

Description

200V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

Features

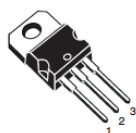
V_{DS}	$R_{DS(ON)(MAX)}$ @ $V_{GS} = 10V$	I_D
200V	0.085 Ω	34A

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS Compliant & Halogen-Free

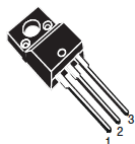
Application

- Active power factor correction
- Switching Mode Power Supply

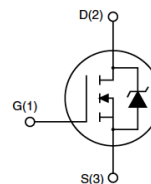
Package



TO-220



TO-220F



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

Symbol	Parameter		Max.	Units
V_{DS}	Drain-Source Voltage		200	V
V_{GS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_C = 25^{\circ}C$	34	A
		$T_C = 100^{\circ}C$	25	A
I_{DM}	Pulsed Drain Current ^{note1}		136	A
P_D	Power Dissipation	$T_C = 25^{\circ}C$	230	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.68	$^{\circ}C/W$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^{\circ}C$

*Drain current limited by maximum junction temperature

Electrical Characteristics $T_C=25^{\circ}\text{C}$ 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	200	-	-	V
ΔV _{(BR)DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I _D = 250μA	-	0.3	-	V/℃
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 200V, V _{GS} = 0V	-	-	25	μA
		V _{DS} = 160V, T _C = 125℃	-	-	250	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage ^{note2}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D = 17A	-	0.061	0.085	Ω
g _{FS}	Forward Transconductance	V _{DS} =50V, I _D = 17A	12	-	-	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	2300	-	pF
C _{oss}	Output Capacitance		-	650	-	pF
C _{rss}	Reverse Transfer Capacitance		-	200	-	pF
Q _g	Total Gate Charge	V _{DS} = 160V, I _D = 34A, V _{GS} = 10V	-	-	120	nC
Q _{gs}	Gate-Source Charge		-	-	25	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	-	65	nC
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 100V, I _D = 34A, R _G = 6.2Ω, V _{GS} = 10V	-	15	-	ns
t _r	Turn-On Rise Time		-	80	-	ns
t _{d(off)}	Turn-Off Delay Time		-	72	-	ns
t _f	Turn-Off Fall Time		-	64	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	34	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	136	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 34A	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _F = 34A,	-	370	550	ns
Q _{rr}	Reverse Recovery Charge	di/dt =100A/μs	-	4.7	7.2	uC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

Typical Performance Characteristics

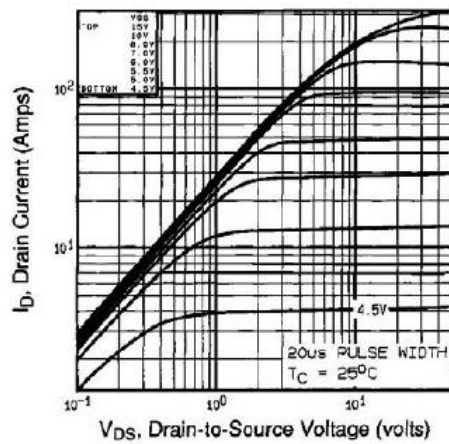


Figure 1. Output Characteristics

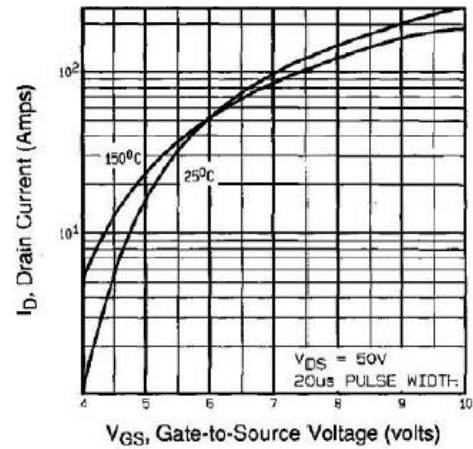


Figure 2. Transfer Characteristics

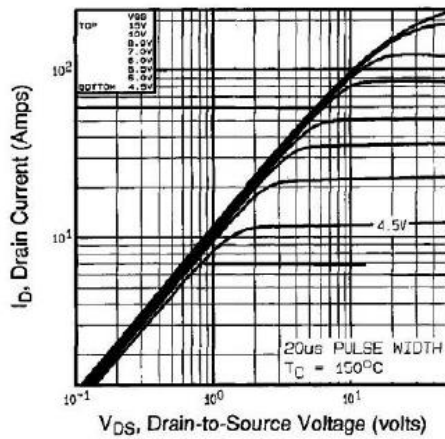


Figure 3. Transfer Characteristics $T_C=150^\circ\text{C}$

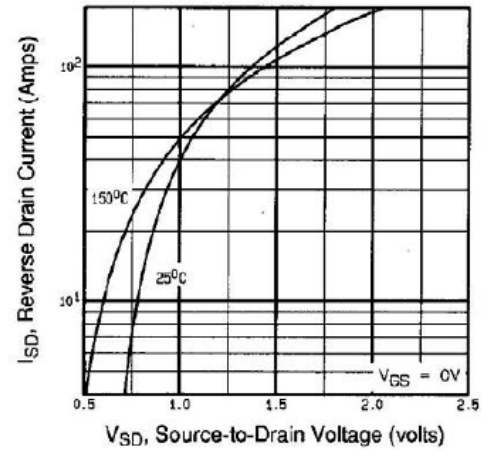


Figure 4. Body Diode Forward Voltage vs. Source Current and Temperature

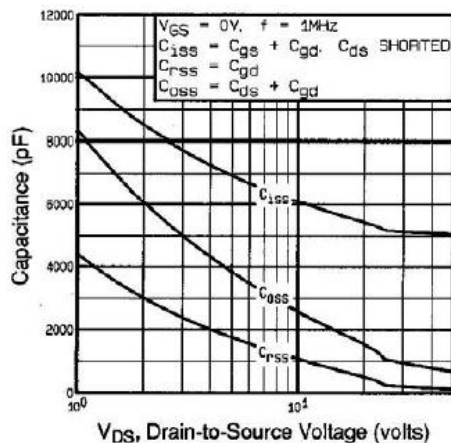


Figure 5. Capacitance Characteristics

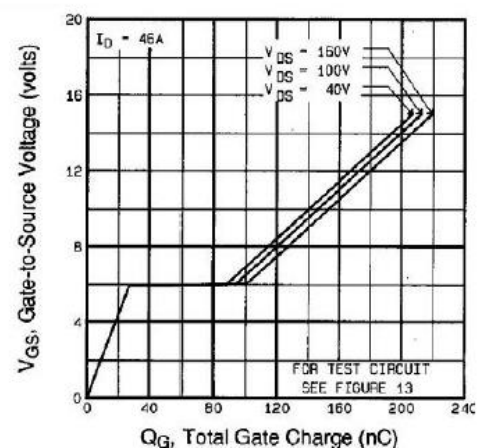


Figure 6. Gate Charge Characteristics

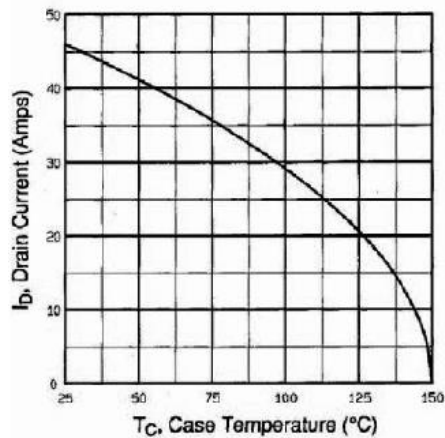


Figure 7. Maximum Continuous Drain Current vs. Case Temperature

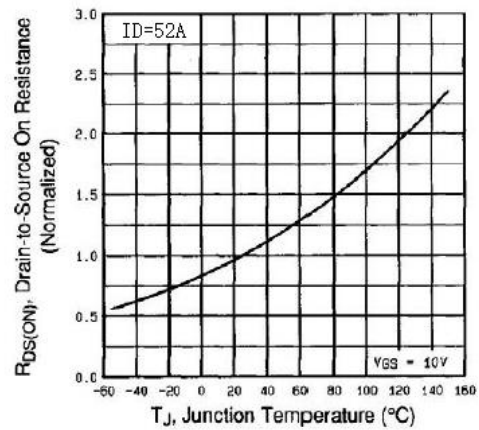


Figure 8. Normalized On Resistance vs. Junction Temperature

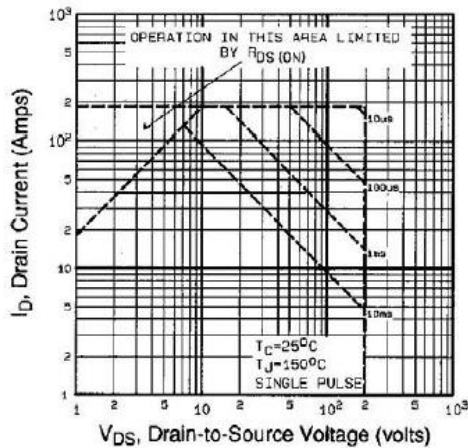


Figure 9. Maximum Safe Operating Area

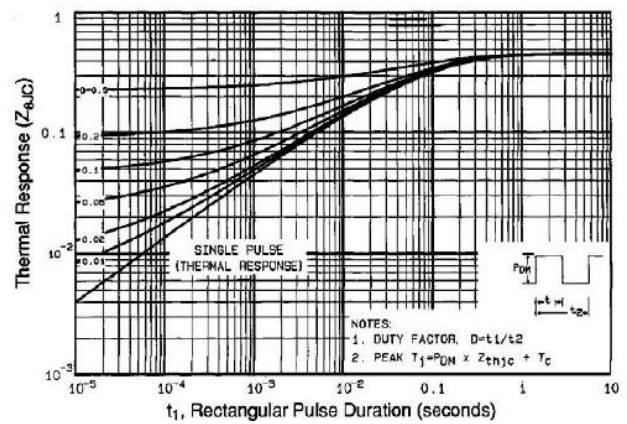


Figure 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

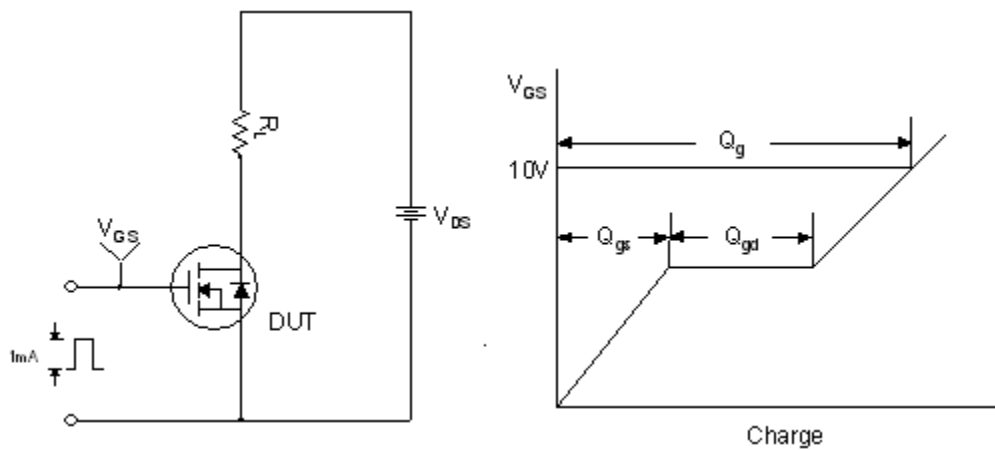


Figure 11. Gate Charge Test Circuit & Waveform

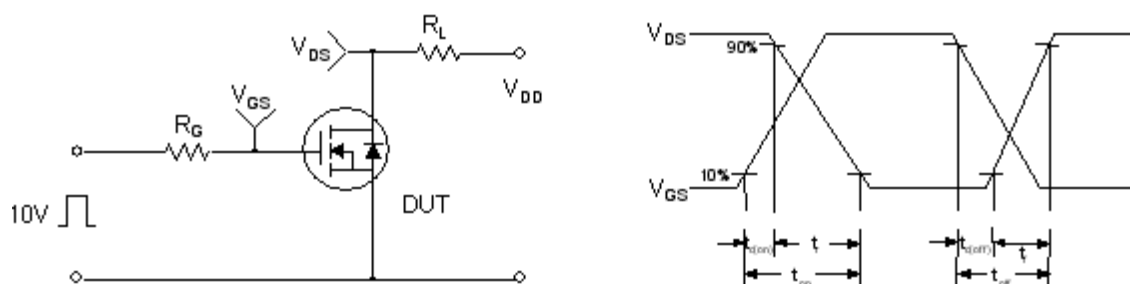


Figure 12. Resistive Switching Test Circuit & Waveforms

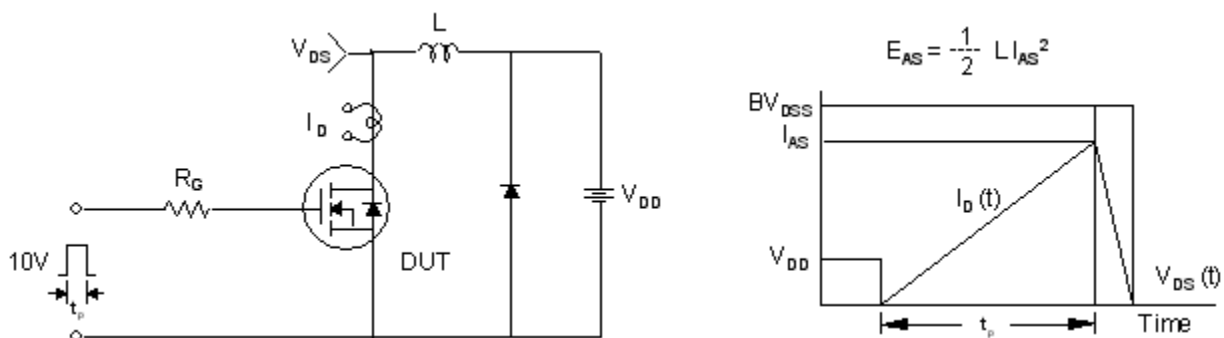


Figure 13. Unclamped Inductive Switching Test Circuit & Waveforms

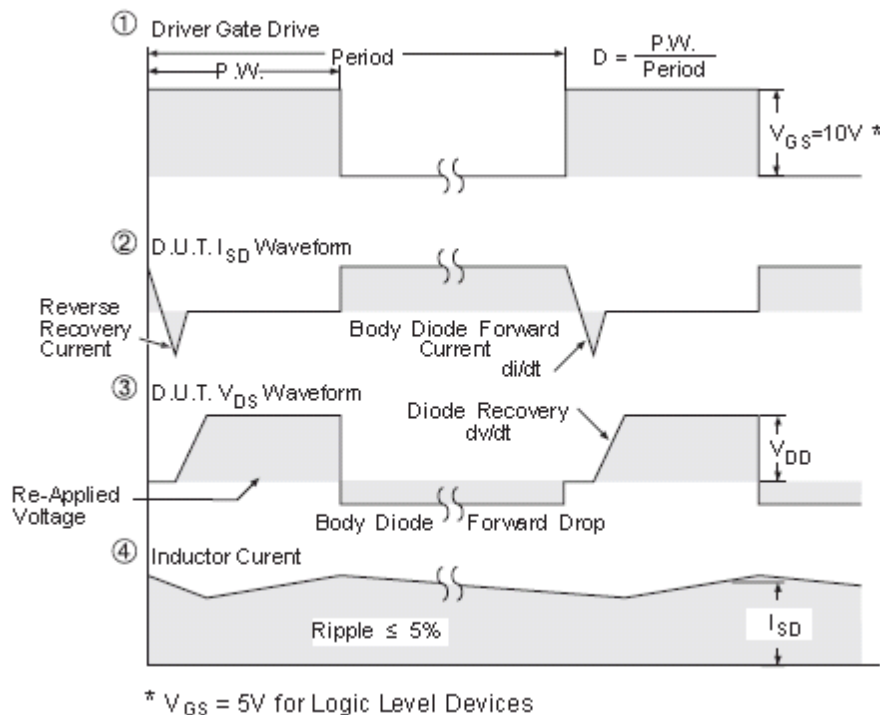
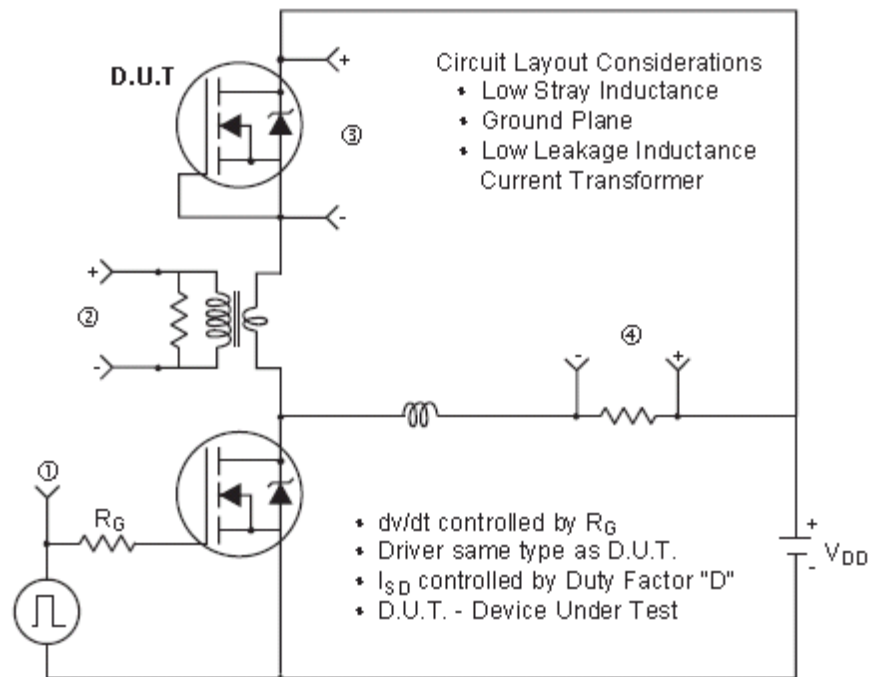


Figure 14. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)