

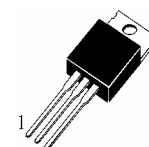


N-Channel Enhancement Mode Field Effect Transistor

General Description

This Power MOSFET is produced using advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. This devices is specially well suited for half bridge and full bridge resonant topolgy like a electronic lamp ballast.

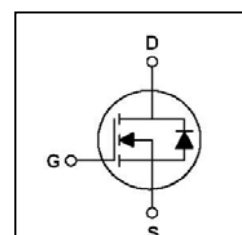
TO-220



1- G 2-D 3-S

Features

- 10A, 400V, $R_{DS(on)} < 0.55\Omega @ V_{GS} = 10V$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- Equivalent Type:IRF740



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	400V
V_{DGR}	Drain-Gate Voltage ($R_{GS}=20k\Omega$)	400V
V_{GSS}	Gate-Source Voltage	$\pm 20V$
I_D	Drain Current (Continuous)	10A
P_D	Maximum Power Dissipation	125W
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $d < 1\%$)	10 A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25^\circ C$, $I_D = I_{AR}$, $V_{DD} = 50V$)	450 mJ
E_{AR}	Repetitive Avalanche Energy(pulse width limited by T_j max, $d < 1\%$)	13.4mJ

Thermal Characteristics

Symbol	Items	TO-220	Unit
$R_{thj-case}$	Thermal Resistance Junction-case	Max 1.0	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max 62.5	°C/W
$R_{th c-s}$	Thermal Resistance Case-sink	Typ 0.5	°C/W

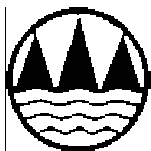


Electrical Characteristics (Ta=25°C unless otherwise specified)

Symbol	Items	Min.	Typ.	Max.	Unit	Conditions
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	400			V	$I_D=250\mu A, V_{GS}=0V$
I_{DSS}	Zero Gate Voltage Drain Current			25	μA	$V_{DS}=400V, V_{GS}=0V$
				250	μA	$V_{DS}=320V, V_{GS}=0V, T_j=125^\circ C$
I_{GSS}	Gate – Body Leakage			± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	2.0		4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
$R_{DS(on)}$	Static Drain-Source On-Resistance			0.55	Ω	$V_{GS}=10V, I_D=5A$
g_{FS}	Forward Transconductance		9.6		S	$V_{DS}=40V, I_D=5A$ (Note 1)
Dynamic Characteristics and Switching Characteristics						
C_{iss}	Input Capacitance			1800	pF	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$
C_{oss}	Output Capacitance			195	pF	
C_{rss}	Reverse Transfer Capacitance			45	pF	
$t_{d(on)}$	Turn - On Delay Time			50	nS	$V_{DD}=200V, I_D=10A_{pk}$ $R_G=25\Omega$ (Note 1,2)
t_r	Rise Time			170	nS	
$t_{d(off)}$	Turn - Off Delay Time			260	nS	
t_f	Fall Time			180	nS	$V_{DS}=0.8V_{DSS}, I_D=10A,$ $V_{GS}=10V$ (Note 1,2)
Q_g	Total Gate Charge			53	nC	
Q_{gs}	Gate–Source Charge		7		nC	
Q_{gd}	Gate–Drain Charge		17		nC	
Drain-Source Diode Characteristics and Maximun Ratings						
I_S	Continuous Source–Drain Diode Forward Current			10	A	
I_{SM}	Pulsed Drain-Source Diode Forward Current			40	A	
V_{SD}	Source–Drain Diode Forward On–Voltage			2.0	V	$I_S=10A, V_{GS}=0$

Notes:

1. Pulse Test: Pulse width $\leq 300\mu S$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature



Typical Characteristics

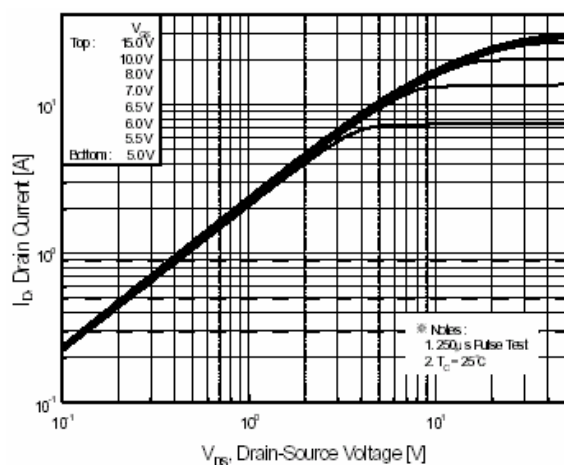


Figure 1. On-Region Characteristics

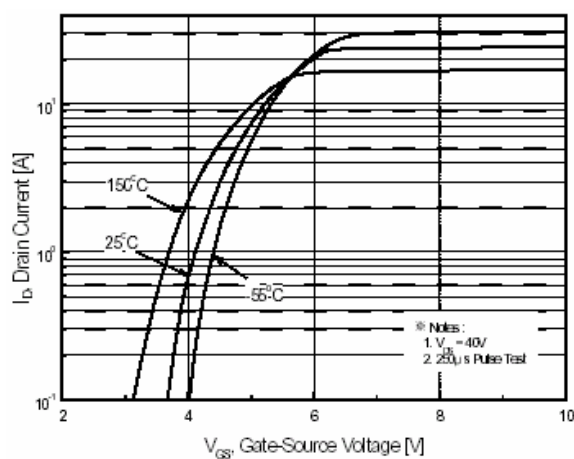


Figure 2. Transfer Characteristics

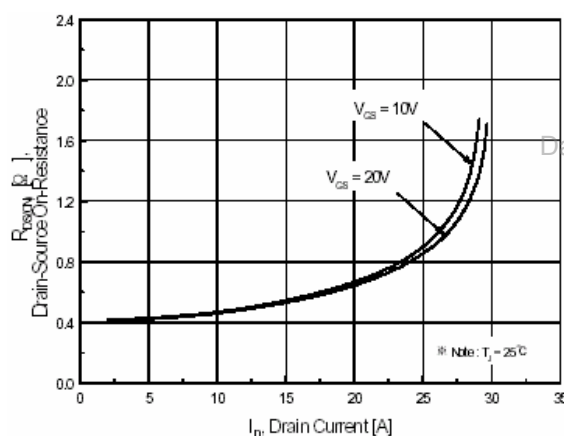


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

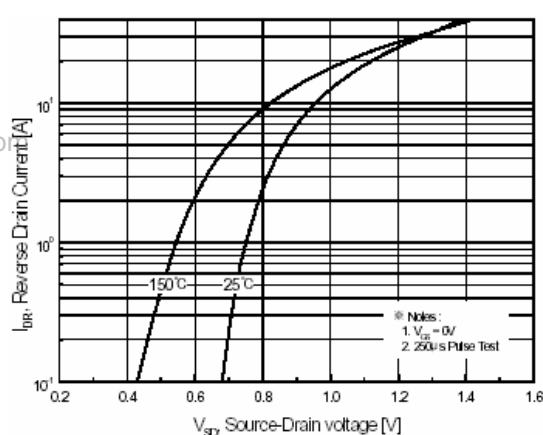


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

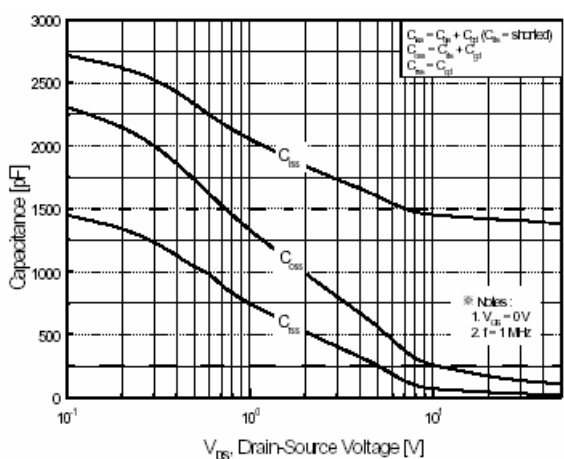


Figure 5. Capacitance Characteristics

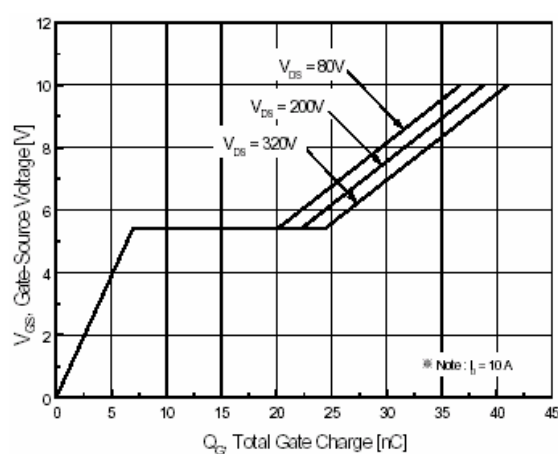
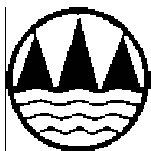


Figure 6. Gate Charge Characteristics



Typical Characteristics

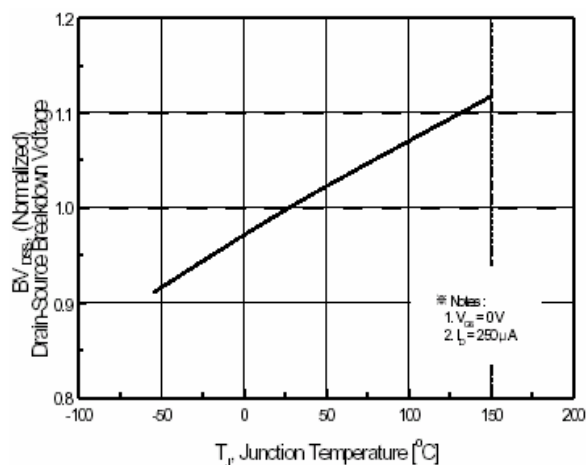


Figure 7. Breakdown Voltage Variation vs Temperature

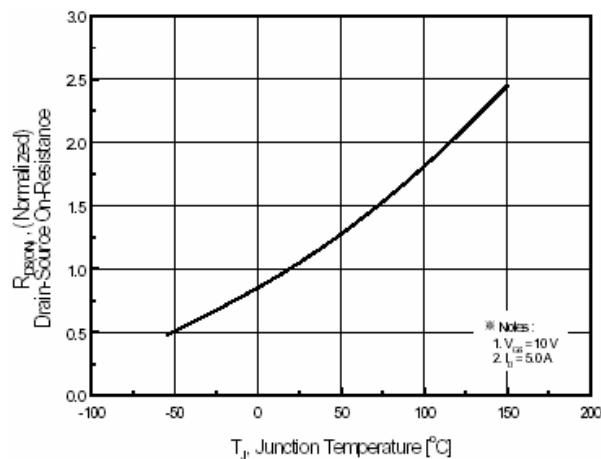


Figure 8. On-Resistance Variation vs Temperature

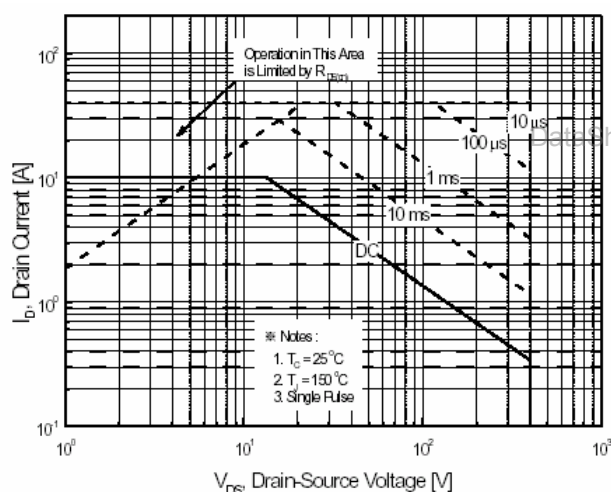


Figure 9. Maximum Safe Operating Area

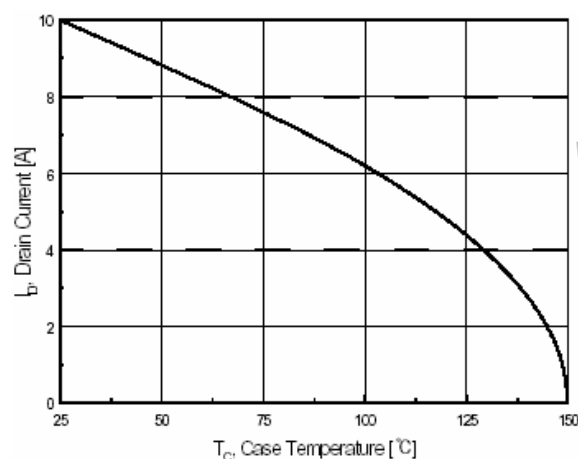


Figure 10. Maximum Drain Current vs Case Temperature

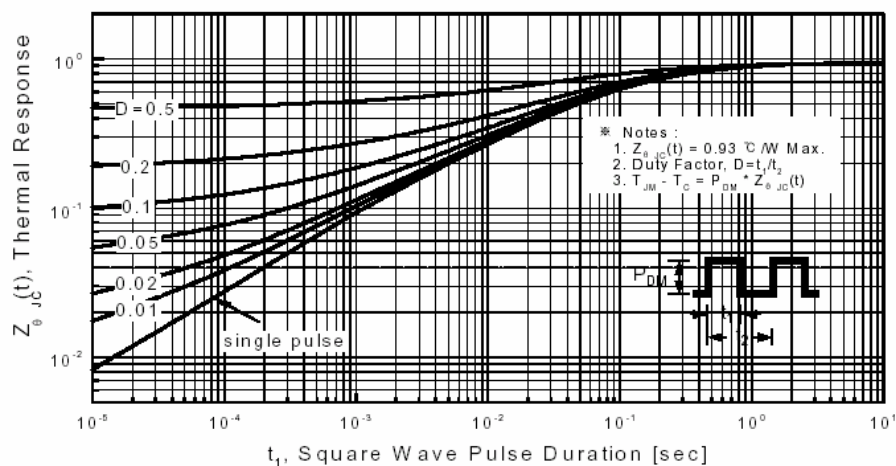
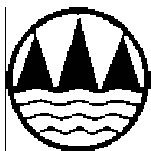
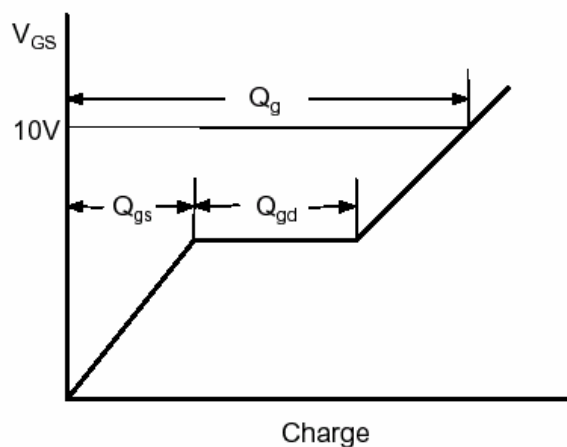
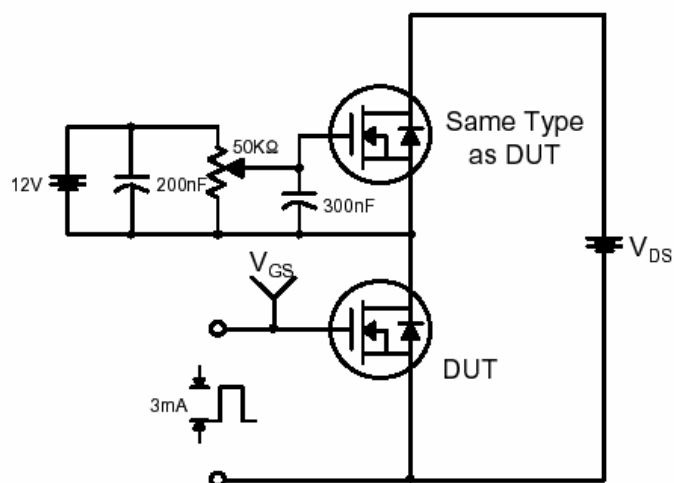


Figure 11. Transient Thermal Response Curve

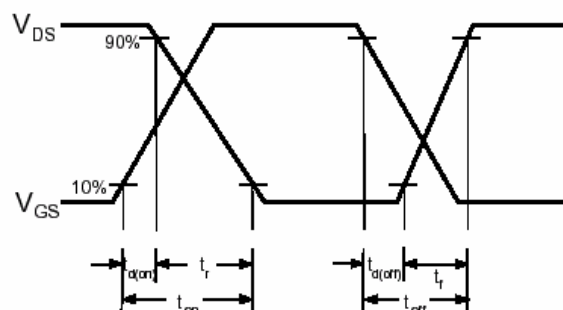
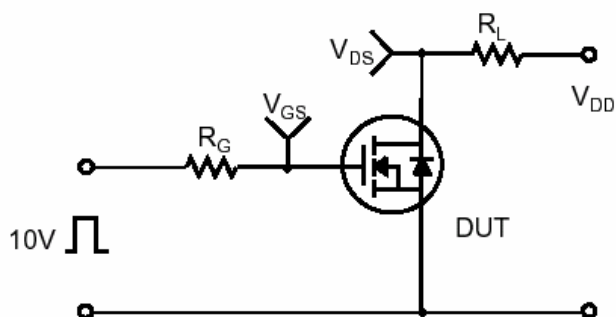


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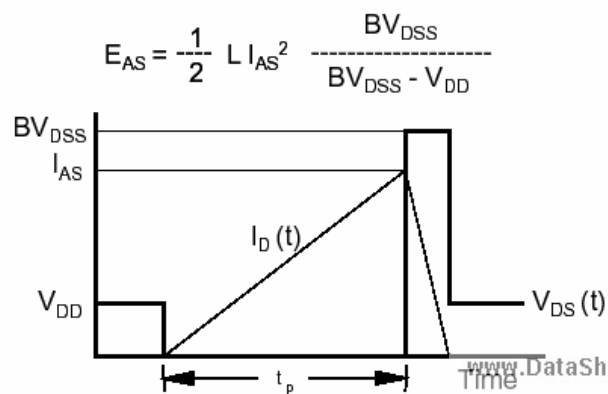
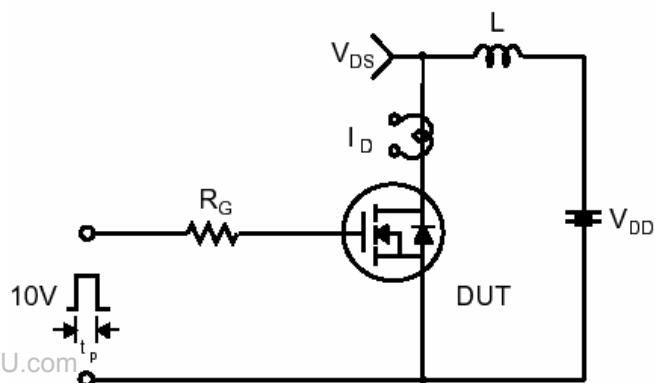
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms

