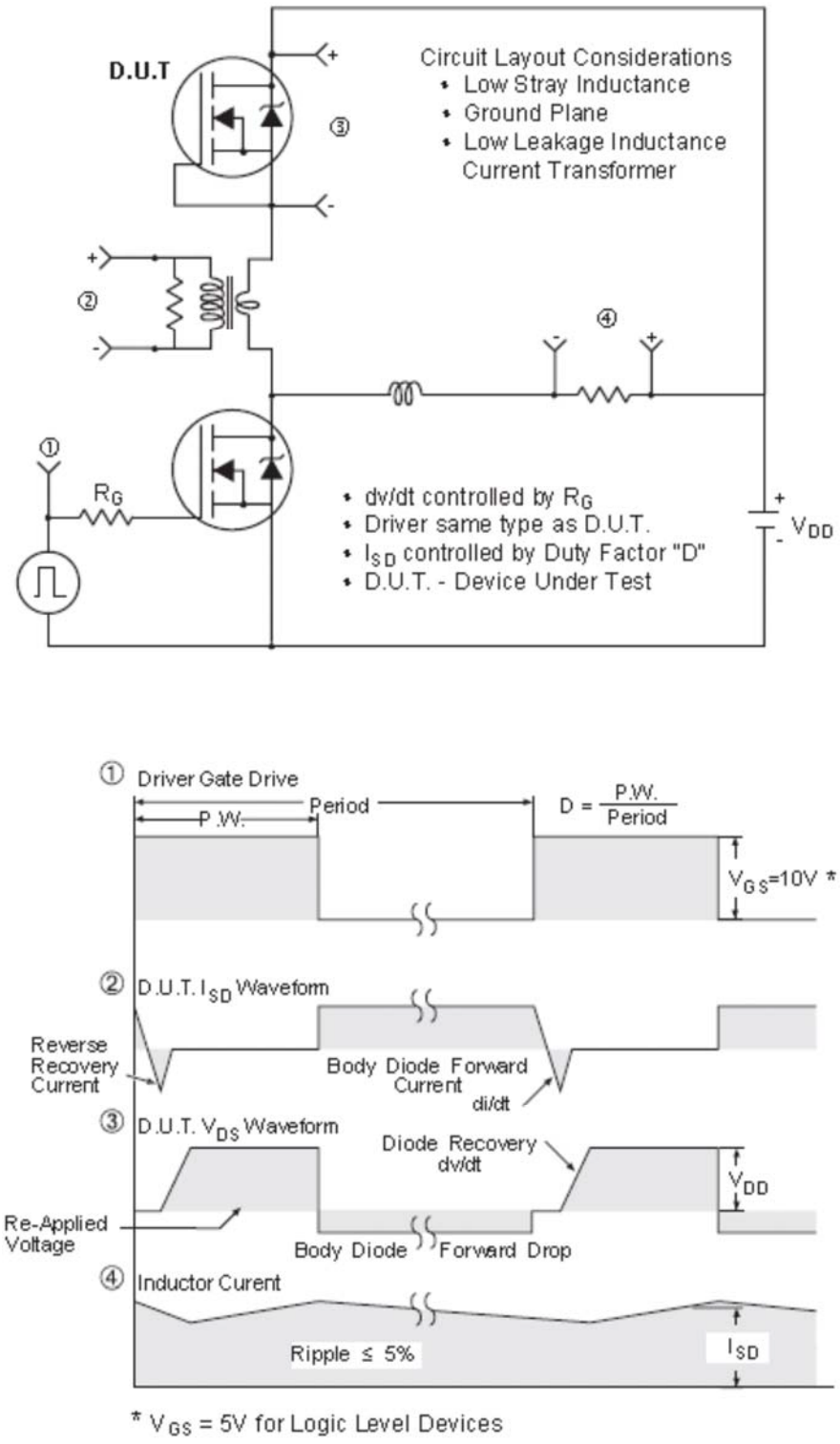


Figure 4. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)