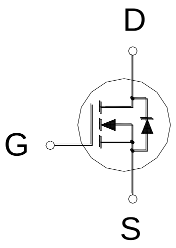
NIKO-SEM

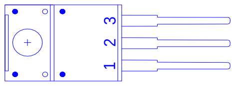
N-Channel High Voltage Mode
Field Effect Transistor

P0690ATF:TO-220F
P0690ATFS:TO-220FS
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
900V	2.35Ω	6A





1. GATE
2. DRAIN
3. SOURCE

ABSOLUTE MAXIMUN RATINGS(T_A=25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	900	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	6	A
	T_C = 100 °C		3.5	
Pulsed Drain Current[1]		I_{DM}	18	
Avalanche Current[3]		IAS	3	
Avalanche Energy[3]		EAS	45	mJ
Power Dissipation	T_C = 25 °C	P_D	52	W
	T_C = 100 °C		20	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		2.4	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	°C / W

[1] Pulse width limited by maximum junction temperature.
[2] Ensure that the channel temperature does not exceed 150°C.
[3] V_{DD} = 50V , L = 10mH ,starting T_J = 25°C.

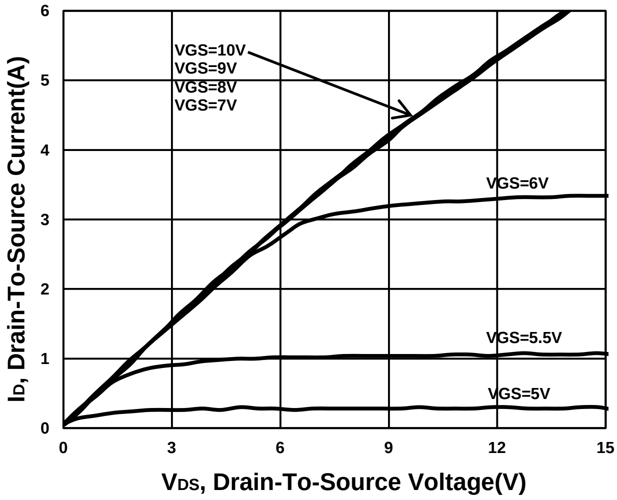
ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	900			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.5	3.8	4.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±30V			±100	nA
Gate Voltage Drain Current	I_{DSS}	V_{DS} = 900V, V_{GS} = 0V , T_C = 25 °C			1	μA
		V_{DS} = 720V, V_{GS} = 0V , T_C = 100 °C			100	

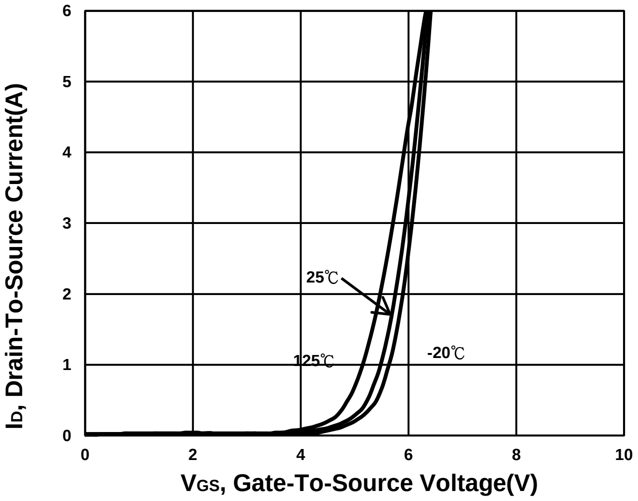
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 3A		2	2.35	Ω
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 3A		6		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		1610		pF
Output Capacitance	C_{oss}			89		
Reverse Transfer Capacitance	C_{rss}			9		
Total Gate Charge[2]	Q_g	V_{DD} = 720V, I_D =6A, V_{GS} = 10V		34		nC
Gate-Source Charge[2]	Q_{gs}			10.5		
Gate-Drain Charge[2]	Q_{gd}			11		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 450V, I_D =6A, R_G= 6Ω		80		nS
Rise Time[2]	t_r			190		
Turn-Off Delay Time[2]	$t_{d(off)}$			120		
Fall Time[2]	t_f			130		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				6	A
Forward Voltage[1]	V_{SD}	I_F =6A, V_{GS} = 0V			1.4	V
Reverse Recovery Time	t_{rr}	I_F =6A, dI_F/dt = 100A / µS		545		nS
Reverse Recovery Charge	Q_{rr}			3.6		uC

[1] Pulse test : Pulse Width ≤ 380 µsec, Duty Cycle ≤ 2%.
[2] Independent of operating temperature.
[3] Pulse width limited by maximum junction temperature.

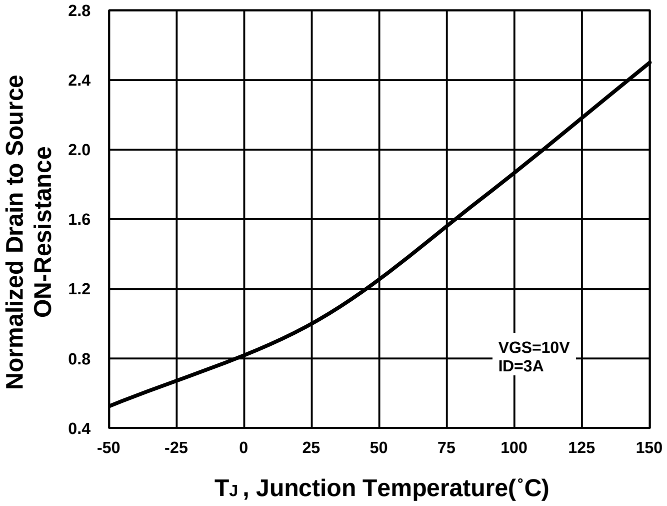
Output Characteristics



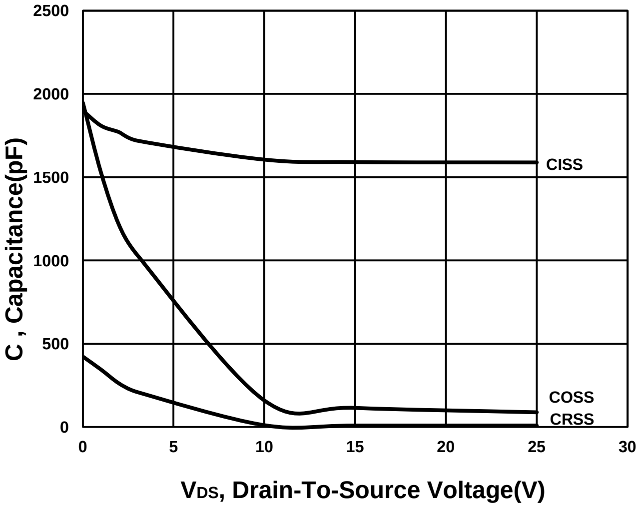
Transfer Characteristics



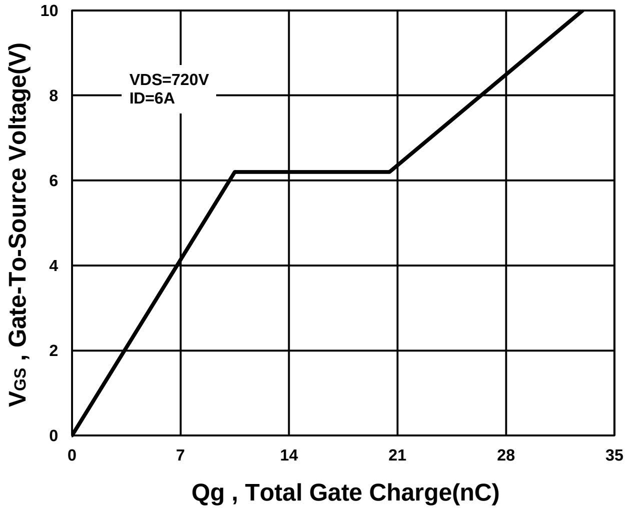
On-Resistance VS Temperature



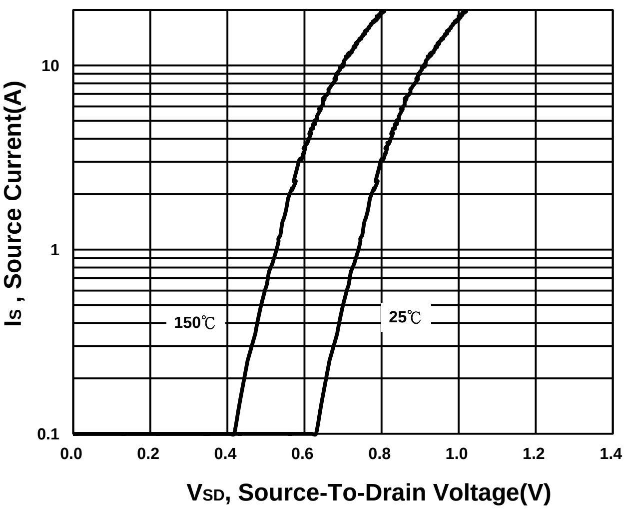
Capacitance Characteristic



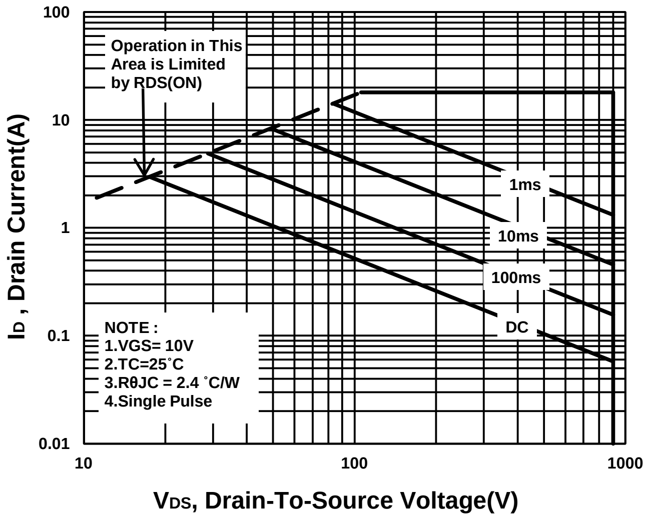
Gate charge Characteristics



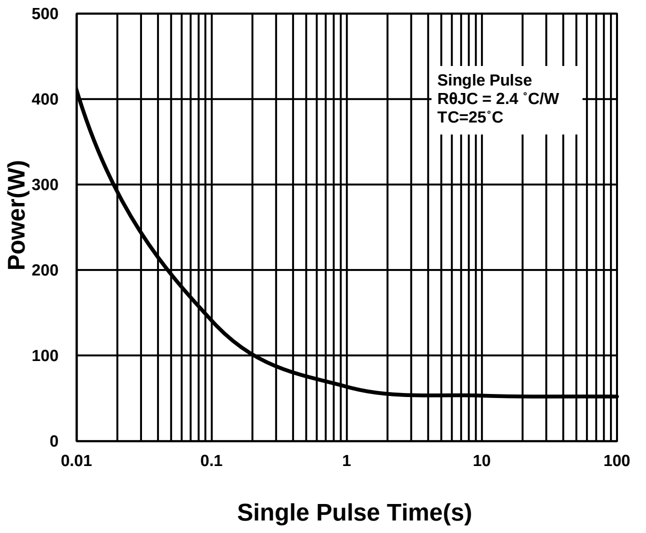
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve