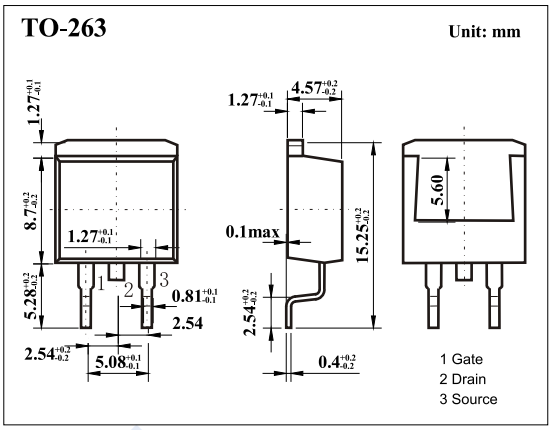
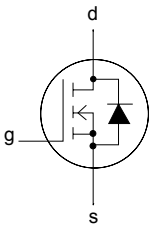
N-Channel MOSFET

IRF630S (KRF630S)



■ Features

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



■ Absolute Maximum Ratings Ta = 25℃

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	Ta = 25℃	I_D	9	A
	Ta = 100℃		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	℃/W
Thermal Resistance Junction to Mounting Base		R_{thJB}	1.7	
Junction Temperature		T_J	175	℃
Storage Temperature Range		T_{stg}	-55 to 175	

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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	200			V
		I_D=250μA, V_{GS}=0V , T_J = 55℃	178			
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=200V, V_{GS}=0V			10	uA
		V_{DS}=160V, V_{GS}=0V, T_J=175℃			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=1mA	2		4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=5.4A			0.4	Ω
		V_{GS}=10V, I_D=5.4A T_J=175℃			1.12	
Forward Transconductance	g_{FS}	V_{DS}=25V, I_D=5.4A	3.8	9		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz		959		pF
Output Capacitance	C_{oss}			93		
Reverse Transfer Capacitance	C_{rss}			54		
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=160V, I_D=5.9A			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 DelayTime	$t_{d(on)}$	V_{GS}=10V, V_{DS}=100V, R_L=10Ω,R_G=5.6Ω		8		ns
Turn-On Rise Time	t_r			19		
Turn-Off DelayTime	$t_{d(off)}$			25		
Turn-Off Fall Time	t_f			15		
Body Diode Reverse Recovery Time	t_{rr}	I_F = 9 A; dIF/dt = 100 A/us; V_{GS} = -10 V; V_R = 25 V		92		
Body Diode Reverse Recovery Charge	Q_{rr}			0.5		nC
Maximum Body-Diode Continuous Current	I_S				9	A
Pulsed Source Current (Body Diode)	I_{SM}				36	
Diode Forward Voltage	V_{SD}	I_S=9A,V_{GS}=0V			1.2	V

■ Typical Characterisitics

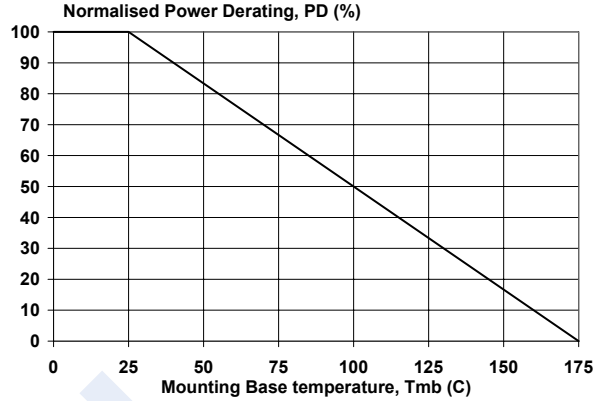

Fig.1. Normalised power dissipation. PD% = 100·P_D/$P_{D\ 25\ ^\circ C}$ = f(T_{mb})

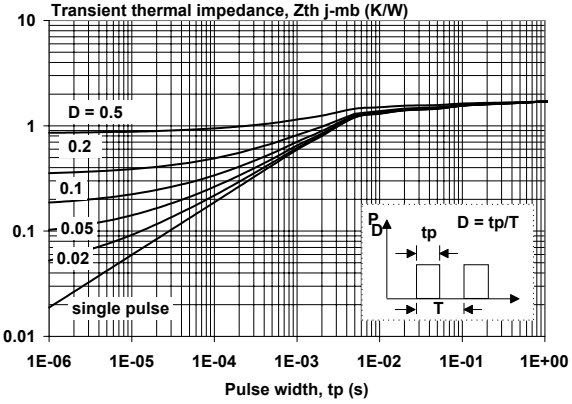

Fig.4. Transient thermal impedance. $Z_{th\ j\text{-}mb}$ = f(t); parameter D = t_p/T

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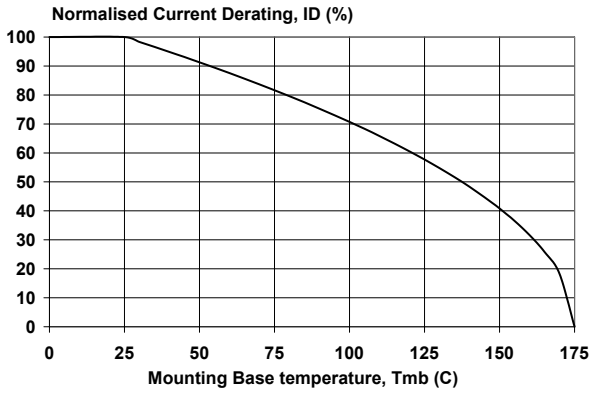

Fig.2. Normalised continuous drain current.
ID% = 100·I_D/$I_{D\ 25\ ^\circ C}$ = f(T_{mb}); $V_{GS} \geq$ 10 V

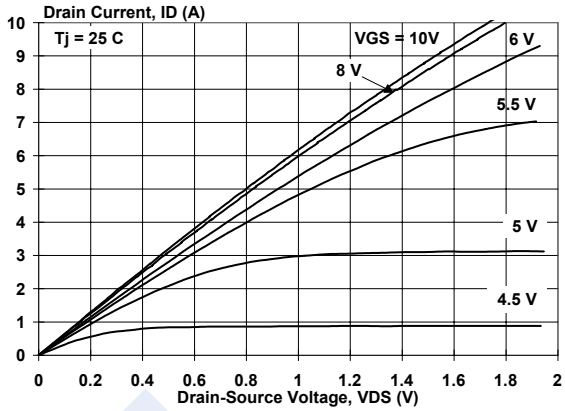

Fig.5. Typical output characteristics, T_j = 25 ˚C.
I_D = f(V_{DS})

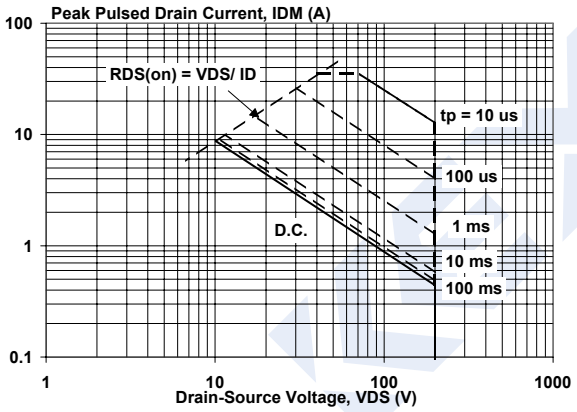

Fig.3. Safe operating area
I_D & I_{DM} = f(V_{DS}); I_{DM} single pulse; parameter t_p

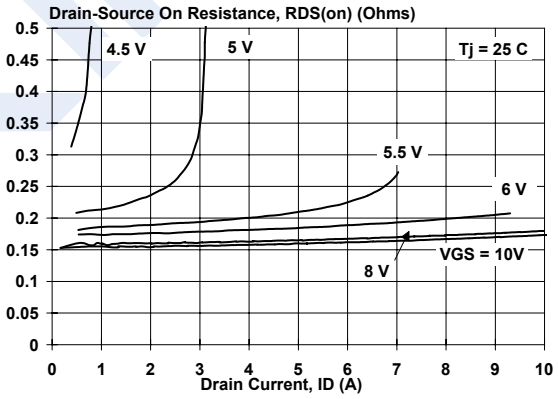

Fig.6. Typical on-state resistance, T_j = 25 ˚C.
$R_{DS(ON)}$ = f(I_D)

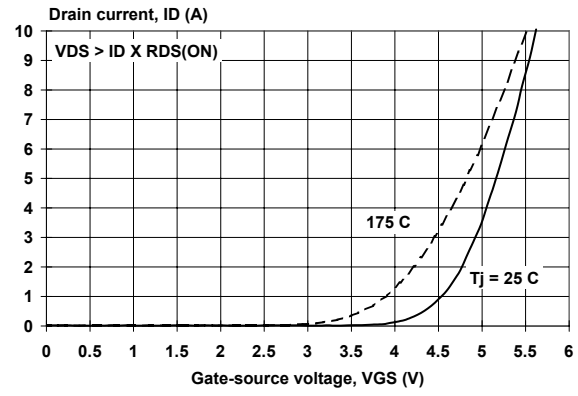

Fig.7. Typical transfer characteristics.
I_D = f(V_{GS})

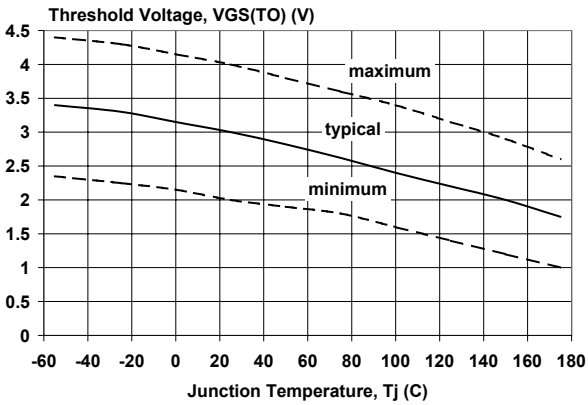

Fig.10. Gate threshold voltage.
$V_{GS(TO)}$ = f(T_j); conditions: I_D = 1 mA; V_{DS} = V_{GS}

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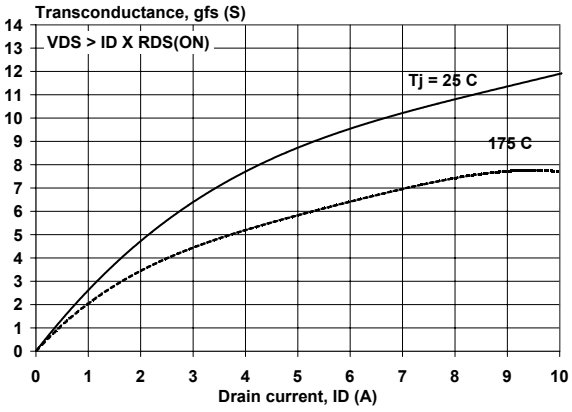

Fig.8. Typical transconductance, T_j = 25 ˚C. $g_{fs} = f(I_D)$

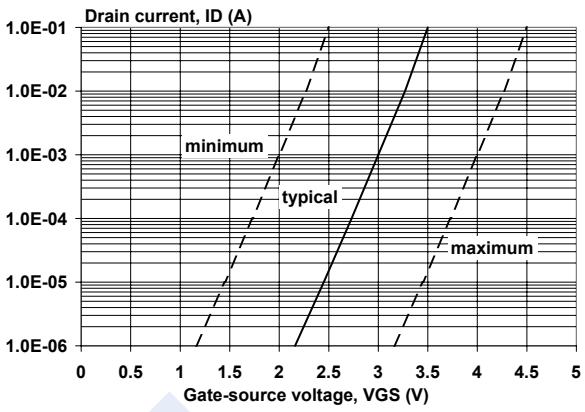

Fig.11. Sub-threshold drain current. $I_D = f(V_{GS})$; conditions: T_j = 25 ˚C

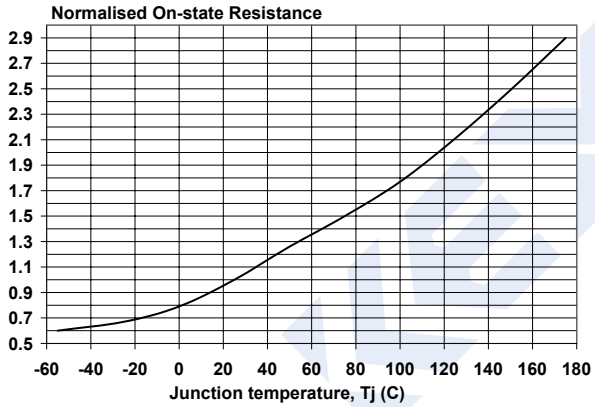

Fig.9. Normalised drain-source on-state resistance. $R_{DS(ON)}/R_{DS(ON)25\ ˚C} = f(T_j)$

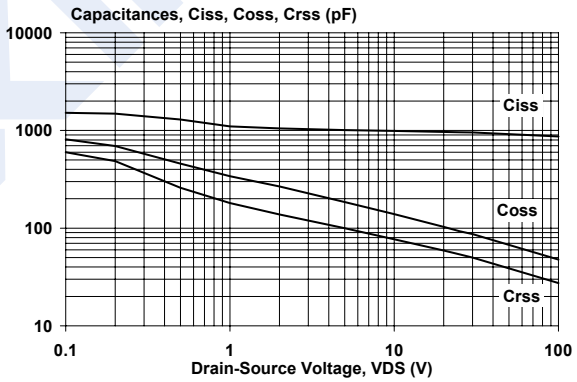

Fig.12. Typical capacitances, C_{iss}, C_{oss}, C_{rss}. $C = f(V_{DS})$; conditions: V_{GS} = 0 V; f = 1 MHz

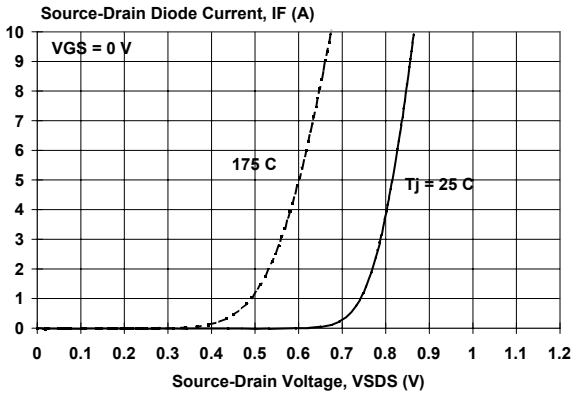

Fig.13. Typical reverse diode current. $I_F = f(V_{SDS})$; conditions: V_{GS} = 0 V; parameter T_j

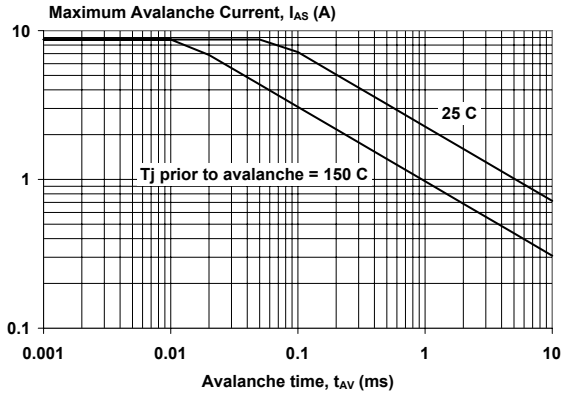

Fig.14. Maximum permissible non-repetitive avalanche current (I_{AS}) versus avalanche time (t_{AV}); unclamped inductive load