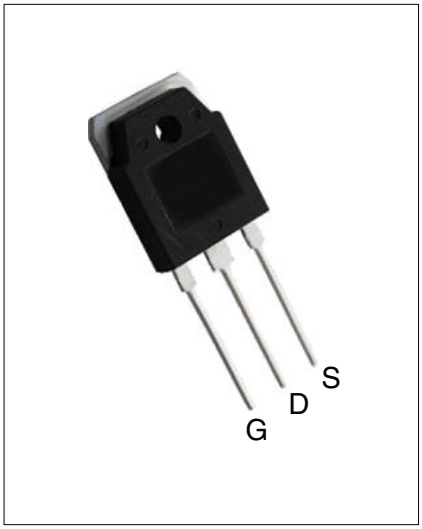
YAREN TECHNOLOGY

# IRF360

***Power MOSFET***

## 25Amps, 400 Volts
## N-CHANNEL MOSFET




*Pb-free plating product number:IRF360

### ■ DESCRIPTION

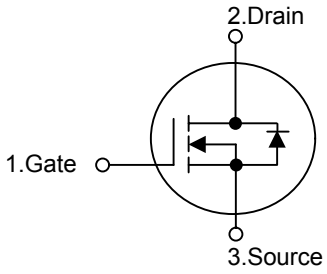
The YRIRF360 are N-Channel enhancement mode power field effect transistors (MOSFET) which are produced using YR's proprietary, planar stripe, DMOS technology.

These devices are suited for high efficiency switch mode power supply. To minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode the advanced technology has been especially tailored.

### ■ FEATURES

* $R_{DS(ON)}$ = 0.20Ω @$V_{GS}$ = 10 V
* Ultra low gate charge ( typical 42 nC )
* Low reverse transfer capacitance ( $C_{RSS}$ = typical 400 pF )
* Fast switching capability
* Avalanche energy specified
* Improved dv/dt capability, high ruggedness

### ■ SYMBOL



## ■ ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25℃, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | IRF360 | $V_{DSS}$ | 400 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Avalanche Current (Note 1) | | $I_{AR}$ | 25 | A |
| Continuous Drain Current | | $I_D$ | 25 | A |
| Pulsed Drain Current (Note 1) | | $I_{DM}$ | 100 | A |
| Avalanche Energy | Single Pulsed (Note 2) | $E_{AS}$ | 980 | mJ |
| | Repetitive (Note 1) | $E_{AR}$ | 30 | mJ |
| Peak Diode Recovery dv/dt (Note 3) | | dv/dt | 4 | V/ns |
| Junction Temperature | | $T_J$ | +150 | ℃ |
| Operating Temperature | | $T_{OPR}$ | -55 ~ +150 | ℃ |
| Storage Temperature | | $T_{STG}$ | -55 ~ +150 | ℃ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ ELECTRICAL CHARACTERISTICS ($T_C$ =25℃, unless otherwise specified)

| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | | |
| Drain-Source Breakdown Voltage | IRF360 | $BV_{DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 1.0mA | 400 | | | V |
| Drain-Source Leakage Current | | $I_{DSS}$ | $V_{DS}$ = 320 V, $V_{GS}$ = 0 V | | | 10 | μA |
| Gate-Source Leakage Current | | $I_{GSS}$ | $V_{GS}$ = ±20 V, $V_{DS}$ = 0 V | | | ±100 | nA |
| Breakdown Voltage Temperature Coefficient | | $\triangle BV_{DSS}/\triangle T_J$ | $I_D$ = 250 μA, Referenced to 25°C | | 0.46 | | V/℃ |
| **ON CHARACTERISTICS** | | | | | | | |
| Gate Threshold Voltage | | $V_{GS(TH)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | | 4.0 | V |
| Static Drain-Source On-State Resistance | | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 16A | | | 0.20 | Ω |
| **DYNAMIC CHARACTERISTICS** | | | | | | | |
| Input Capacitance | | $C_{ISS}$ | $V_{DS}$ = 25 V, $V_{GS}$ = 0 V, f = 1MHz | | 4200 | | pF |
| Output Capacitance | | $C_{OSS}$ | | | 900 | | pF |
| Reverse Transfer Capacitance | | $C_{RSS}$ | | | 400 | | pF |
| **SWITCHING CHARACTERISTICS** | | | | | | | |
| Turn-On Delay Time | | $t_{D(ON)}$ | $V_{DD}$ = 200V, $I_D$ = 25A, $R_G$ = 25Ω (Note 4, 5) | | | 33 | ns |
| Turn-On Rise Time | | $t_R$ | | | | 140 | ns |
| Turn-Off Delay Time | | $t_{D(OFF)}$ | | | | 120 | ns |
| Turn-Off Fall Time | | $t_F$ | | | | 99 | ns |
| Total Gate Charge | | $Q_G$ | $V_{DS}$= 400V,$I_D$= 25A, $V_{GS}$= 10 V (Note 4, 5) | | | 210 | nC |
| Gate-Source Charge | | $Q_{GS}$ | | | | 28 | nC |
| Gate-Drain Charge | | $Q_{GD}$ | | | | 120 | nC |
| **SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | | |
| Drain-Source Diode Forward Voltage | | $V_{SD}$ | $V_{GS}$ = 0 V, $I_S$ = 25A | | | 1.7 | V |
| Maximum Continuous Drain-Source Diode Forward Current | | $I_S$ | | | | 25 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | | $I_{SM}$ | | | | 100 | A |
| Reverse Recovery Time | | $t_{RR}$ | $V_{GS}$ = 0 V, $I_S$ = 25A, $dI_F/dt$ = 100 A/μs (Note 4) | | | 1000 | ns |
| Reverse Recovery Charge | | $Q_{RR}$ | | | | 16 | μC |

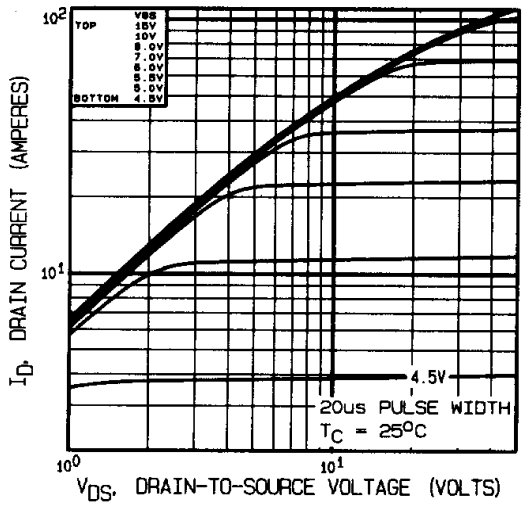



**Fig 1.** Typical Output Characteristics

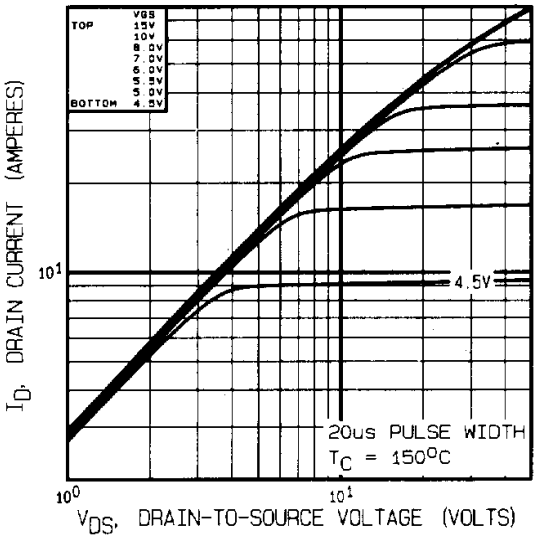



**Fig 2.** Typical Output Characteristics

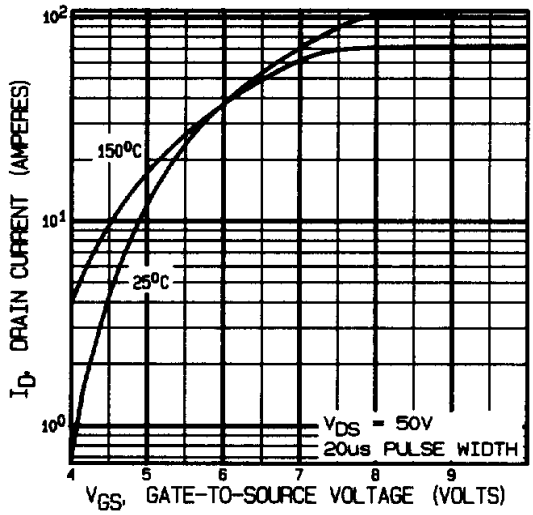



**Fig 3.** Typical Transfer Characteristics

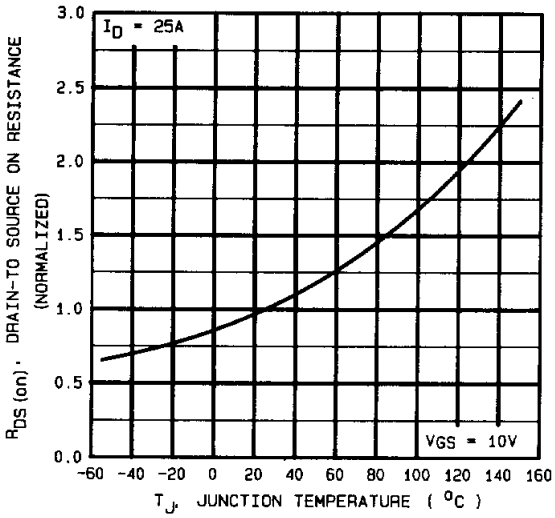



**Fig 4.** Normalized On-Resistance Vs. Temperature

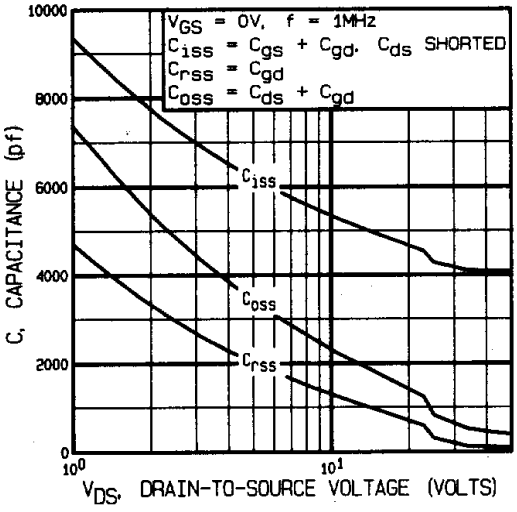



**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage

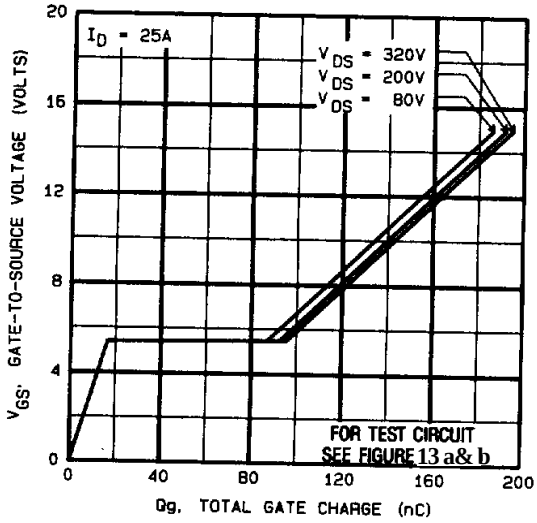



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

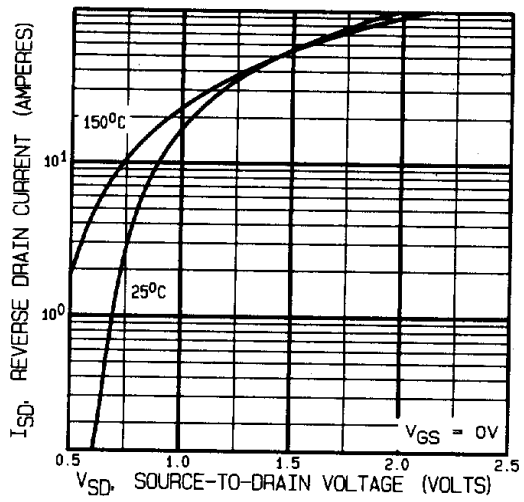



**Fig 7.** Typical Source-Drain Diode Forward Voltage

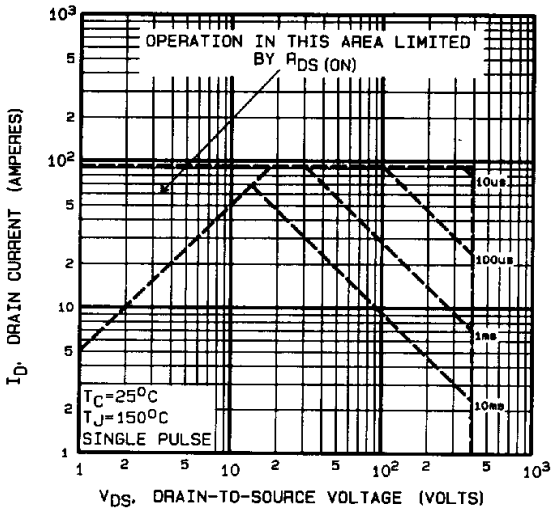



**Fig 8.** Maximum Safe Operating Area

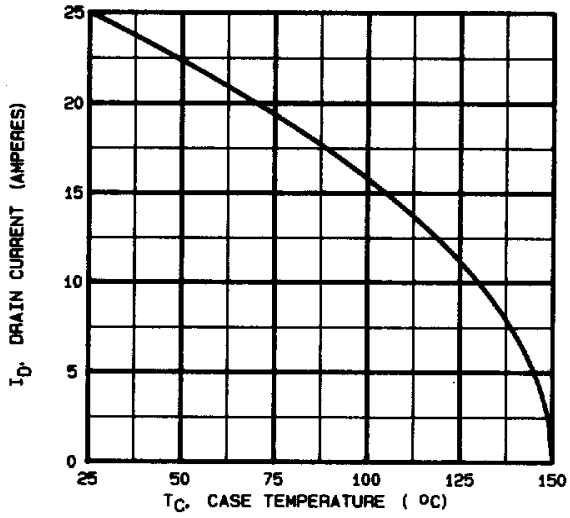



**Fig 9.** Maximum Drain Current Vs. Case Temperature

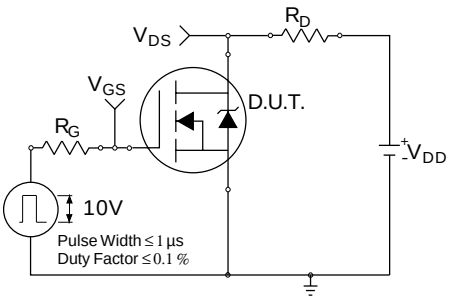



**Fig 10a.** Switching Time Test Circuit

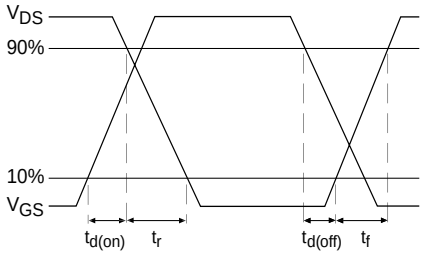



**Fig 10b.** Switching Time Waveforms

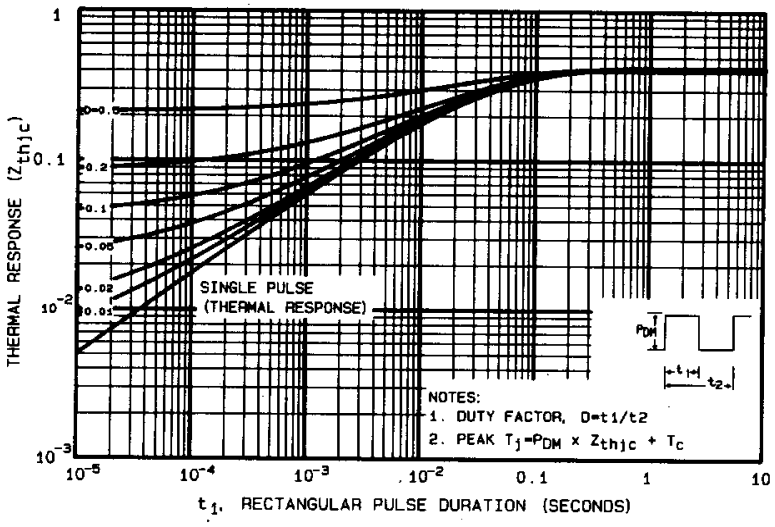



**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case

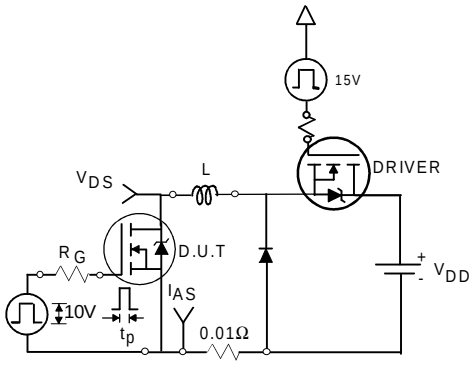



**Fig 12a.** Unclamped Inductive Test Circuit

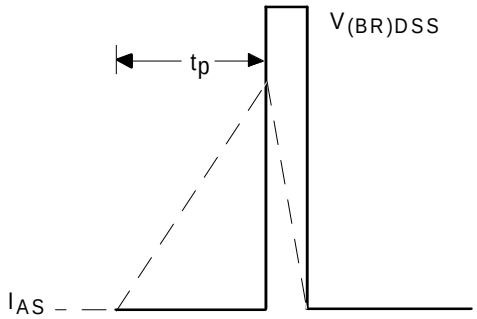



**Fig 12b.** Unclamped Inductive Waveforms

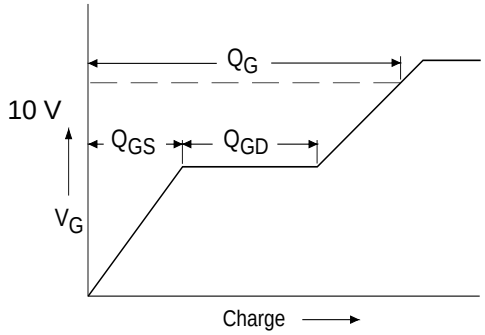



**Fig 13a.** Basic Gate Charge Waveform

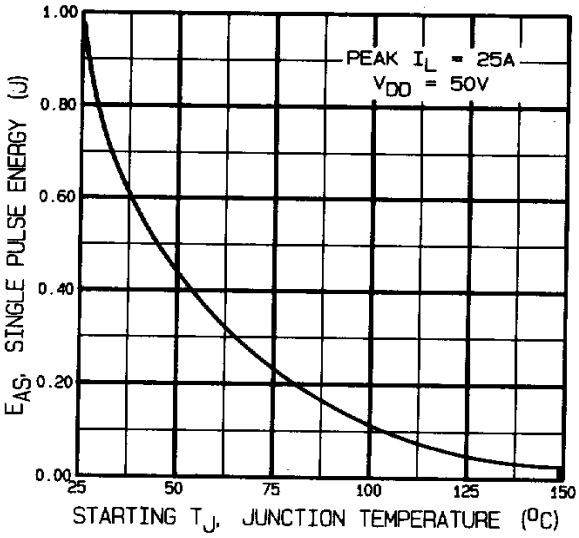



**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current

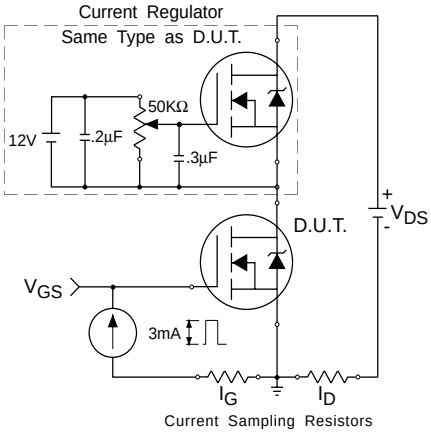



**Fig 13b.** Gate Charge Test Circuit