



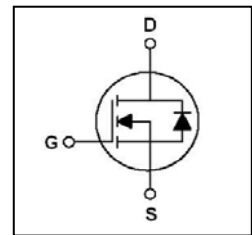
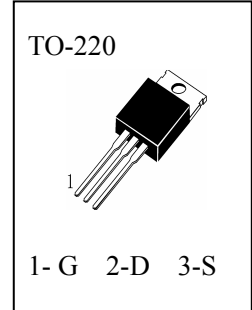
N-Channel Enhancement Mode Field Effect Transistor

■ Applications

- Servo motor control.
- Power MOSFET gate drivers.
- DC/DC converters
- Other switching applications.

■ Features

- 60A, 60V(See Note), $R_{DS(on)} < 11.5mV\Omega @ V_{GS} = 10V$
- Fast switching
- 100% avalanche tested
- Minimize input capacitance and gate charge
- Exceptional dv/dt capability



■ Maximum Ratings (Ta=25°C unless otherwise specified)

T_{stg}	Storage Temperature	-----	-55~165°C
T_j	Operating Junction Temperature	-----	150°C
V_{DSS}	Drain-Source Voltage	-----	60V
V_{GSS}	Gate-Source Voltage	-----	±20V
I_D	Drain Current (Continuous)($T_c=25^\circ C$)	-----	60A
I_{DM}	Pulsed Drain Current (Note 1)	-----	240A
P_D	Maximum Power Dissipation ($T_c=25^\circ C$)	-----	150W
E_{AS}	Pulsed Avalanche Energy (Note 2)	-----	550mJ

■ Thermal Characteristics

Symbol	Items	TO-220	Unit
Rthj-case	Thermal Resistance Junction-case	Max 1.13	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max 63	°C/W

**Electrical Characteristics** (Ta=25°C unless otherwise specified)

Symbol	Items	Min.	Typ.	Max.	Unit	Conditions
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	60			V	I _D =250μA, V _{GS} =0V
I _{DSS}	Zero Gate Voltage Drain Current			1	μA	V _{DS} =60V, V _{GS} =0V
I _{GSS}	Gate – Body Leakage			±100	nA	V _{GS} =±20V, V _{DS} =0V
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	2.0		4.0	V	V _{DS} = V _{GS} , I _D =250μA
R _{DS(on)}	Static Drain-Source On-Resistance			11.5	mΩ	V _{GS} =10V, I _D =30A (Note 3)
Dynamic Characteristics and Switching Characteristics						
C _{iss}	Input Capacitance		2350		pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0 MHz
C _{oss}	Output Capacitance		237		pF	
C _{rss}	Reverse Transfer Capacitance		205		pF	
t _{d(on)}	Turn - On Delay Time		16		nS	V _{DS} = 30V, V _{GS} = 10 V, R _L = 15 Ω, R _G = 2.5 Ω (Note 3)
t _r	Rise Time		10		nS	
t _{d(off)}	Turn - Off Delay Time		45		nS	
t _f	Fall Time		12		nS	
Q _g	Total Gate Charge		50		nC	V _{DS} =30V, I _D =30A, V _{GS} = 10V (Note 3)
Q _{gs}	Gate–Source Charge		12		nC	
Q _{gd}	Gate–Drain Charge		16		nC	
Drain-Source Diode Characteristics and Maximun Ratings						
I _S	Continuous Source–Drain Diode Forward Current			60	A	
I _{SM}	Pulsed Drain-Source Diode Forward Current			240	A	
V _{SD}	Source–Drain Diode Forward On–Voltage			1.2	V	I _S =30A, V _{GS} =0(Note 3)

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition: T_j=25°C, V_{DD}=50V, V_G=10V, L=0.5mH
3. Pulse Test: Pulse width≤300μS, Duty Cycle≤2%



Typical Characteristics

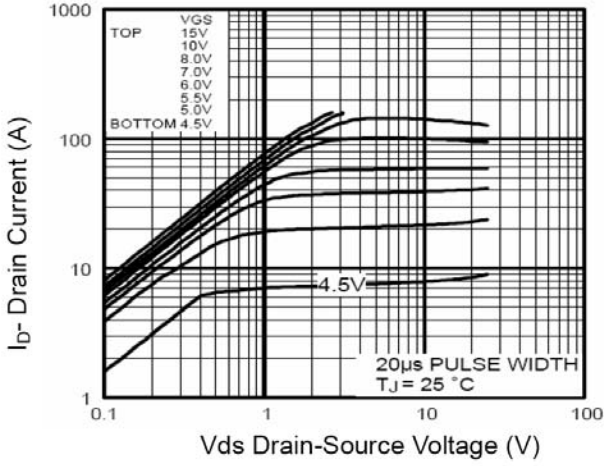


Figure 1 Output Characteristics

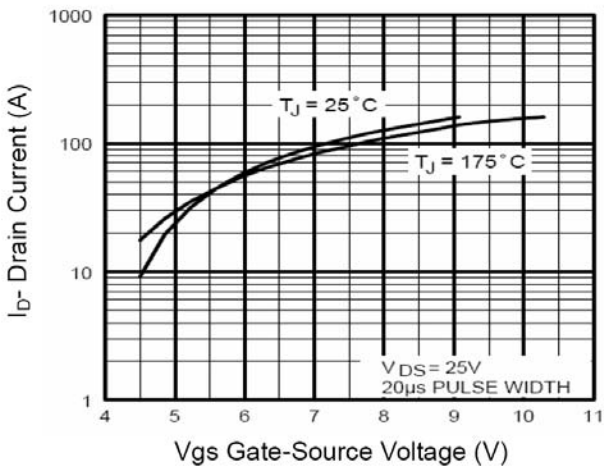


Figure 2 Transfer Characteristics

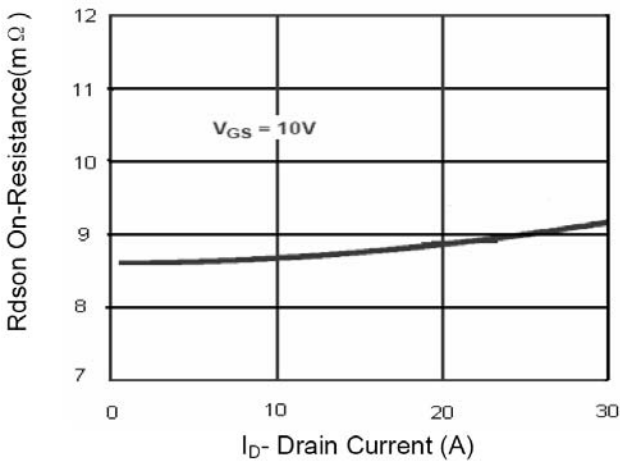


Figure 3 $R_{DS(on)}$ - Drain Current

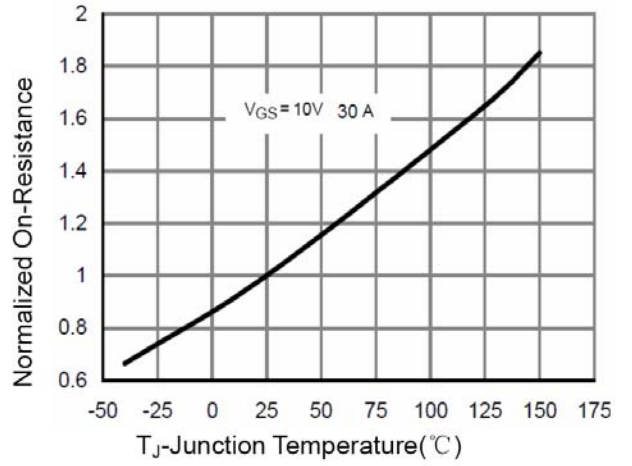


Figure 4 $R_{DS(on)}$ -Junction Temperature

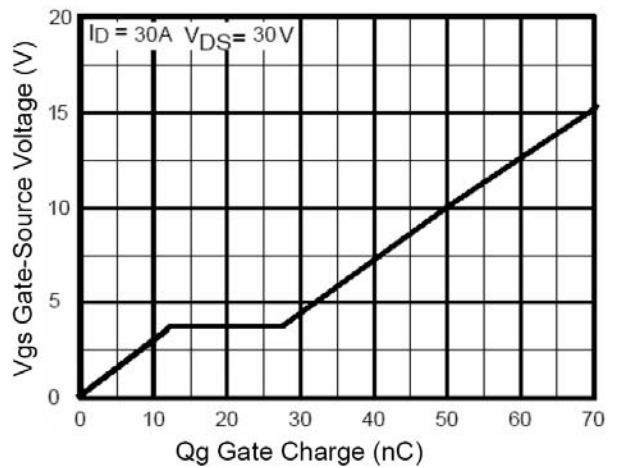


Figure 5 Gate Charge

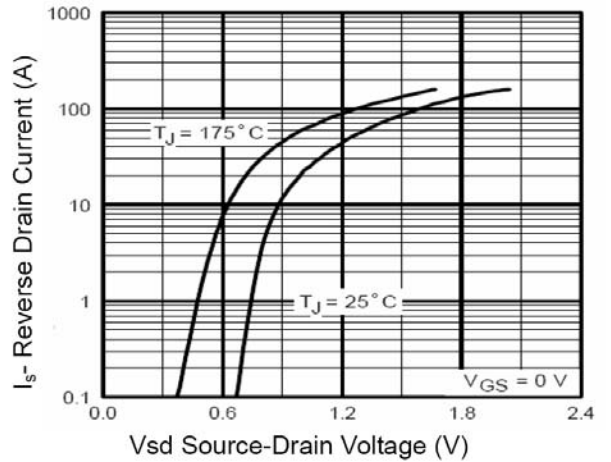


Figure 6 Source- Drain Diode Forward



Typical Characteristics

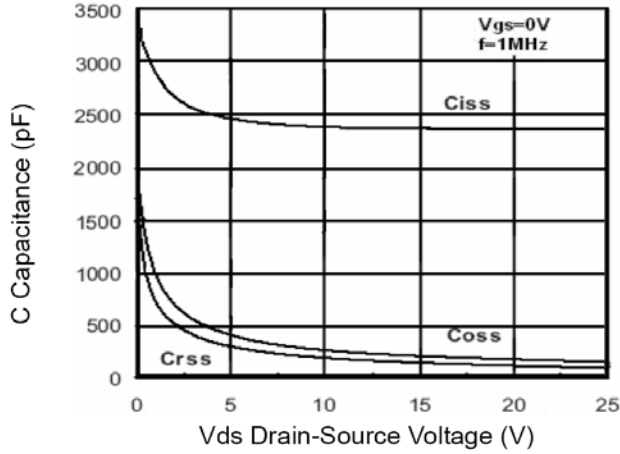


Figure 7 Capacitance vs Vds

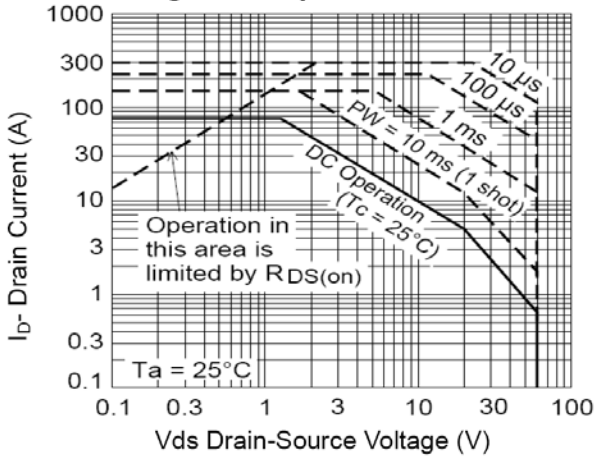


Figure 8 Safe Operation Area

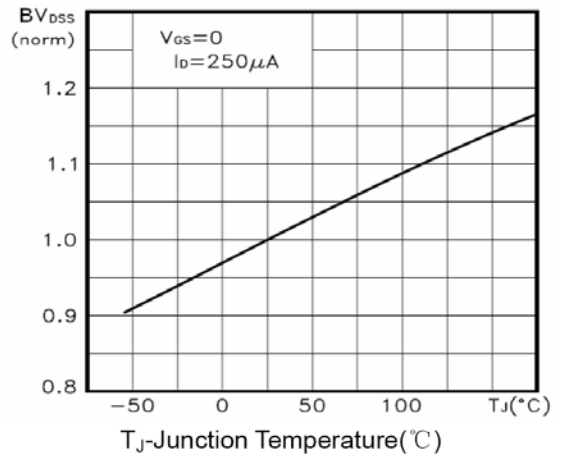


Figure 9 BV_{DSS} vs Junction Temperature

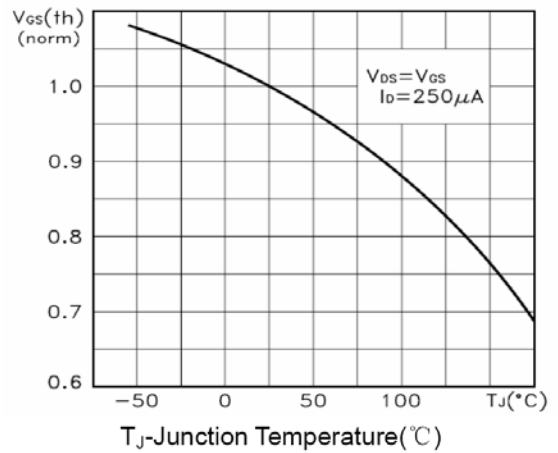


Figure 10 $V_{GS(th)}$ vs Junction Temperature

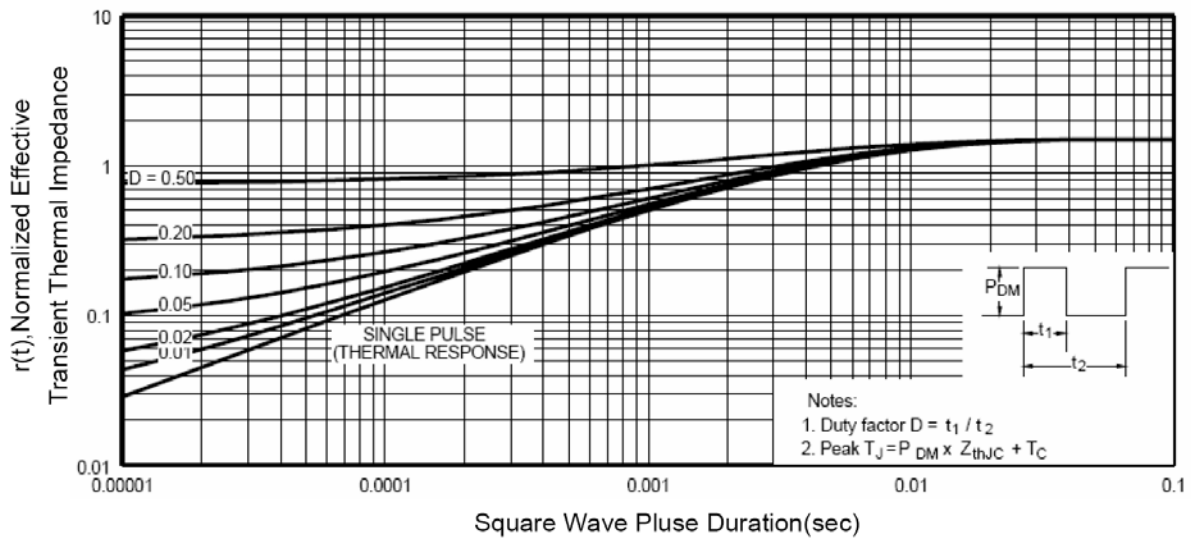
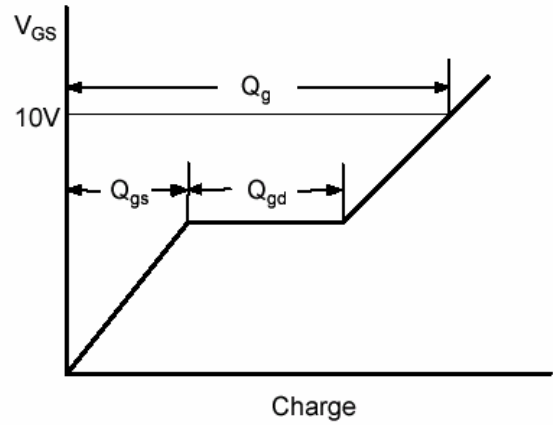
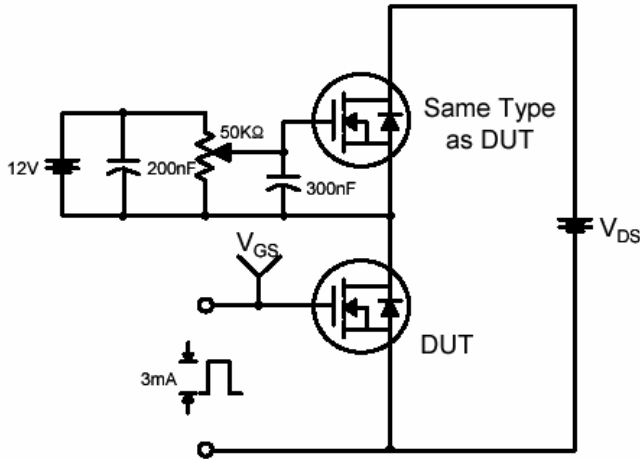


Figure 11 Normalized Maximum Transient Thermal Impedance

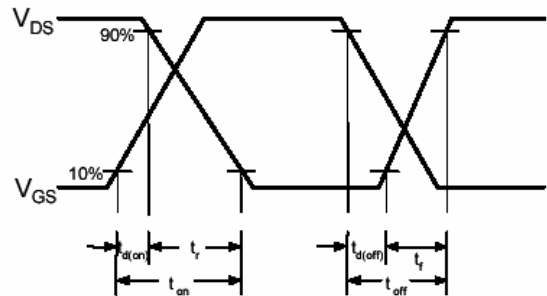
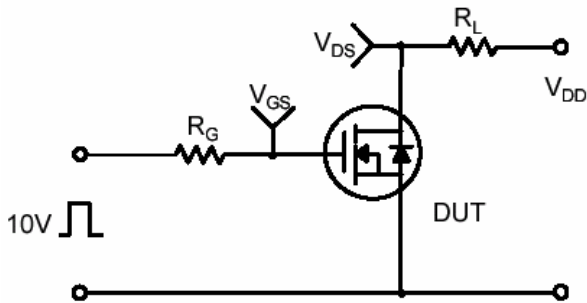


Typical Characteristics

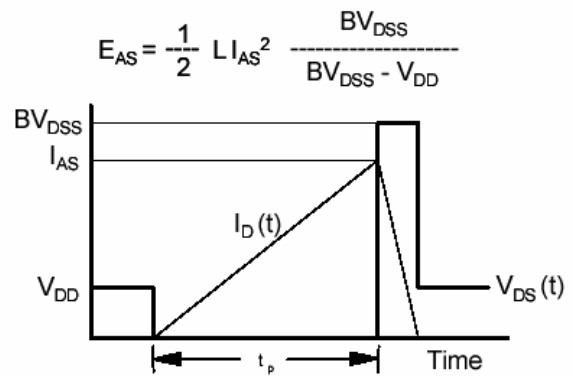
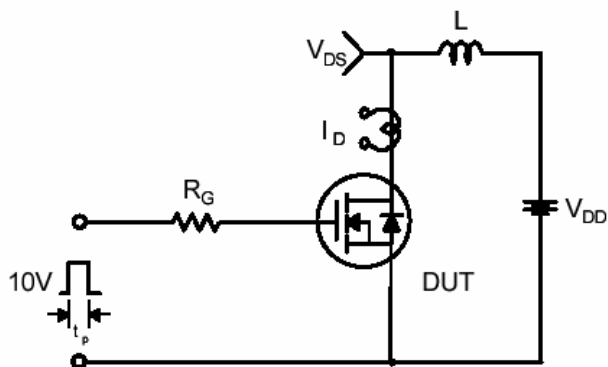
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms





Typical Characteristics

Peak Diode Recovery dv/dt Test Circuit & Waveforms

