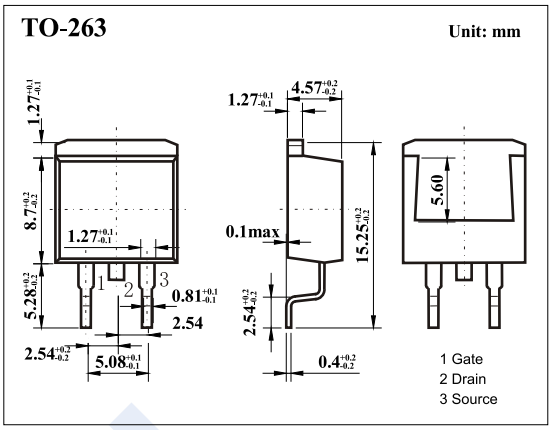
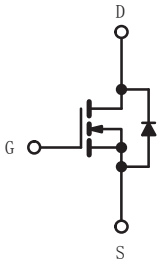
N-Channel MOSFET

IRF830S (KRF830S)



■ Features

- V_{DS} (V) = 500V
- I_D = 4.5 A (V_{GS} = 10V)
- $R_{DS(ON)}$ < 1.5Ω (V_{GS} = 10V)
- Fast Switching
- Repetitive Avalanche Rated



■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	Tc=25℃	I_D	4.5	A
	Tc=100℃		2.9	
Pulsed Drain Current		I_{DM}	18	
Avalanche Current		I_{AR}	4.5	
Power Dissipation	Tc=25℃	P_D	74	W
	Ta=25℃		3.1	
Single Pulse Avalanche Energy (Note1)		E_{AS}	280	mJ
Repetitive Avalanche Energy		E_{AR}	7.4	
Peak Diode Recovery dv/dt (Note 2)		dv/dt	3.5	V/ns
Thermal Resistance.Junction- to-Ambient		R_{thJA}	62	℃/W
Thermal Resistance.Junction- to-Ambient (PCB Mount)			40	
Thermal Resistance.Junction- to-Case		R_{thJC}	1.7	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

Note.1: L = 24mH, I_{AS} = 4.5A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C.

Note.2: I_{SD} = 4.5A, di/dt = 75 A/μs, V_{DD} = $V_{(BR)DSS}$, Starting T_J = 25°C.

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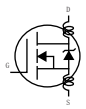
■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	500			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=500V, V_{GS}=0V			25	uA
		V_{DS}=400V, V_{GS}=0V,T_J=125℃			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=2.7A (Note.1)			1.5	Ω
Forward Transconductance	g_{FS}	V_{DS}=50V, I_D=2.7A (Note.1)	2.5			S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz		610		pF
Output Capacitance	C_{oss}			160		
Reverse Transfer Capacitance	C_{rss}			68		
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=400V, I_D=3.1A			38	nC
Gate Source Charge	Q_{gs}				5	
Gate Drain Charge	Q_{gd}				22	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact 		4.5		nH
Internal Source Inductance	L_S			7.5		
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 250 V, I_D = 3.1 A, R_g = 12Ω, R_D = 79Ω (Note.1)		8.2		ns
Turn-On Rise Time	t_r			16		
Turn-Off DelayTime	$t_{d(off)}$			42		
Turn-Off Fall Time	t_f			16		
Body Diode Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 3.1A, dI/dt = 100A/μs			640	
Body Diode Reverse Recovery Charge	Q_{rr}				2	uC
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 			4.5	A
Pulsed Diode Forward Current	I_{SM}				18	
Diode Forward Voltage	V_{SD}	I_S=4.5A,V_{GS}=0V,T_J = 25°C			1.6	V

Note.1: Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

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■ Typical Characterisitics

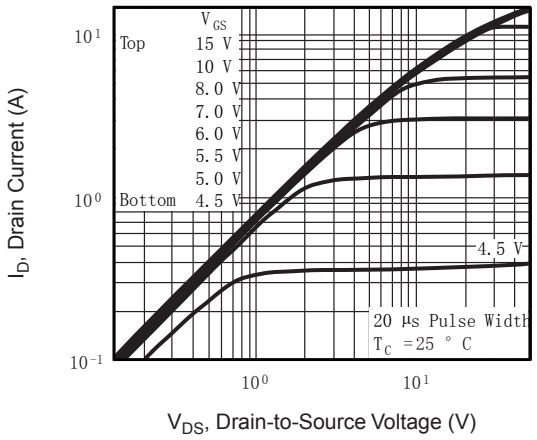

Fig. 1 - Typical Output Characteristics, T_C = 25 °C

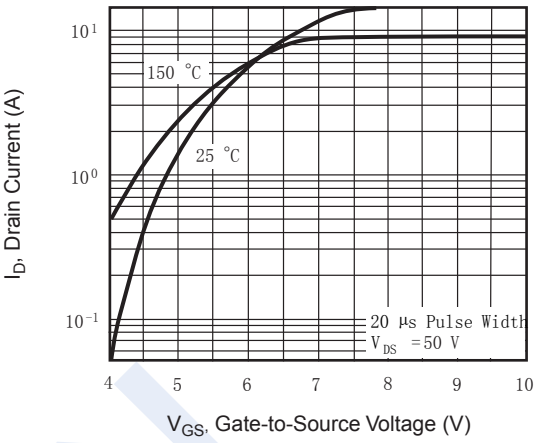

Fig. 3 - Typical Transfer Characteristics

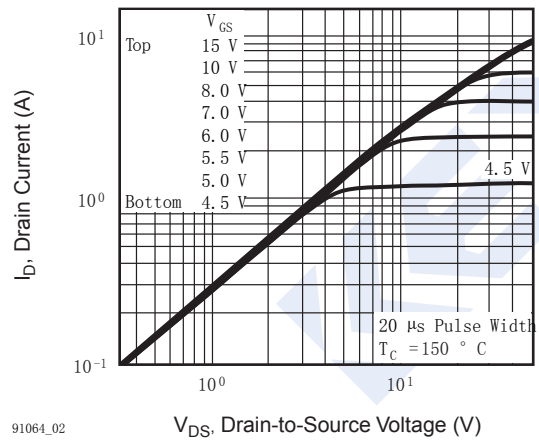

Fig. 2 - Typical Output Characteristics, T_C = 150 °C

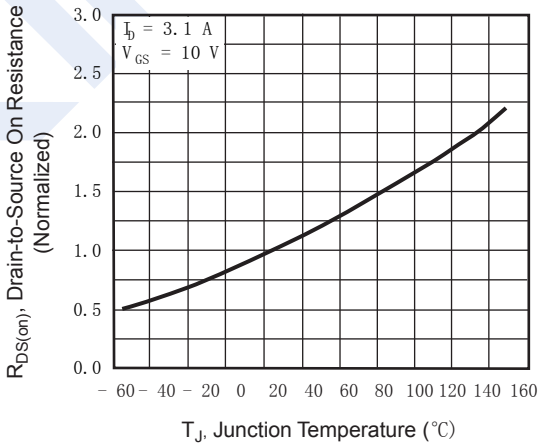

Fig. 4 - Normalized On-R esistance vs. Temperature

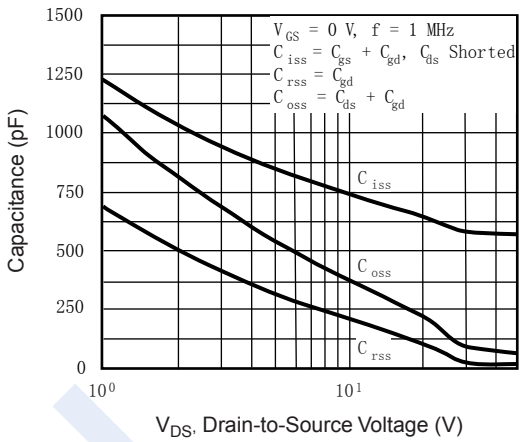

Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

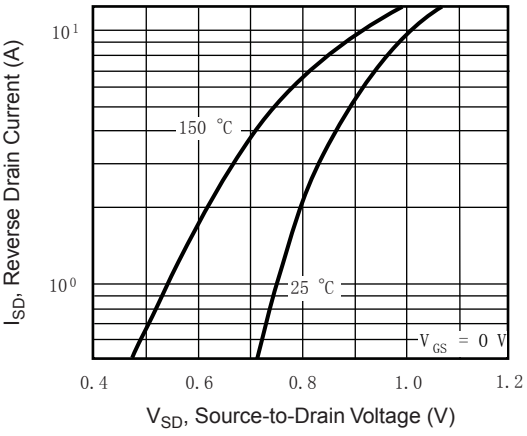

Fig. 7 - Typical Source-Drain Diode Forward Voltage

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■ Typical Characterisitics

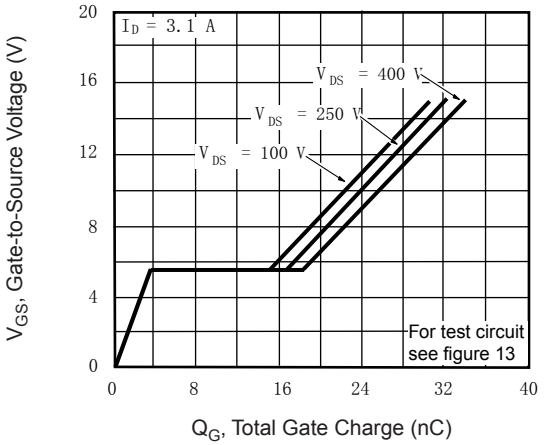

Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

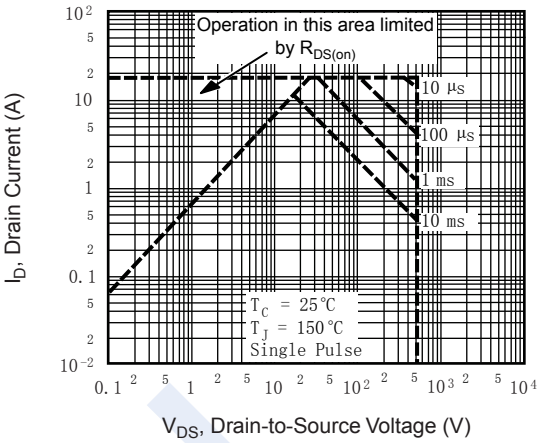

Fig. 8 - Maximum Safe Operating Area

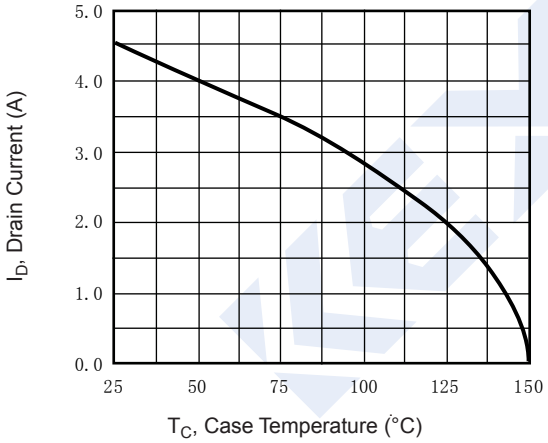

Fig. 9 - Maximum Drain Current vs. Case Temperature

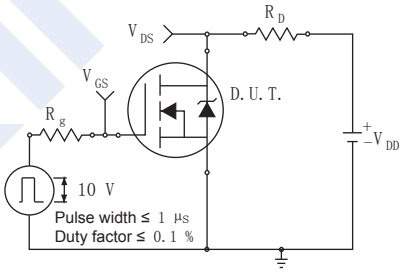

Fig. 10a - Switching Time Test Circuit

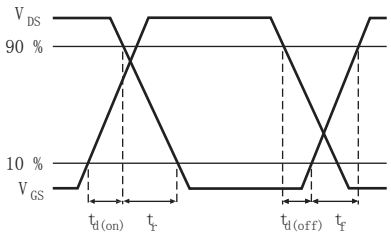

Fig. 10b - Switching Time Waveforms

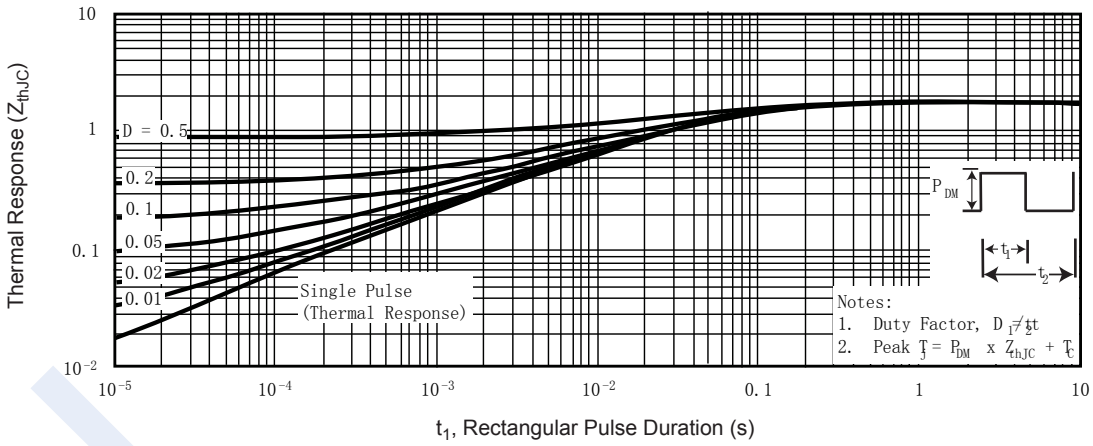

Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

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■ Typical Characterisitics

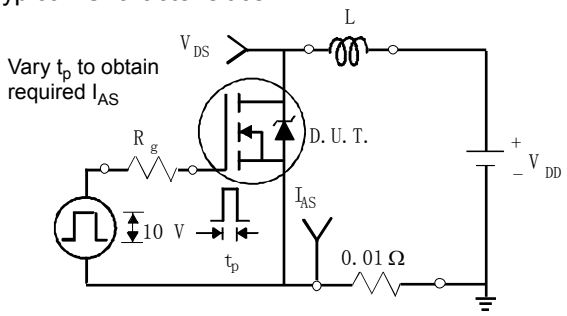

Fig. 12a - Unclamped Inductive Test Circuit

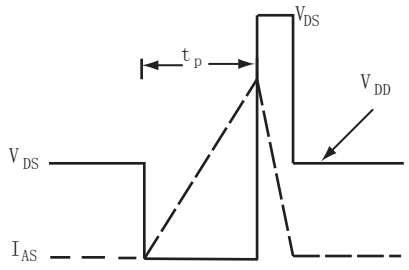

Fig. 12b - Unclamped Inductive Waveforms

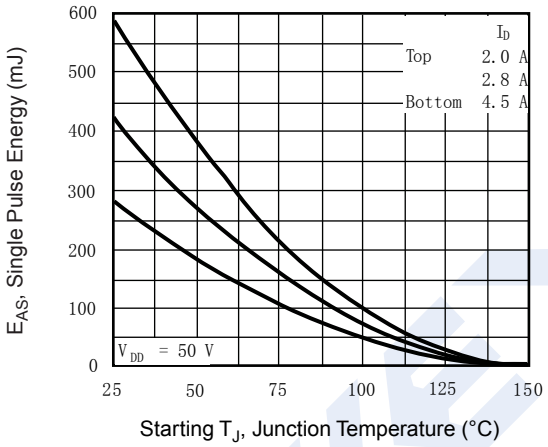

Fig. 12c - Maximum Avalanche Energy vs. Drain Current

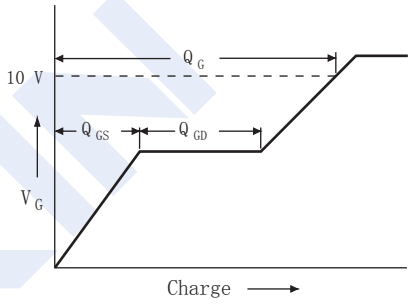

Fig. 13a - Basic Gate Charge Waveform

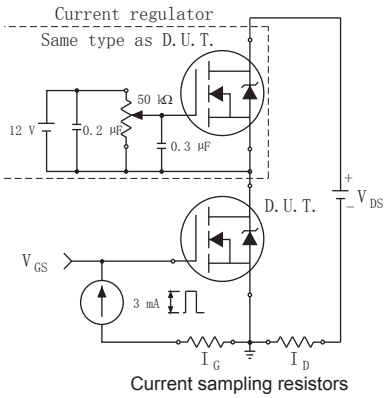

Fig. 13b - Gate Charge Test Circuit

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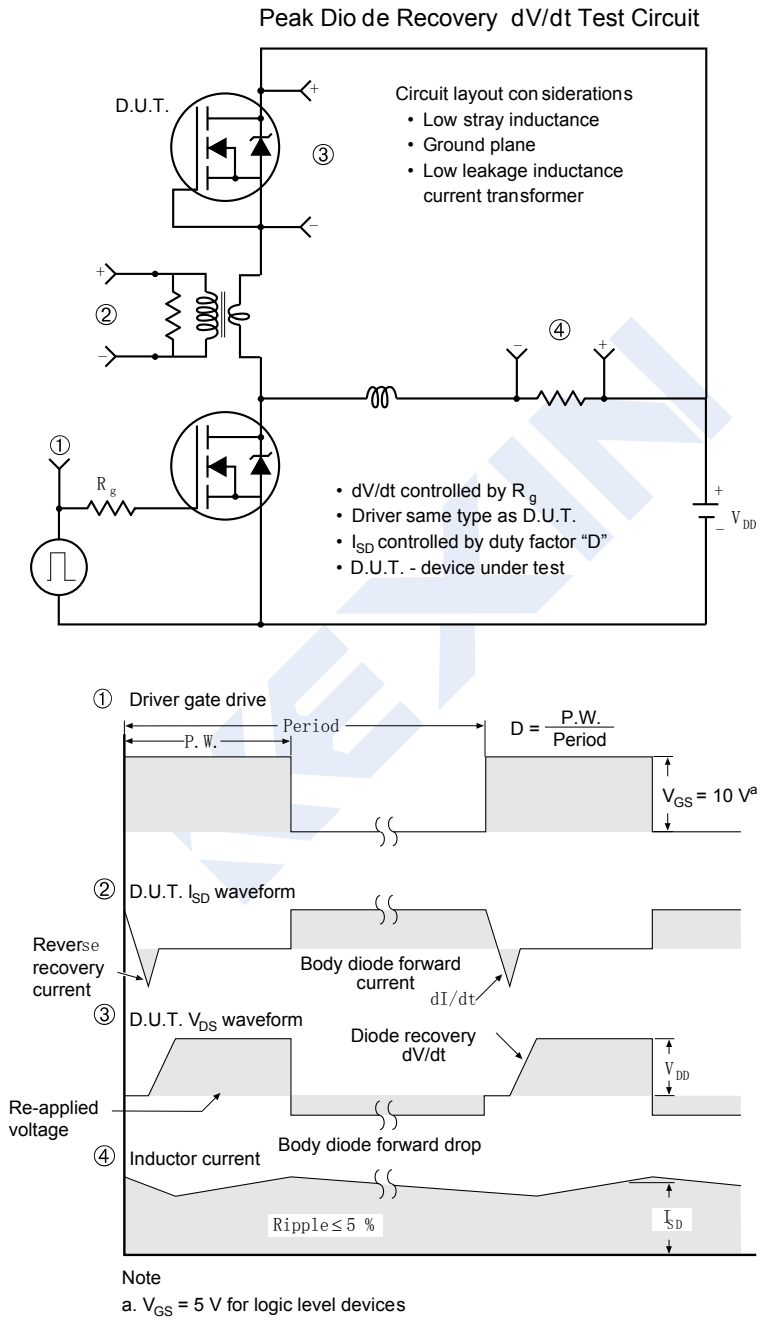
■ Typical Characterisitics



Note

a. V_{GS} = 5 V for logic level devices

Fig. 14 - For N-Channel