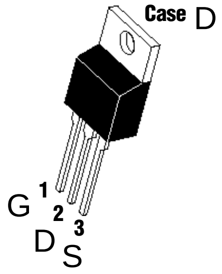
IRF4N60 4.0A 600V N CHANNEL POWER MOSFET

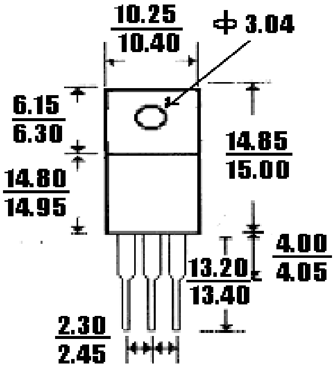
Description

IRF4N60

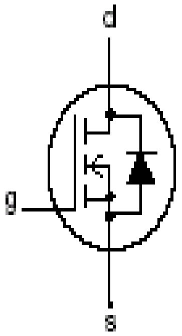


TO-220AB

Mechanical Dimensions



DIMENSION IN MM



GENERAL DESCRIPTION

This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

FEATURES

- Higher Current Rating
- Lower Rds(on)
- Lower Capacitances
- Lower Total Gate Charge
- Tighter VSD Specifications
- Avalanche Energy Specified

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	I_D	4.0	A
— Pulsed	I_{DM}	18	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
— Non-repetitive	V_{GSM}	±40	V
Total Power Dissipation	P_D		W
TO-220		96	
TO-220FP		38	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Single Pulse Drain-to-Source Avalanche Energy — T_J = 25℃ (V_{DD} = 100V, V_{GS} = 10V, I_L = 4A, L = 10mH, R_G = 25Ω)	E_{AS}	80	mJ
Thermal Resistance — Junction to Case	θ_{JC}	1.70	℃/W
— Junction to Ambient	θ_{JA}	62	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	300	℃

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

			IRF4N60			
Characteristic		**Symbol**	**Min**	**Typ**	**Max**	**Units**
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	600			V
Drain-Source Leakage Current (V_{DS} =600 V, V_{GS} = 0 V)		I_{DSS}			0.1	mA
Gate-Source Leakage Current-Forward (V_{gsf} = 20 V, V_{DS} = 0 V)		I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V_{gsr} = 20 V, V_{DS} = 0 V)		I_{GSSR}			-100	nA
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	2.0		4.0	V
Static Drain-Source On-Resistance (V_{GS} = 10 V, I_D = 2.0A) *		$R_{DS(on)}$		1.5	2.4	Ω
Forward Transconductance (V_{DS} = 50 V, I_D = 2.0 A) *		g_{FS}	2.5			mhos
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		520	730	pF
Output Capacitance		C_{oss}		125	180	pF
Reverse Transfer Capacitance		C_{rss}		8.0	20	pF
Turn-On Delay Time	(V_{DD} = 300 V, I_D = 4.0 A, V_{GS} = 10 V, R_G = 9.1Ω) *	$t_{d(on)}$		12	20	ns
Rise Time		t_r		7.0	10	ns
Turn-Off Delay Time		$t_{d(off)}$		19	40	ns
Fall Time		t_f		10	20	ns
Total Gate Charge	(V_{DS} = 480 V, I_D = 4.0 A, V_{GS} = 10 V)*	Q_g		5.0	10	nC
Gate-Source Charge		Q_{gs}		2.7		nC
Gate-Drain Charge		Q_{gd}		2.0		nC
Internal Drain Inductance (Measured from the drain lead 0.25” from package to center of die)		L_D		4.5		nH
Internal Drain Inductance (Measured from the source lead 0.25” from package to source bond pad)		L_S		7.5		nH
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	(I_S = 4.0 A, d_{IS}/d_t = 100A/µs)	V_{SD}			1.5	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		655		ns

* Pulse Test: Pulse Width ≦300µs, Duty Cycle ≦2%

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

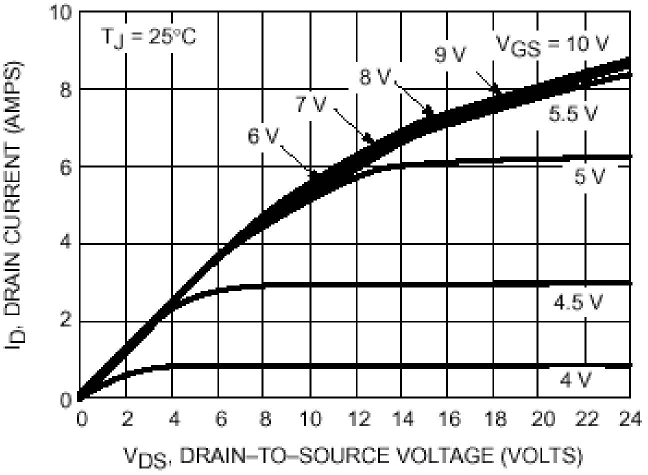


Figure 1. On–Region Characteristics

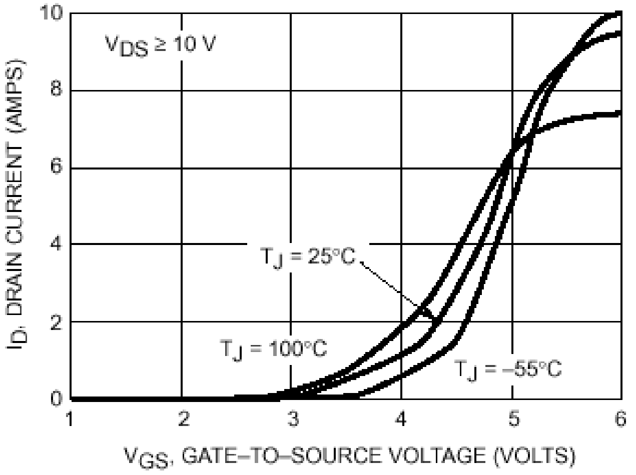


Figure 2. Transfer Characteristics

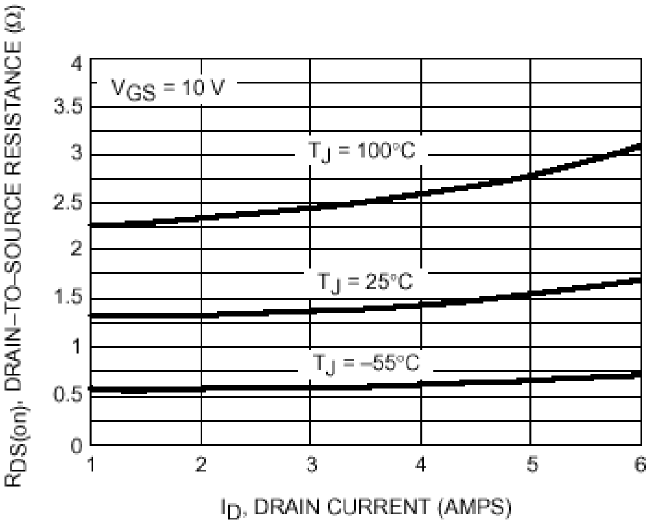


Figure 3. On–Resistance versus Drain Current and Temperature

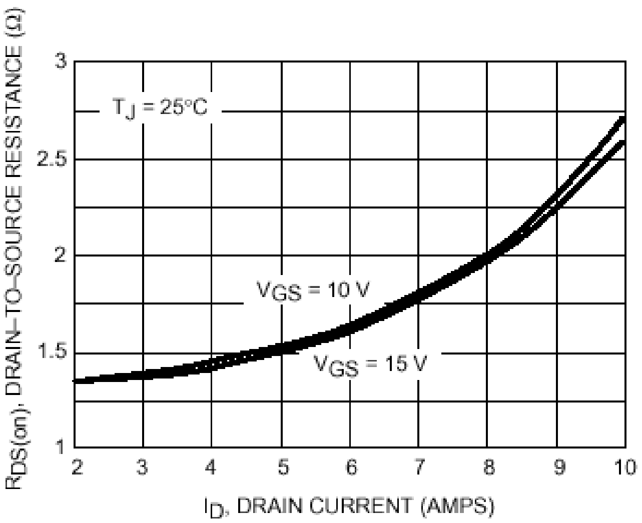


Figure 4. On–Resistance versus Drain Current and Gate Voltage

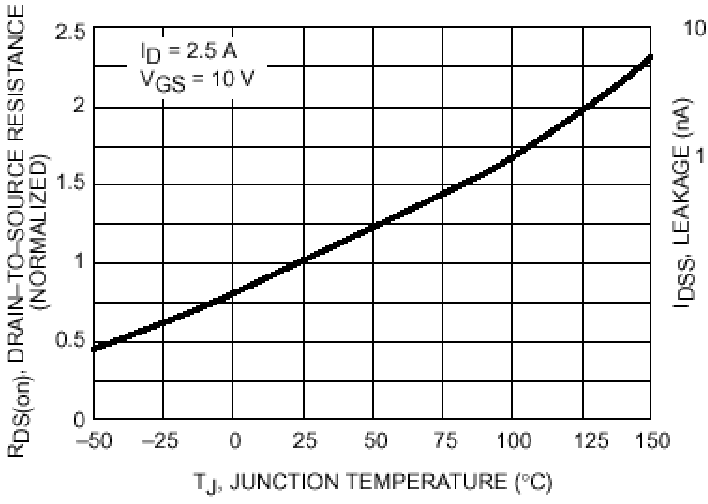


Figure 5. On–Resistance Variation with Temperature

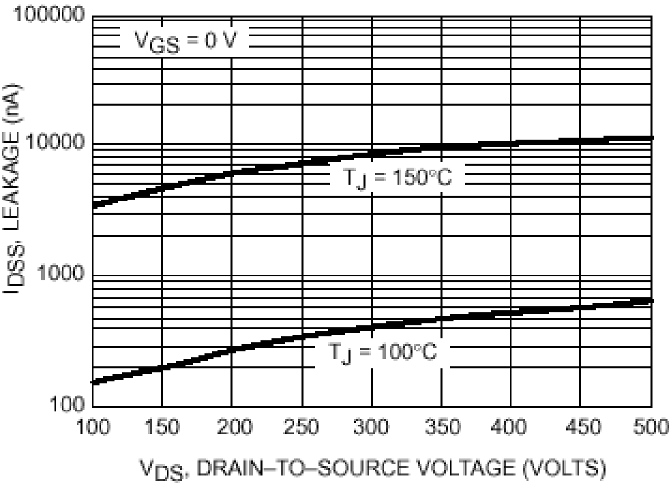


Figure 6. Drain–to–Source Leakage Current versus Voltage