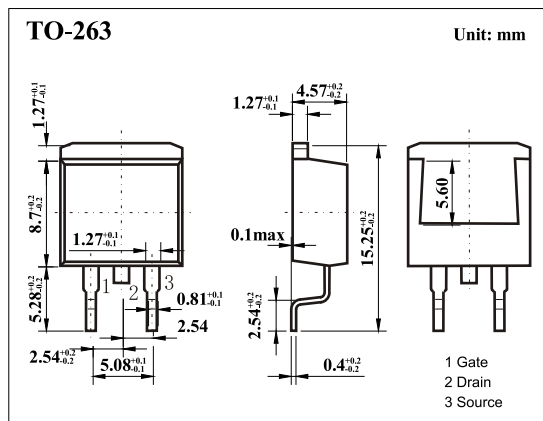
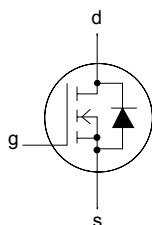


N-Channel MOSFET

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}	± 20	
Continuous Drain Current	I_D	9	A
		6.3	
Pulsed Drain Current	I_{DM}	36	
Peak Non-Repetitive Avalanche Current	I_{AS}	9	W
Power Dissipation	P_D	88	
Non-Repetitive Avalanche Energy	E_{AS}	250	
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 $T_a = 25^\circ\text{C}$

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DS}	$I_D=250\ \mu\text{A}$, $V_{GS}=0\text{V}$	200			V
		$I_D=250\ \mu\text{A}$, $V_{GS}=0\text{V}$, $T_J = 55^\circ\text{C}$	178			
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=200\text{V}$, $V_{GS}=0\text{V}$			10	μA
		$V_{DS}=160\text{V}$, $V_{GS}=0\text{V}$, $T_J=175^\circ\text{C}$			250	
Gate-Body Leakage Current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=1\text{mA}$	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}$, $I_D=5.4\text{A}$			0.4	Ω
		$V_{GS}=10\text{V}$, $I_D=5.4\text{A}$, $T_J=175^\circ\text{C}$			1.12	
Forward Transconductance	g_{FS}	$V_{DS}=25\text{V}$, $I_D=5.4\text{A}$	3.8	9		S
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1\text{MHz}$		959		pF
Output Capacitance	C_{oss}			93		
Reverse Transfer Capacitance	C_{rss}			54		
Total Gate Charge	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=160\text{V}$, $I_D=5.9\text{A}$			39	nC
Gate Source Charge	Q_{gs}				6.3	
Gate Drain Charge	Q_{gd}				21	
Internal Drain Inductance	L_D	Measured tab to centre of die		3.5		nH
Internal Source Inductance	L_S			7.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10\text{V}$, $V_{DS}=100\text{V}$, $R_L=10\ \Omega$, $R_G=5.6\ \Omega$		8		ns
Turn-On Rise Time	t_r			19		
Turn-Off Delay Time	$t_{d(off)}$			25		
Turn-Off Fall Time	t_f			15		
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 9\text{A}$; $dI_F/dt = 100\text{A}/\mu\text{s}$; $V_{GS} = -10\text{V}$; $V_R = 25\text{V}$		92		nC
Body Diode Reverse Recovery Charge	Q_{rr}			0.5		
Maximum Body-Diode Continuous Current	I_S				9	A
Pulsed Source Current (Body Diode)	I_{SM}				36	
Diode Forward Voltage	V_{SD}	$I_S=9\text{A}$, $V_{GS}=0\text{V}$			1.2	V

■ Typical Characteristics

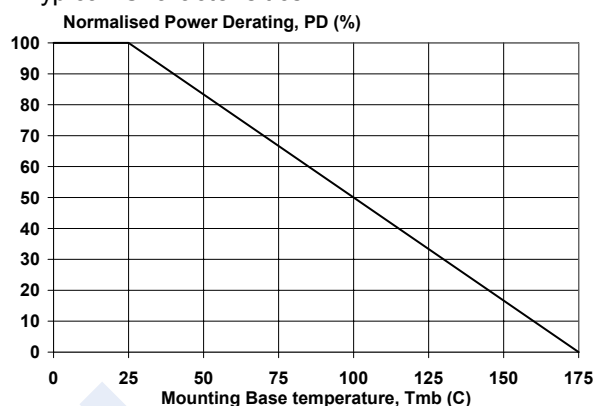


Fig.1. Normalised power dissipation.
 $PD\% = 100 \cdot P_D / P_{D\ 25^\circ\text{C}} = f(T_{mb})$

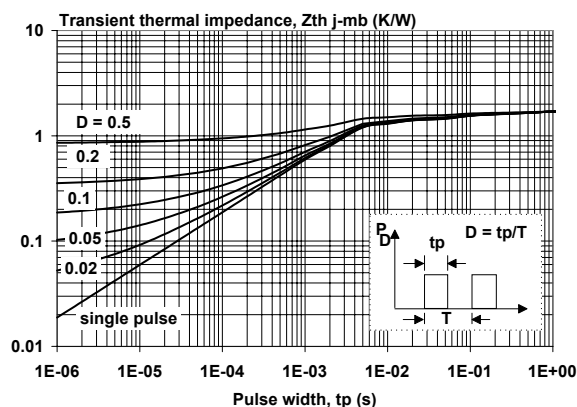


Fig.4. Transient thermal impedance.
 $Z_{th\ j-mb} = f(t)$; parameter $D = t_p/T$

N-Channel MOSFET

IRF630S (KRF630S)

■ Typical Characteristics

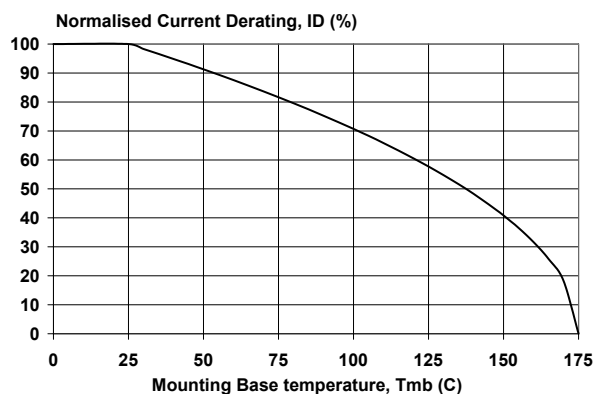


Fig.2. Normalised continuous drain current.
 $ID\% = 100 \cdot I_D / I_{D\ 25^\circ\text{C}} = f(T_{mb})$; $V_{GS} \geq 10\text{ V}$

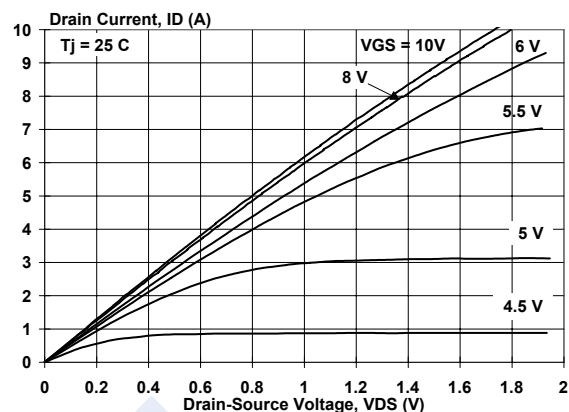


Fig.5. Typical output characteristics, $T_j = 25^\circ\text{C}$.
 $I_D = f(V_{DS})$

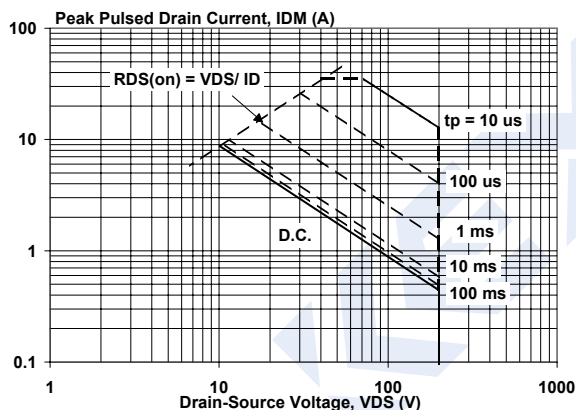


Fig.3. Safe operating area
 I_D & $I_{DM} = f(V_{DS})$; I_{DM} single pulse; parameter t_p

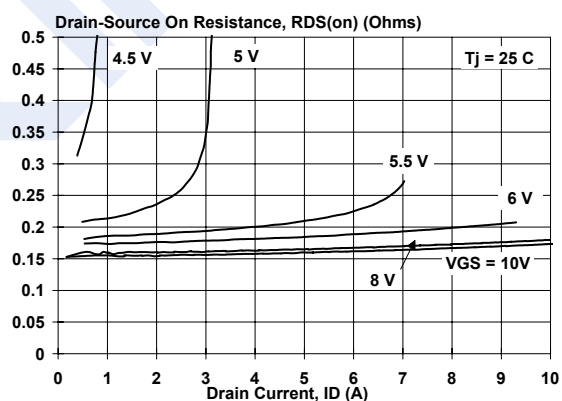


Fig.6. Typical on-state resistance, $T_j = 25^\circ\text{C}$.
 $R_{DS(ON)} = f(I_D)$

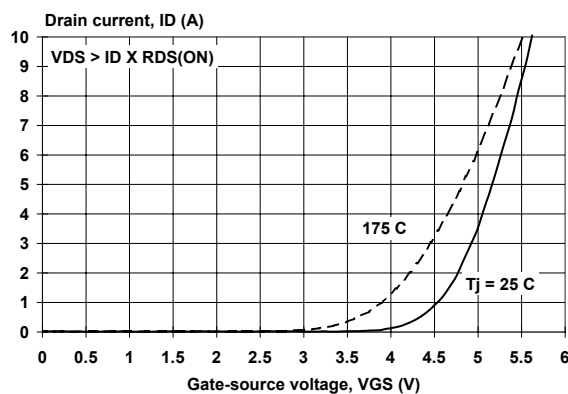


Fig.7. Typical transfer characteristics.
 $I_D = f(V_{GS})$

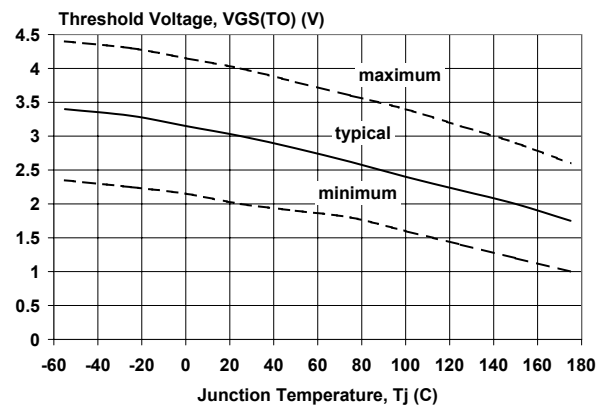


Fig.10. Gate threshold voltage.
 $V_{GS(T0)} = f(T_j)$; conditions: $I_D = 1\text{ mA}$; $V_{DS} = V_{GS}$

N-Channel MOSFET

IRF630S (KRF630S)

Typical Characteristics

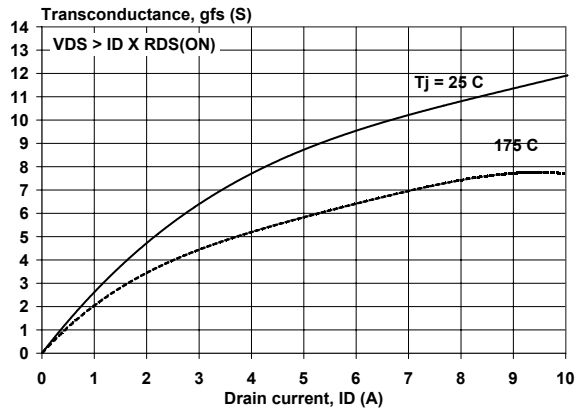


Fig. 8. Typical transconductance, $T_j = 25\text{ }^{\circ}\text{C}$.
 $g_{fs} = f(I_D)$

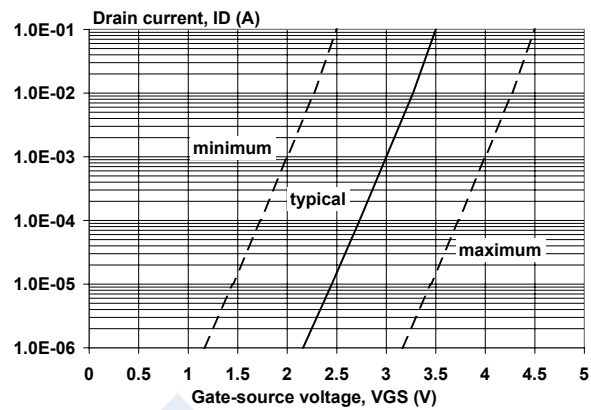


Fig. 11. Sub-threshold drain current.
 $I_D = f(V_{GS})$; conditions: $T_j = 25\text{ }^{\circ}\text{C}$

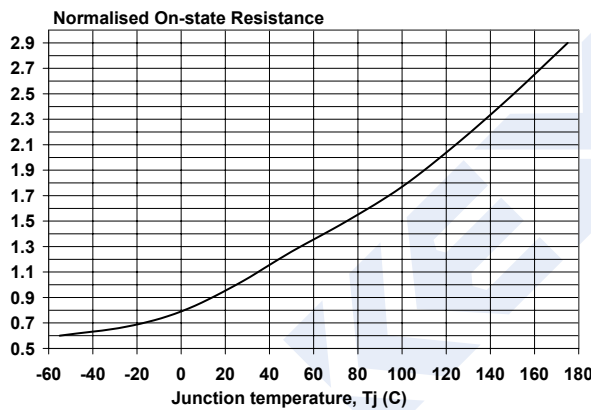


Fig. 9. Normalised drain-source on-state resistance.
 $R_{DS(ON)}/R_{DS(ON)25\text{ }^{\circ}\text{C}} = f(T_j)$

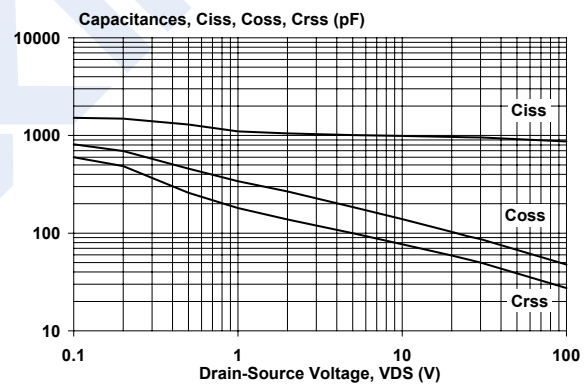


Fig. 12. Typical capacitances, C_{iss} , C_{oss} , C_{rss} .
 $C = f(V_{DS})$; conditions: $V_{GS} = 0\text{ V}$; $f = 1\text{ MHz}$

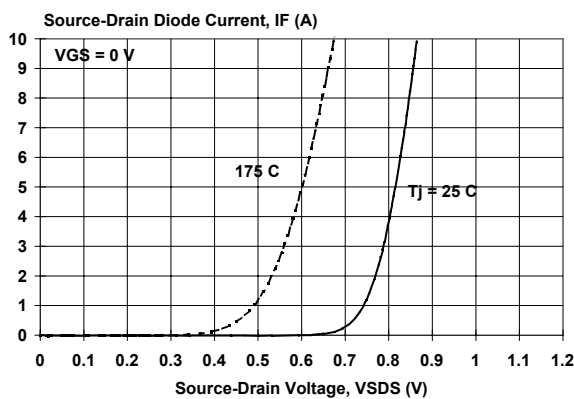


Fig. 13. Typical reverse diode current.
 $I_F = f(V_{SDS})$; conditions: $V_{GS} = 0\text{ V}$; parameter T_j

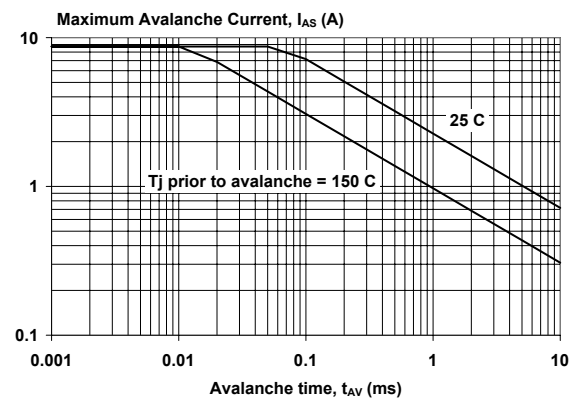


Fig. 14. Maximum permissible non-repetitive avalanche current (I_{AS}) versus avalanche time (t_{AV}); unclamped inductive load