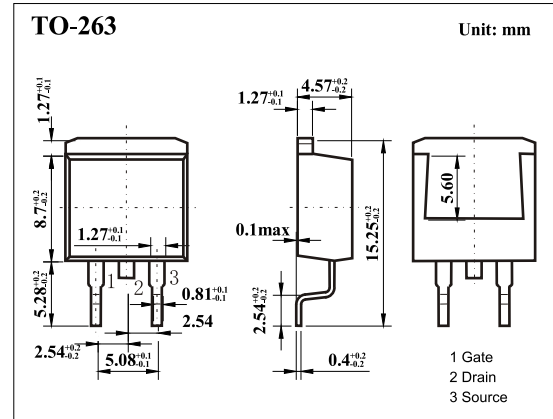
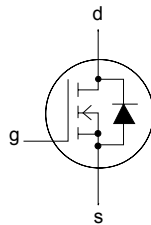


## N-Channel MOSFET

### IRF630S (KRF630S)

#### ■ Features

- $V_{DS} (V) = 200V$
- $I_D = 9 A (V_{GS} = 10V)$
- $R_{DS(ON)} < 400m\Omega (V_{GS} = 10V)$
- Fast switching
- Low thermal resistance



#### ■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	$V_{DS}$	200	V	
Drain-Gate Voltage	$V_{DG}$	200		
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current	$I_D$	$T_a = 25^\circ C$	9	A
		$T_a = 100^\circ C$	6.3	
Pulsed Drain Current	$I_{DM}$	36		
Peak Non-Repetitive Avalanche Current	$I_{AS}$	9		
Power Dissipation	$P_D$	88	W	
Non-Repetitive Avalanche Energy	$E_{AS}$	250	mJ	
Thermal Resistance Junction- to-Ambient	$R_{thJA}$	50	$^\circ C/W$	
Thermal Resistance Junction to Mounting Base	$R_{thJB}$	1.7		
Junction Temperature	$T_J$	175	$^\circ C$	
Storage Temperature Range	$T_{stg}$	-55 to 175		

## N-Channel MOSFET

### IRF630S (KRF630S)

#### ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	I <sub>D</sub> =250 μA, V <sub>GS</sub> =0V	200			V
		I <sub>D</sub> =250 μA, V <sub>GS</sub> =0V, T <sub>J</sub> = 55°C	178			
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V			10	μA
		V <sub>DS</sub> =160V, V <sub>GS</sub> =0V, T <sub>J</sub> =175°C			250	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =1mA	2		4	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5.4A			0.4	Ω
		V <sub>GS</sub> =10V, I <sub>D</sub> =5.4A, T <sub>J</sub> =175°C			1.12	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =25V, I <sub>D</sub> =5.4A	3.8	9		S
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz		959		pF
Output Capacitance	C <sub>oss</sub>			93		
Reverse Transfer Capacitance	C <sub>rss</sub>			54		
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =160V, I <sub>D</sub> =5.9A			39	nC
Gate Source Charge	Q <sub>gs</sub>				6.3	
Gate Drain Charge	Q <sub>gd</sub>				21	
Internal Drain Inductance	L <sub>D</sub>	Measured tab to centre of die		3.5		nH
Internal Source Inductance	L <sub>S</sub>			7.5		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =100V, R <sub>L</sub> =10Ω, R <sub>G</sub> =5.6Ω		8		ns
Turn-On Rise Time	t <sub>r</sub>			19		
Turn-Off Delay Time	t <sub>d(off)</sub>			25		
Turn-Off Fall Time	t <sub>f</sub>			15		
Body Diode Reverse Recovery Time	t <sub>rr</sub>		I <sub>F</sub> = 9 A; dI <sub>F</sub> /dt = 100 A/μs; V <sub>GS</sub> = -10 V; V <sub>R</sub> = 25 V		92	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			0.5	nC	
Maximum Body-Diode Continuous Current	I <sub>S</sub>				9	A
Pulsed Source Current (Body Diode)	I <sub>SM</sub>				36	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =9A, V <sub>GS</sub> =0V			1.2	V

#### ■ Typical Characteristics

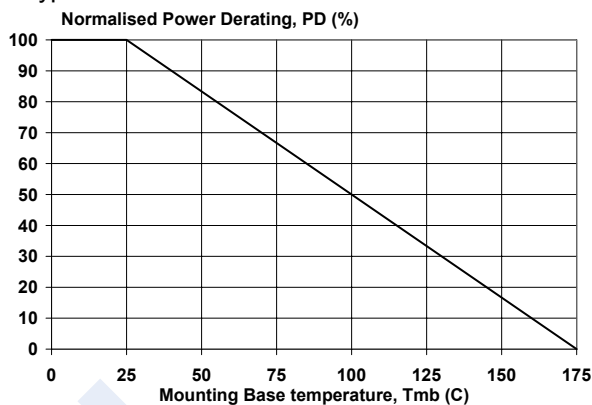


Fig.1. Normalised power dissipation.  
 $PD\% = 100 \cdot P_D / P_{D, 25^\circ C} = f(T_{mb})$

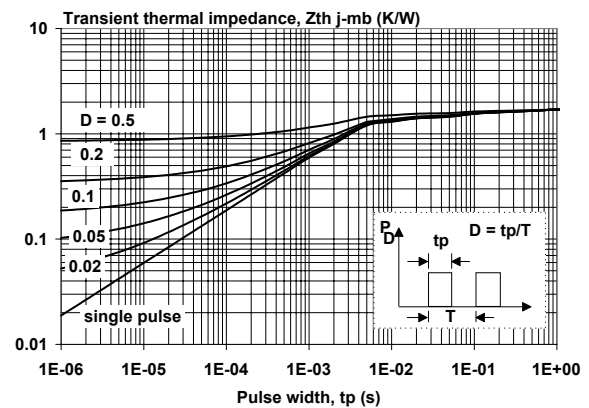


Fig.4. Transient thermal impedance.  
 $Z_{th j-mb} = f(t)$ ; parameter  $D = t_p/T$

## N-Channel MOSFET IRF630S (KRF630S)

■ Typical Characteristics

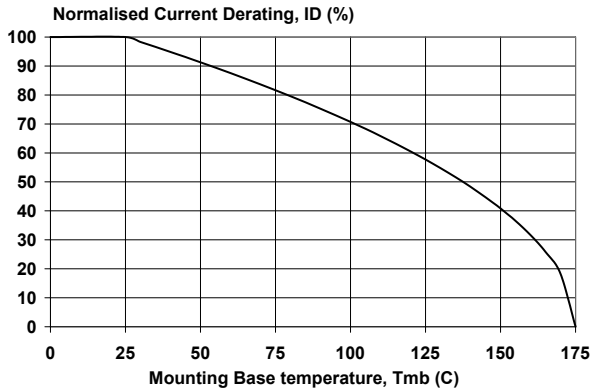


Fig.2. Normalised continuous drain current.  
 $ID\% = 100 \cdot I_D / I_{D\ 25^\circ C} = f(T_{mb}); V_{GS} \geq 10\text{ V}$

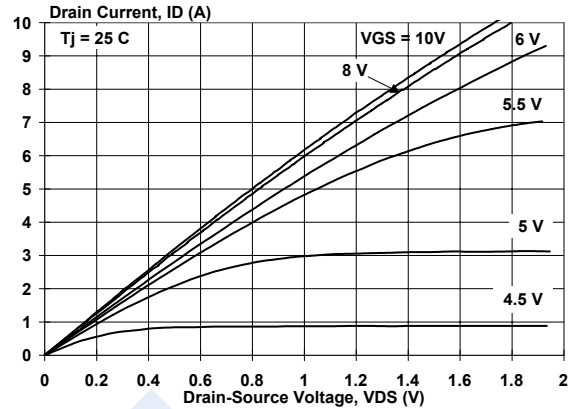


Fig.5. Typical output characteristics,  $T_j = 25^\circ\text{C}$ .  
 $I_D = f(V_{DS})$

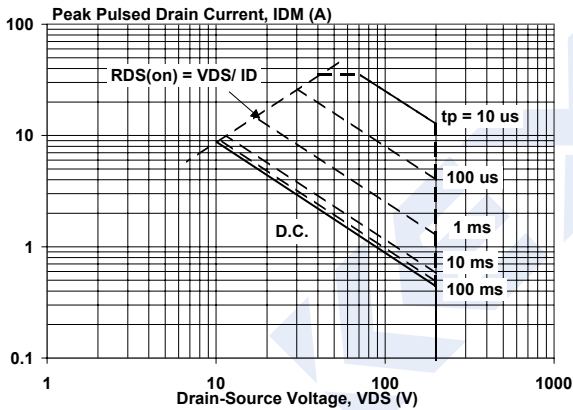


Fig.3. Safe operating area  
 $I_D$  &  $I_{DM} = f(V_{DS}); I_{DM}$  single pulse; parameter  $t_p$

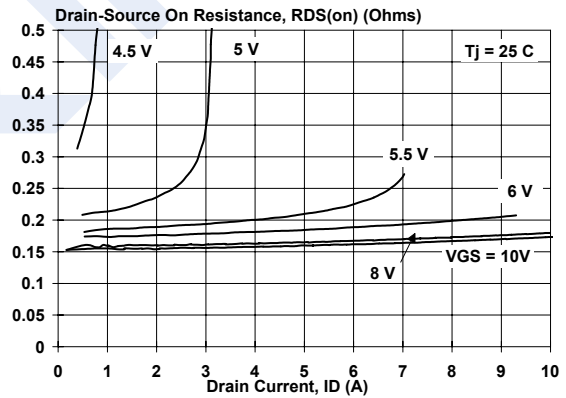


Fig.6. Typical on-state resistance,  $T_j = 25^\circ\text{C}$ .  
 $R_{DS(ON)} = f(I_D)$

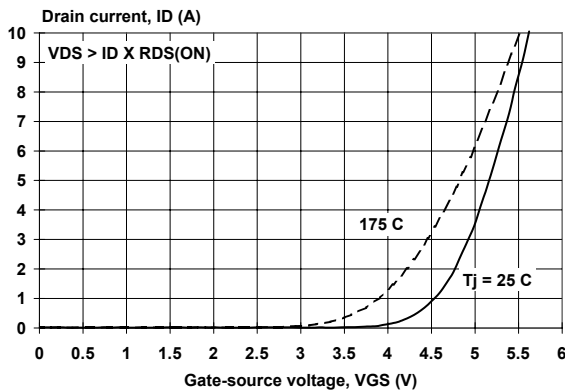


Fig.7. Typical transfer characteristics.  
 $I_D = f(V_{GS})$

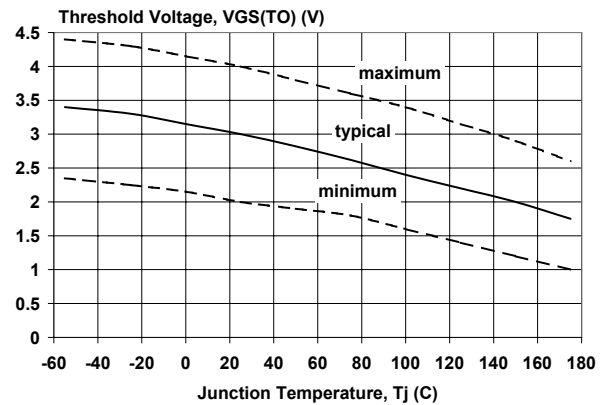


Fig.10. Gate threshold voltage.  
 $V_{GS(T0)} = f(T_j);$  conditions:  $I_D = 1\text{ mA}; V_{DS} = V_{GS}$

## N-Channel MOSFET IRF630S (KRF630S)

■ Typical Characteristics

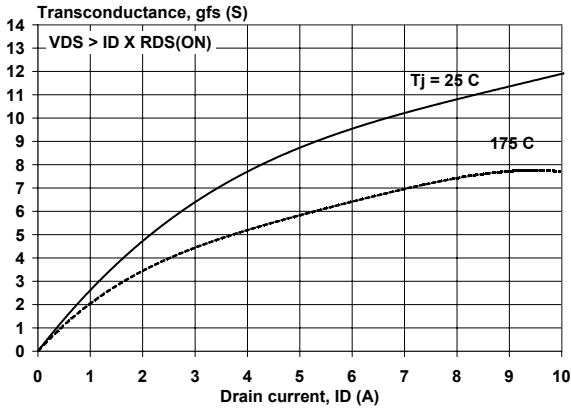


Fig.8. Typical transconductance,  $T_j = 25\text{ }^\circ\text{C}$ .  
 $g_{fs} = f(I_D)$

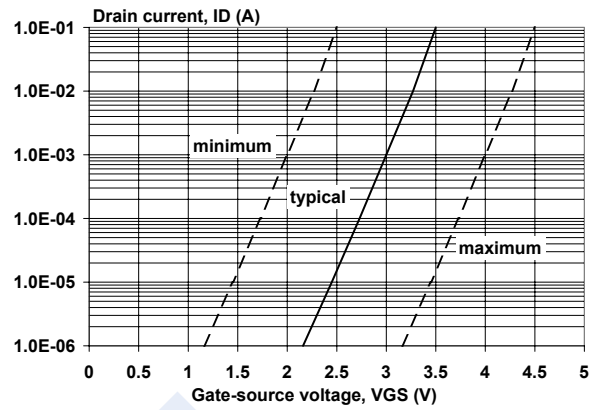


Fig.11. Sub-threshold drain current.  
 $I_D = f(V_{GS})$ ; conditions:  $T_j = 25\text{ }^\circ\text{C}$

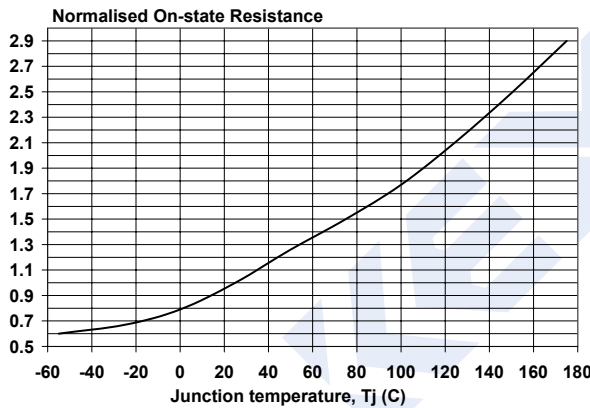


Fig.9. Normalised drain-source on-state resistance.  
 $R_{DS(ON)}/R_{DS(ON)25\text{ }^\circ\text{C}} = f(T_j)$

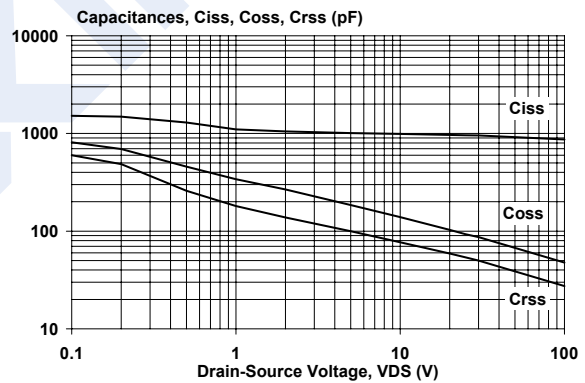


Fig.12. Typical capacitances,  $C_{iss}$ ,  $C_{oss}$ ,  $C_{rss}$ .  
 $C = f(V_{DS})$ ; conditions:  $V_{GS} = 0\text{ V}$ ;  $f = 1\text{ MHz}$

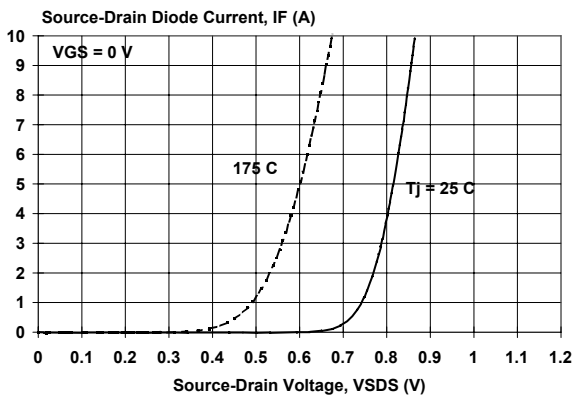


Fig.13. Typical reverse diode current.  
 $I_F = f(V_{SDS})$ ; conditions:  $V_{GS} = 0\text{ V}$ ; parameter  $T_j$

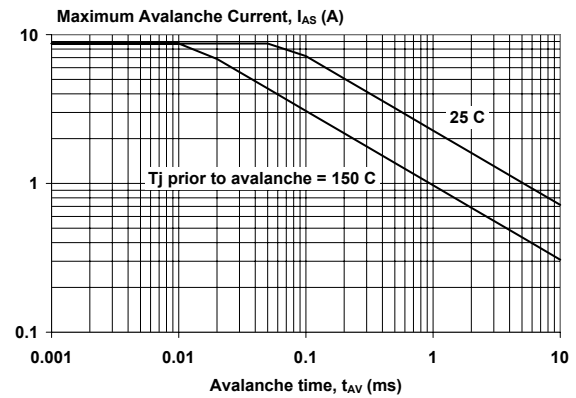


Fig.14. Maximum permissible non-repetitive avalanche current ( $I_{AS}$ ) versus avalanche time ( $t_{AV}$ ); unclamped inductive load