

N-Channel Enhancement Mode Field Effect Transistor

General Description

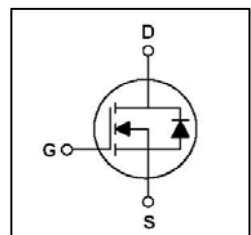
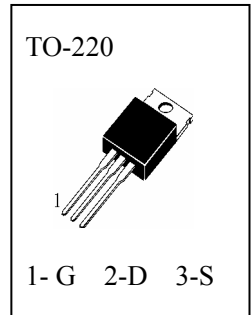
These power MOSFETs is designed for high voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers. And DC-DC&DC-AC Converters for Telecom,Industrial and Consumer Environment

Features

- 18A,200V, $R_{DS(on)} < 0.18\Omega @ V_{GS} = 10V$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- Equivalent Type:IRF640

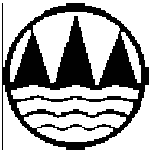
Maximum Ratings (Ta=25°C unless otherwise specified)

T_{stg}	Storage Temperature	-----	-55~150°C
T_j	Operating Junction Temperature	-----	150°C
V_{DSS}	Drain-Source Voltage	-----	200V
V_{DGR}	Drain-Gate Voltage ($R_{GS}=20k\Omega$)	-----	200V
V_{GSS}	Gate-Source Voltage	-----	±20V
I_D	Drain Current (Continuous)	-----	18A
P_D	Maximum Power Dissipation	-----	125W
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $d < 1\%$)	-----	18A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25^\circ C$, $I_D = I_{AR}$, $V_{DD} = 50V$)	-----	320mJ
E_{AR}	Repetitive Avalanche Energy(pulse width limited by T_j max, $d < 1\%$)	-----	13.4mJ



Thermal Characteristics

Symbol	Items	TO-220	Unit
Rthj-case	Thermal Resistance Junction-case	Max 1.0	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max 62.5	°C/W
Rth c-s	Thermal Resistance Case-sink	Typ 0.5	°C/W

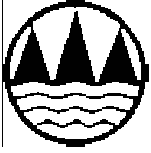


Electrical Characteristics (Ta=25°C unless otherwise specified)

Symbol	Items	Min.	Typ.	Max.	Unit	Conditions
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	200			V	I _D =250μA, V _{GS} =0V
I _{DSS}	Zero Gate Voltage Drain Current			25	μA	V _{DS} =200V, V _{GS} =0V
				250	μA	V _{DS} =160V, V _{GS} =0V, T _j =125°C
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			0.18	Ω	V _{GS} =10V, I _D =9A
g _{FS}	Forward Transconductance	4.3			S	V _{DS} =40V, I _D =9A (Note 1)
Dynamic Characteristics and Switching Characteristics						
C _{iss}	Input Capacitance			1700	pF	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz
C _{oss}	Output Capacitance			230	pF	
C _{rss}	Reverse Transfer Capacitance			60	pF	
t _{d(on)}	Turn - On Delay Time			50	nS	V _{DD} = 100 V, I _D = 18Apk R _G = 25 Ω (Note 1,2)
t _r	Rise Time			300	nS	
t _{d(off)}	Turn - Off Delay Time			300	nS	
t _f	Fall Time			230	nS	
Q _g	Total Gate Charge		45	58	nC	V _{DS} =0.8V _{DSS} , I _D =18A, V _{GS} = 10 V (Note 1,2)
Q _{gs}	Gate–Source Charge		6.5		nC	
Q _{gd}	Gate–Drain Charge		22		nC	
Drain-Source Diode Characteristics and Maximun Ratings						
I _S	Continuous Source–Drain Diode Forward Current			18	A	
I _{SM}	Pulsed Drain-Source Diode Forward Current			72	A	
V _{SD}	Source–Drain Diode Forward On–Voltage			1.5	V	I _S =18A, V _{GS} =0

Notes:

1. Pulse Test: Pulse width ≤ 300 μ S, Duty cycle ≤ 2%
2. Essentially independent of operating temperature



Typical Characteristics

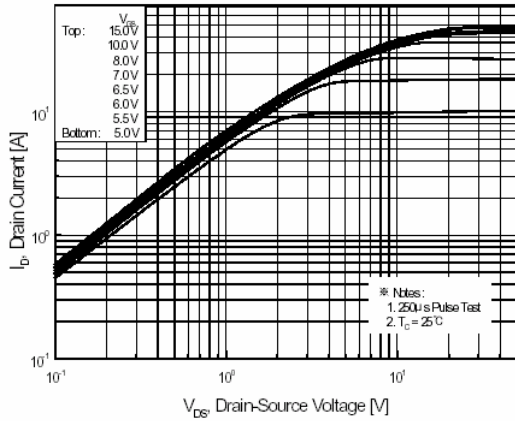


Figure 1. On-Region Characteristics

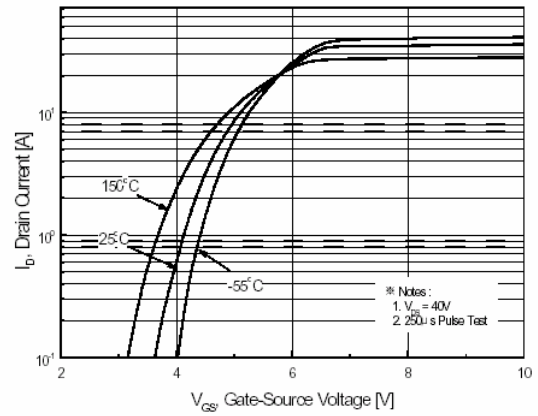


Figure 2. Transfer Characteristics

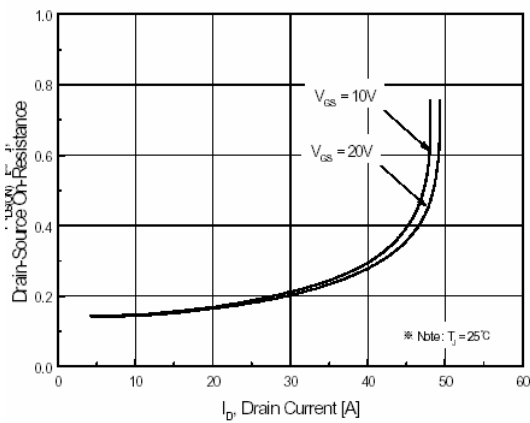


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

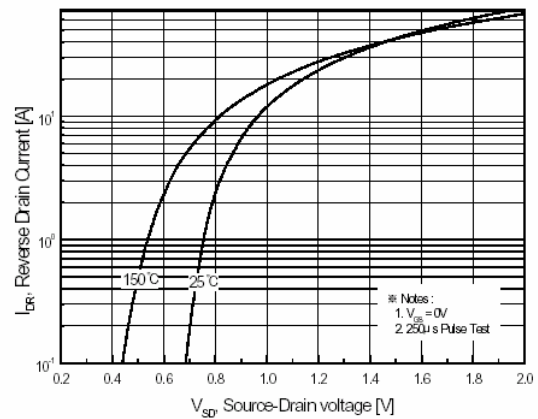


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

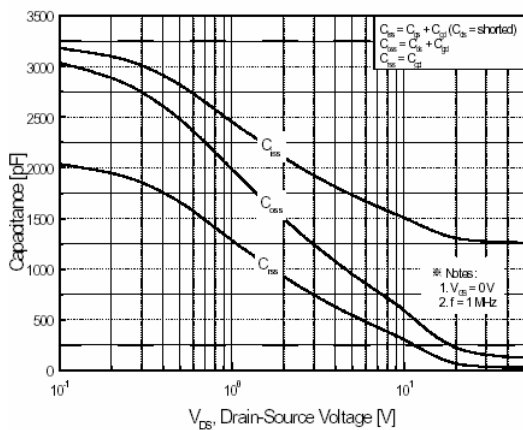


Figure 5. Capacitance Characteristics

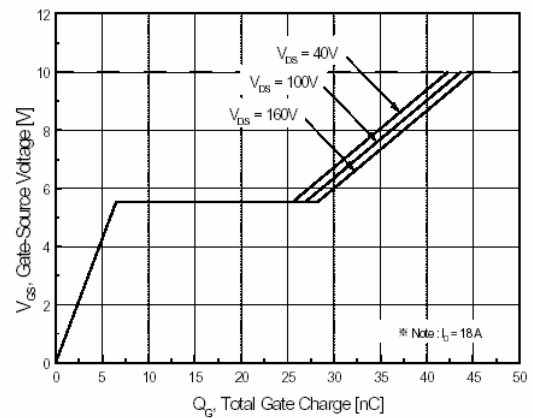
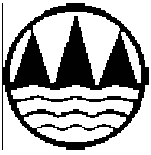


Figure 6. Gate Charge Characteristics



Typical Characteristics

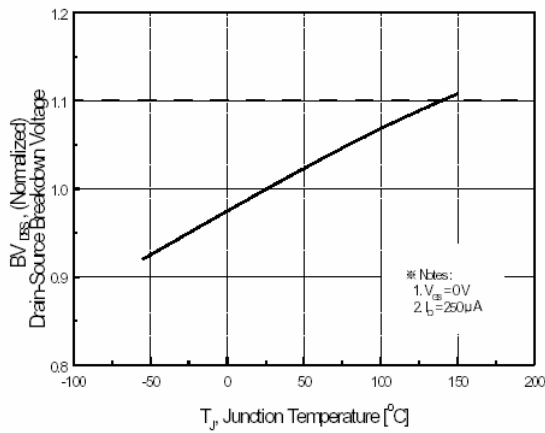


Figure 7. Breakdown Voltage Variation vs Temperature

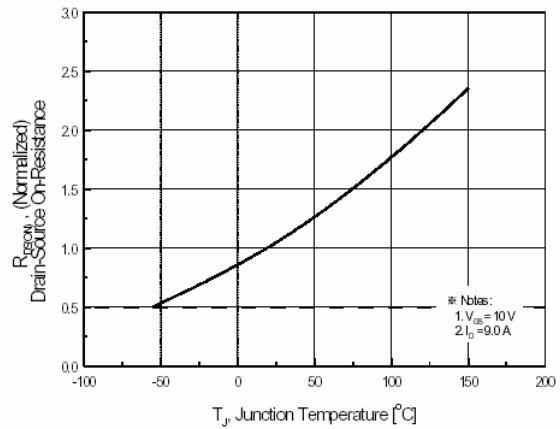


Figure 8. On-Resistance Variation vs Temperature

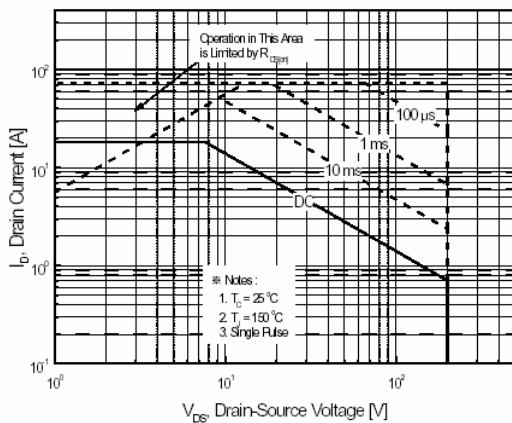


Figure 9. Maximum Safe operating Area

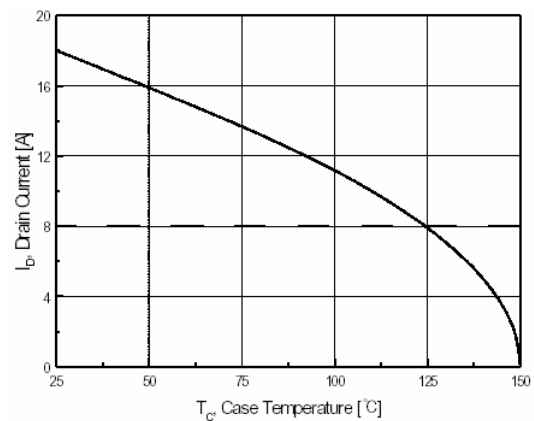


Figure 10. Maximum Drain Current vs Case Temperature

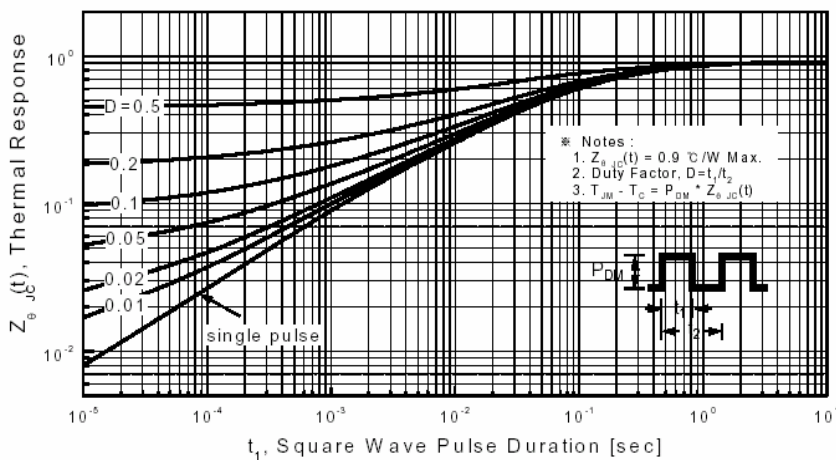
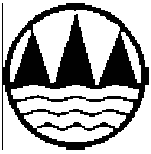
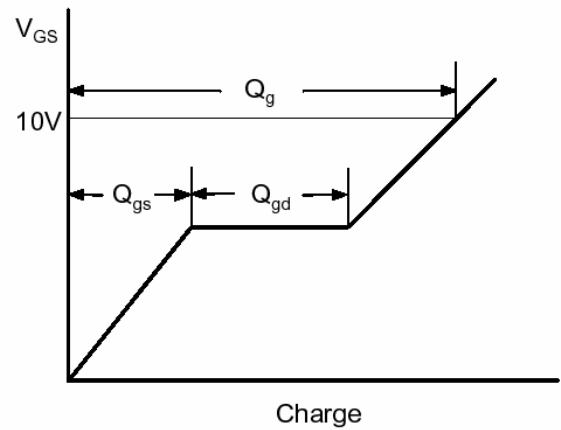
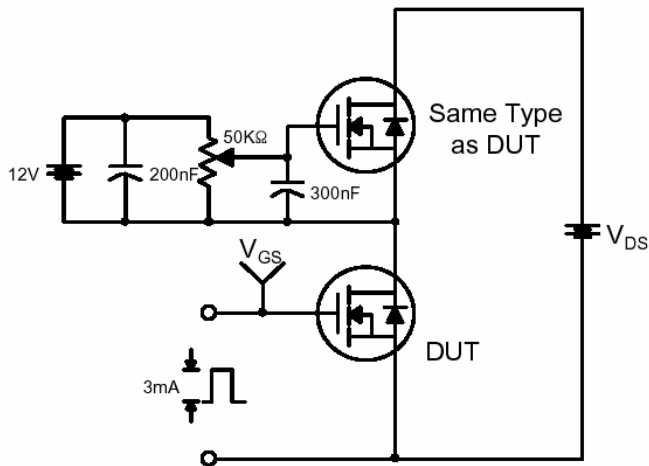


Figure 11. Transient Thermal Response Curve

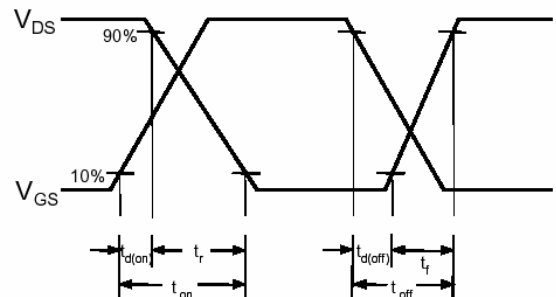
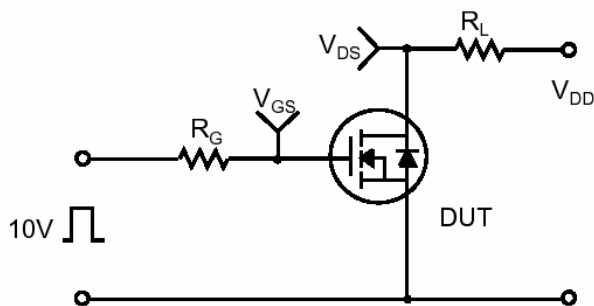


■ Typical Characteristics

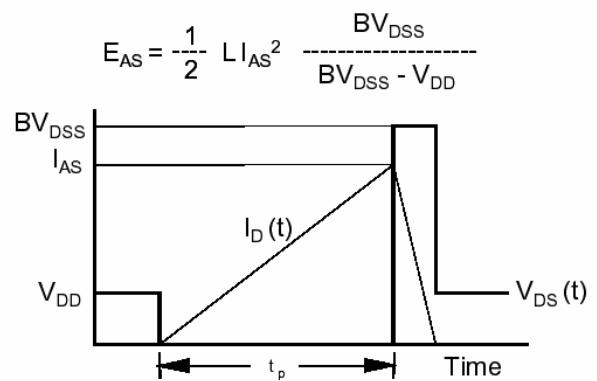
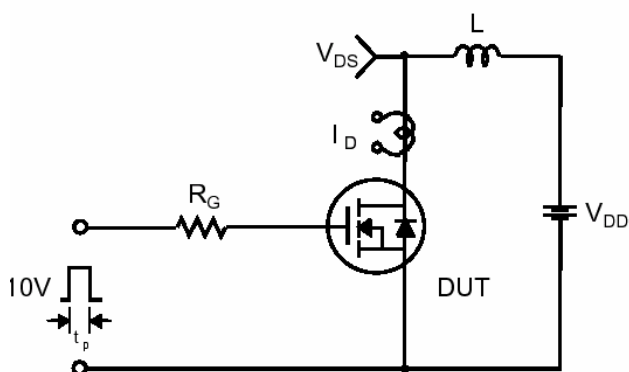
Gate Charge Test Circuit & Waveform

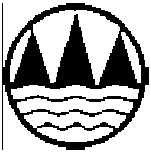


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms





Typical Characteristics

Peak Diode Recovery dv/dt Test Circuit & Waveforms

