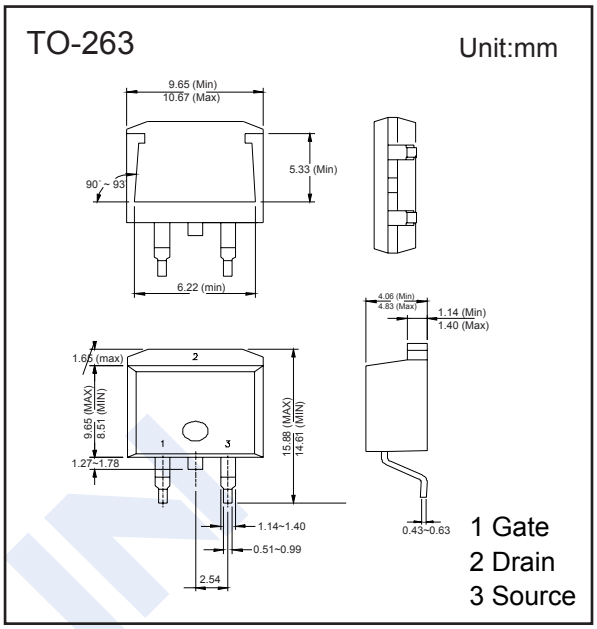
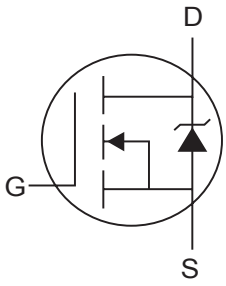
N-Channel MOSFET
IRF540NS (KRF540NS)



■ Features

- V_{DS} (V) = 100V
- I_D = 33 A (V_{GS} = 10V)
- $R_{DS(ON)}$ < 44mΩ (V_{GS} = 10V)
- Fast Switching



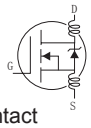
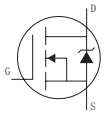
■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	Ta=25℃	I_D	33	A
	Ta=70℃		23	
Pulsed Drain Current		I_{DM}	110	
Avalanche Current		I_{AR}	16	A
Repetitive Avalanche Energy		E_{AR}	13	mJ
Peak Diode Recovery dv/dt		dv/dt	7	V/ns
Power Dissipation	Tc=25℃	P_D	130	W
Linear Derating Factor			0.87	W/℃
Thermal Resistance.Junction- to-Ambient		R_{thJA}	40	℃/W
Thermal Resistance.Junction- to-Case		R_{thJC}	1.15	
Junction Temperature		T_J	175	℃
Storage Temperature Range		T_{stg}	-55 to 175	

N-Channel MOSFET

IRF540NS (KRF540NS)

■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V			25	uA
		V_{DS}=80V, V_{GS}=0V, T_J=150℃			250	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250μA	2		4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=16A (Note.1)			44	mΩ
Forward Transconductance	g_{FS}	V_{DS}=50V, I_D=16A (Note.1)	21			S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz		1960		pF
Output Capacitance	C_{oss}			250		
Reverse Transfer Capacitance	C_{rss}			40		
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=80V, I_D=16A (Note.1)			71	nC
Gate Source Charge	Q_{gs}				14	
Gate Drain Charge	Q_{gd}				21	
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=10V, V_{DS}=50V, I_D=16A,R_G=5.1Ω (Note.1)		11		ns
Turn-On Rise Time	t_r			35		
Turn-Off DelayTime	$t_{d(off)}$			39		
Turn-Off Fall Time	t_f			35		
Body Diode Reverse Recovery Time	t_{rr}	I_F= 16A, di/dt= 100A/μs,T_J = 25°C		115	170	
Body Diode Reverse Recovery Charge	Q_{rr}			505	760	nC
Internal Drain Inductance	L_D	Between lead, 6mm (0.25in.) from package and center of die contact 		4.5		nH
Internal Source Inductance	L_S			7.5		
Single Pulse Avalanche Energy	E_{AS}	I_{AS} = 16A, L = 1.5mH			185	mJ
Maximum Body-Diode Continuous Current	I_S	MOSFET symbol showing the integral reverse p-n junction diode. 			33	A
Pulsed Source Current	I_{SM}				110	
Diode Forward Voltage	V_{SD}	I_S=16A,V_{GS}=0V,T_J = 25°C			1.2	V

Note.1: Pulse width ≤ 400μs; duty cycle ≤ 2%.

N-Channel MOSFET

IRF540NS (KRF540NS)

■ Typical Characterisitics

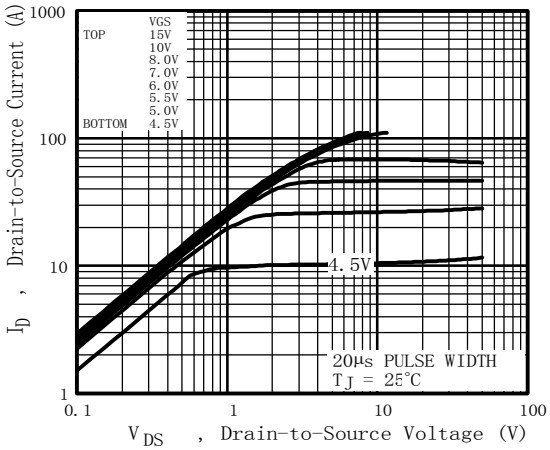


Fig 1. Typical Output Characteristics

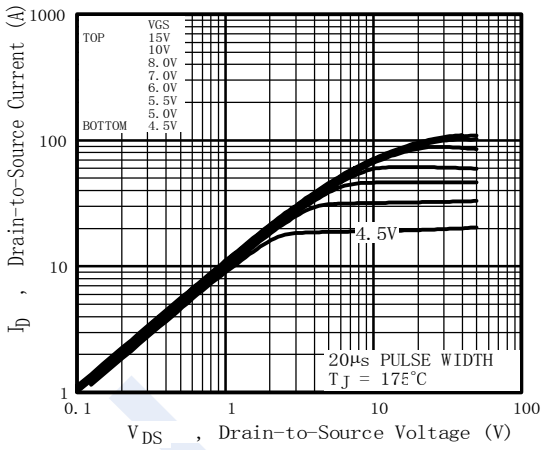


Fig 2. Typical Output Characteristics

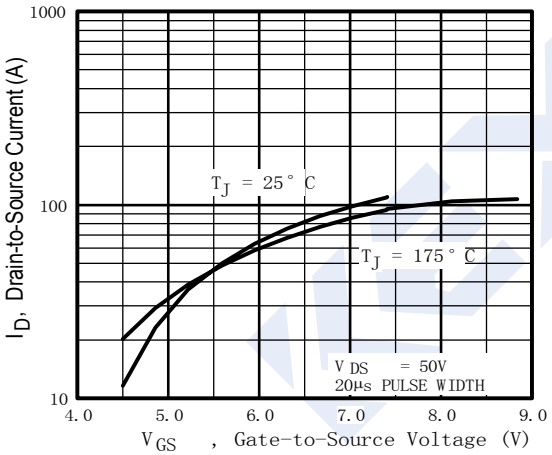


Fig 3. Typical Transfer Characteristics

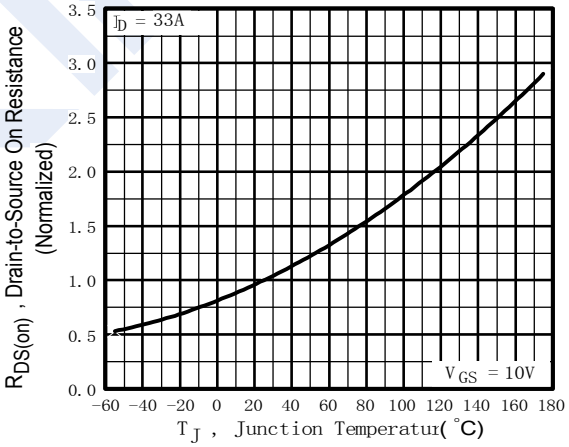


Fig 4. Normalized On-Resistance Vs. Temperature

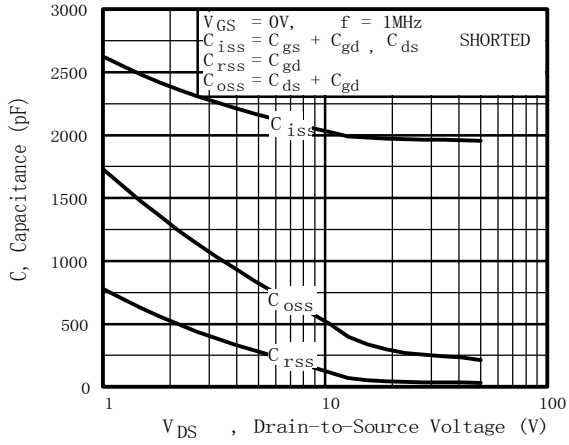


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

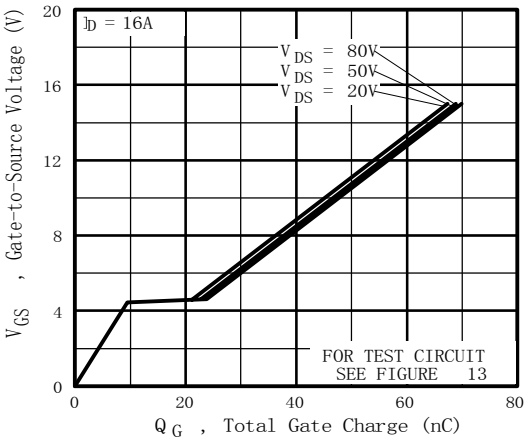


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

N-Channel MOSFET

IRF540NS (KRF540NS)

■ Typical Characterisitics

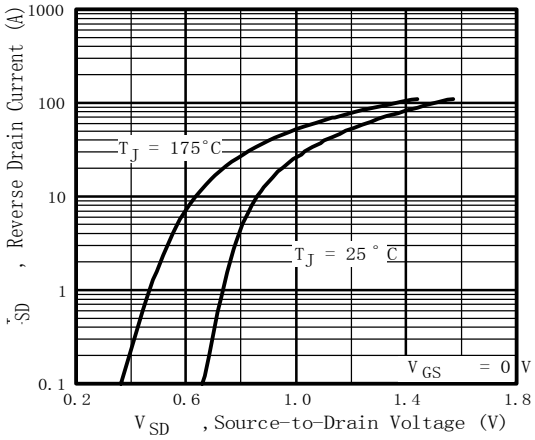


Fig 7. Typical Source-Drain Diode Forward Voltage

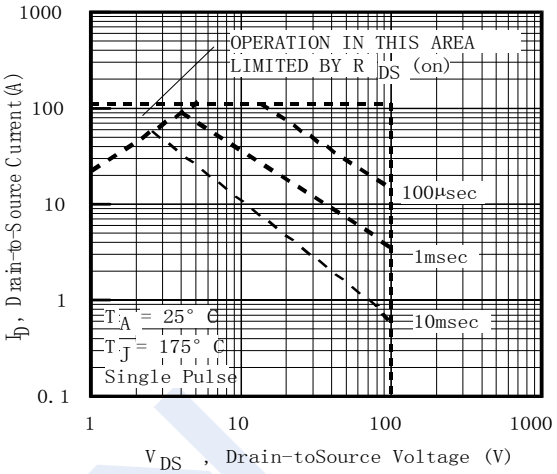


Fig 8. Maximum Safe Operating Area

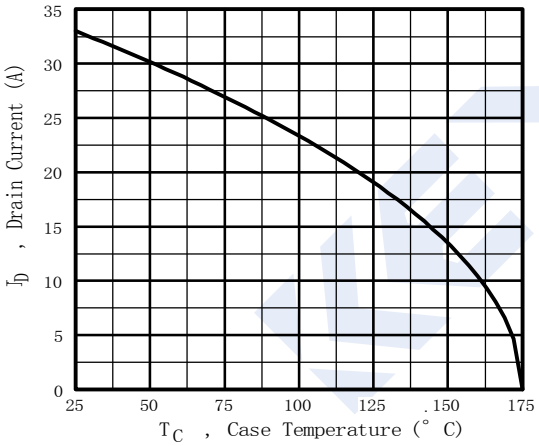


Fig 9. Maximum Drain Current Vs. Case Temperature

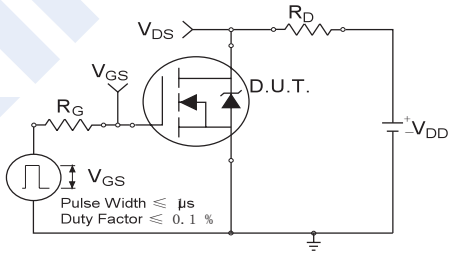


Fig 10a. Switching Time Test Circuit

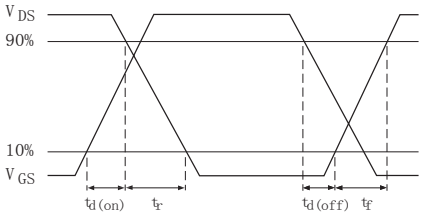


Fig 10b. Switching Time Waveforms

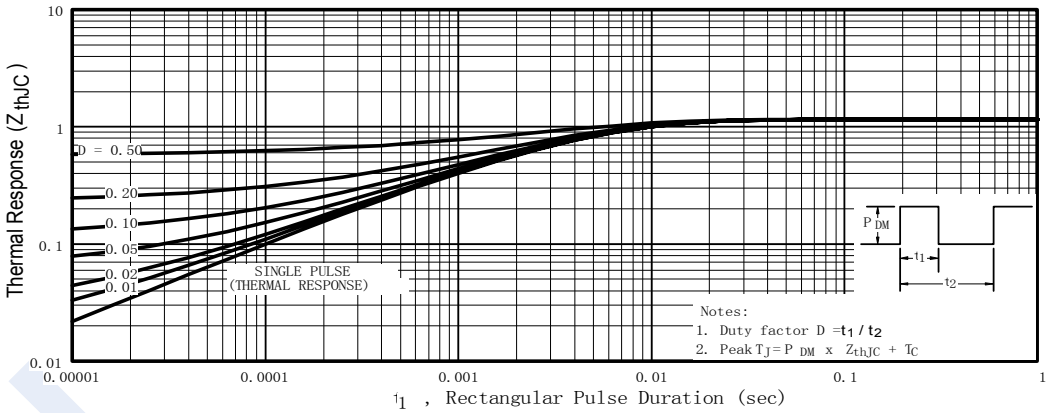


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

N-Channel MOSFET
IRF540NS (KRF540NS)

■ Typical Characterisitics

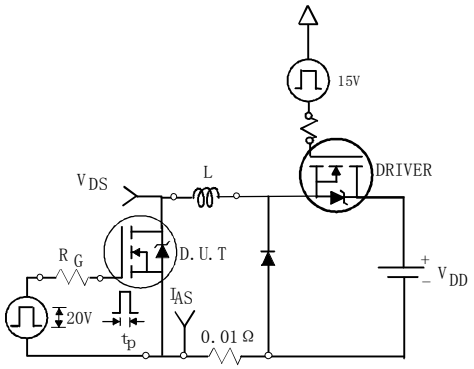


Fig 12a. Unclamped Inductive Test Circuit

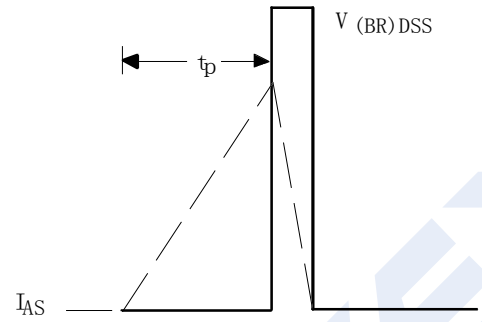


Fig 12b. Unclamped Inductive Waveforms

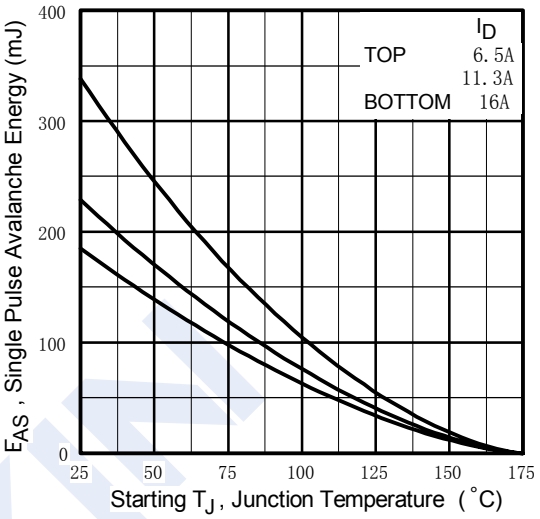


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

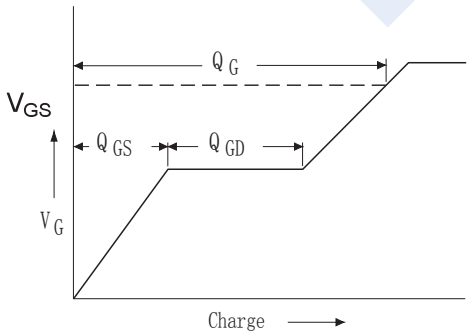


Fig 13a. Basic Gate Charge Waveform

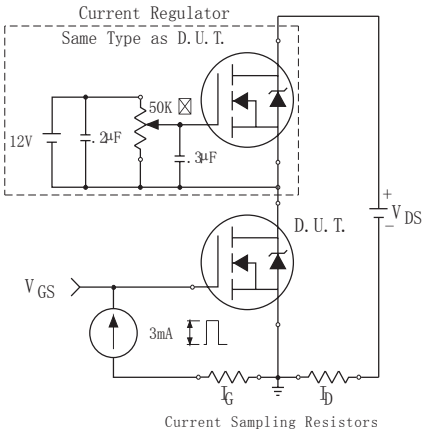
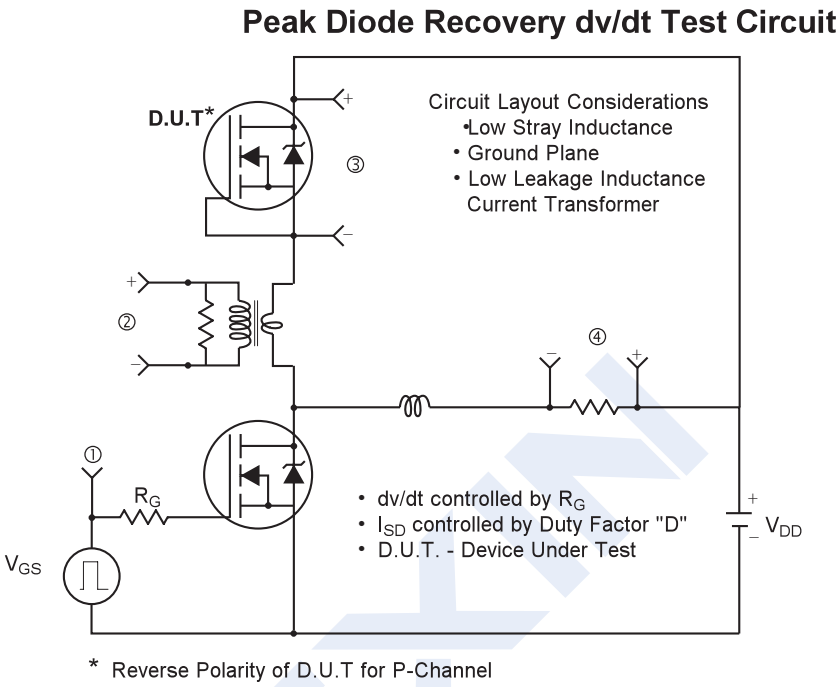
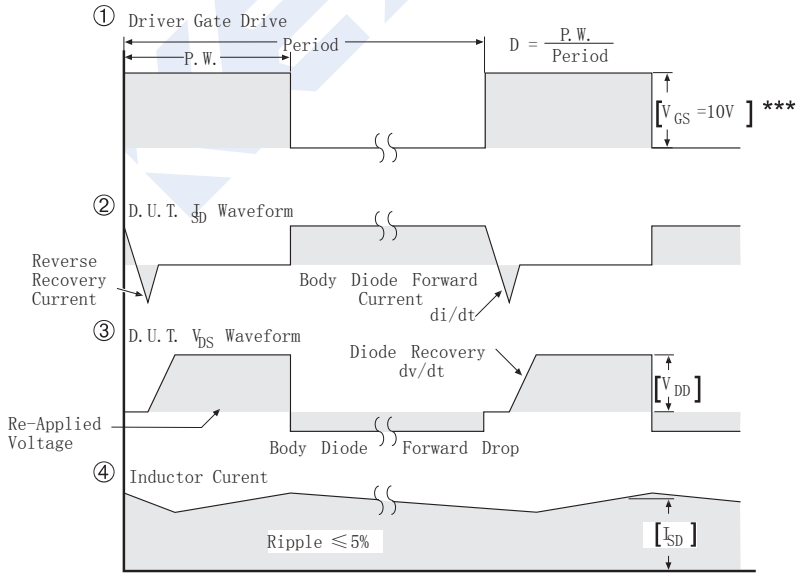


Fig 13b. Gate Charge Test Circuit

N-Channel MOSFET
IRF540NS (KRF540NS)

■ Typical Characterisitics





*** V_{GS} = 5.0V for Logic Level and 3V Drive Devices

Fig 14. For N-channel HEXFET® power MOSFETs