NIKO-SEM

N-Channel Enhancement Mode Field Effect Transistor

P0770EI
TO-251
Halogen-Free & Lead-Free

RoHS Compliant

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
700V	1.5Ω	7A

D

G

S

1. GATE
2. DRAIN
3. SOURCE

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	700	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	7	A
	T_C = 100 °C		4.4	
Pulsed Drain Current[1,2]		I_{DM}	20	
Avalanche Current[3]		I_{AS}	2.2	
Avalanche Energy[3]		E_{AS}	24	mJ
Power Dissipation	T_C = 25 °C	P_D	96	W
	T_C = 100 °C		38	
Operating Junction & Storage Temperature Range		Tj, Tstg	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		1.3	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.
[2]Limited only by maximum temperature allowed
[3]V_{DD} = 50V , L = 10mH ,starting T_J = 25°C

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	700			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	2.9	4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±30V			±100	nA
Gate Voltage Drain Current	I_{DSS}	V_{DS} = 700V, V_{GS} = 0V , T_C = 25 °C			1	μA
		V_{DS} = 560V, V_{GS} = 0V , T_C = 100 °C			10	

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	$V_{GS} = 10V$, $I_D = 3.5A$			1.2	1.5	Ω
Forward Transconductance[1]	g_{fs}	$V_{DS} = 10V$, $I_D = 3.5A$			10		S
DYNAMIC							
Input Capacitance	C_{iss}	$V_{GS} = 0V$, $V_{DS} = 25V$, $f = 1MHz$			1223		pF
Output Capacitance	C_{oss}				106		
Reverse Transfer Capacitance	C_{rss}				9		
Total Gate Charge[2]	Q_g	$V_{DD} = 560V$, $I_D = 7A$, $V_{GS} = 10V$			28		nC
Gate-Source Charge[2]	Q_{gs}				5		
Gate-Drain Charge[2]	Q_{gd}				10		
Turn-On Delay Time[2]	$t_{d(on)}$	$V_{GS} = 10V$, $V_{DD} = 350V$, $I_D = 7A$, $R_G = 25\Omega$			35		nS
Rise Time[2]	t_r				75		
Turn-Off Delay Time[2]	$t_{d(off)}$				80		
Fall Time[2]	t_f				57		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current[3]	I_S					7	A
Forward Voltage[1]	V_{SD}	$I_F = 7A$, $V_{GS} = 0V$				1	V
Reverse Recovery Time	t_{rr}	$I_F = 7A$, $dI_F/dt = 100A / \mu S$			400		nS
Reverse Recovery Charge	Q_{rr}				4		uC
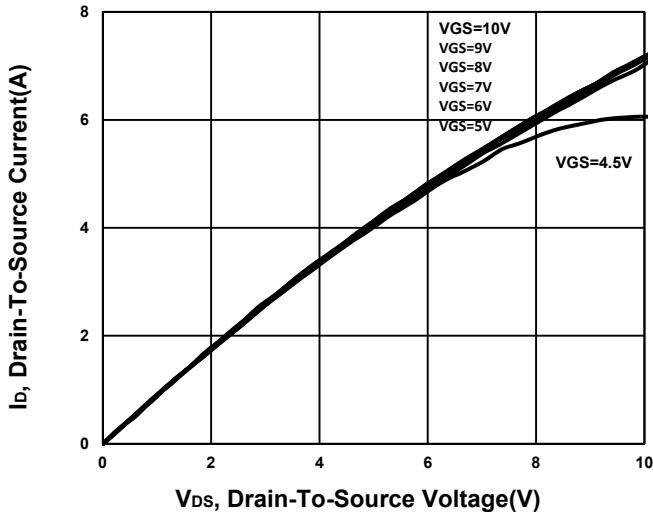
[1]Pulse test : Pulse Width $\leq$ 300 μsec, Duty Cycle $\leq$ 2%.
[2]Independent of operating temperature.
[3]Pulse width limited by maximum junction temperature.

NIKO-SEM
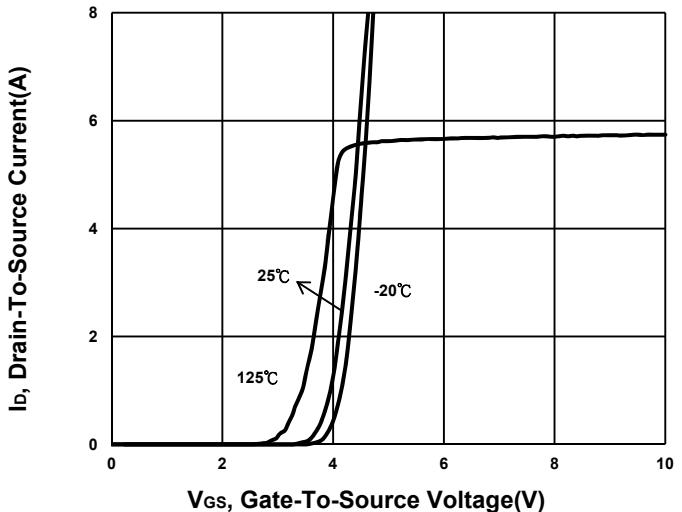
N-Channel Enhancement Mode
Field Effect Transistor

P0770EI
TO-251
Halogen-Free & Lead-Free
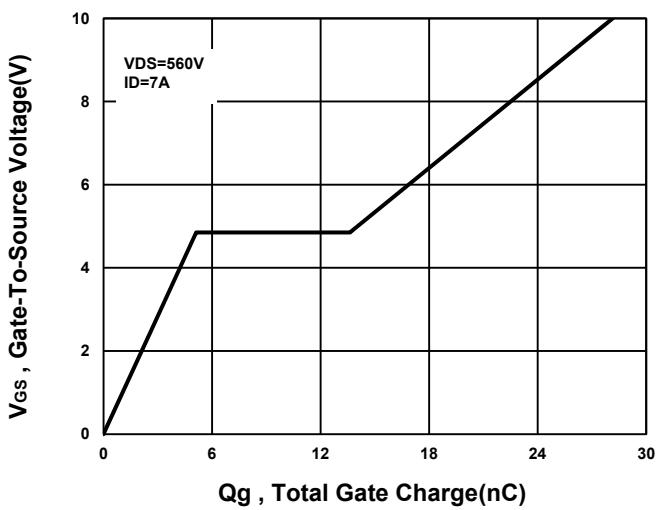
Output Characteristics
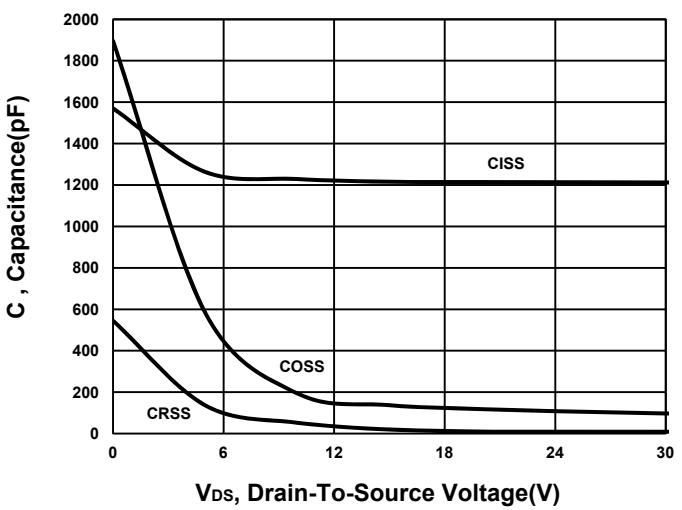

Transfer Characteristics
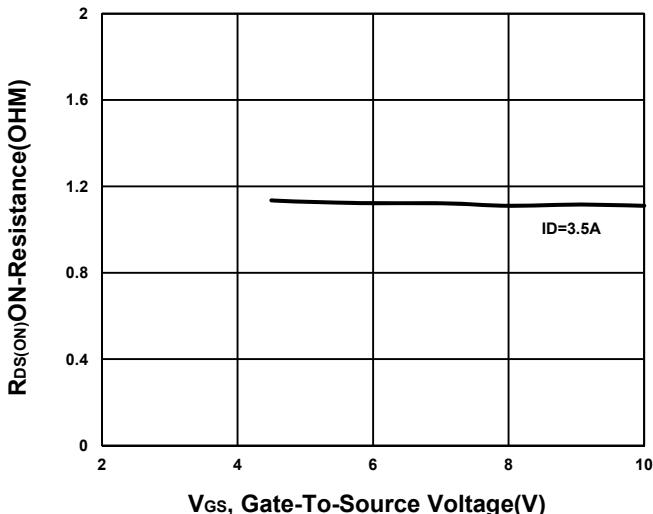

Gate charge Characteristics
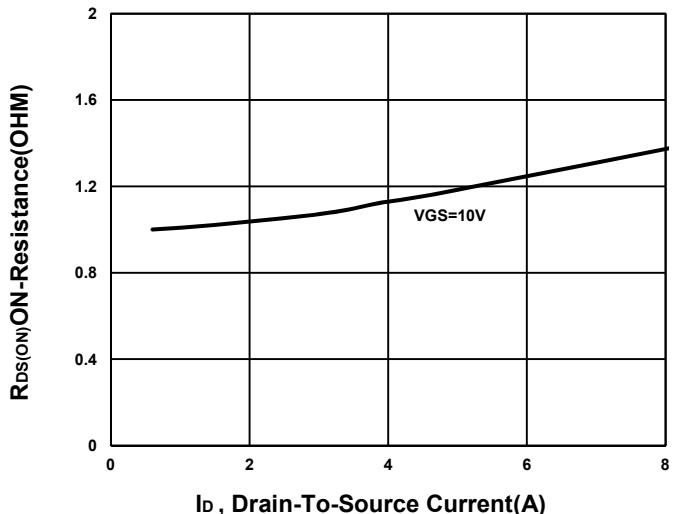
Capacitance Characteristic
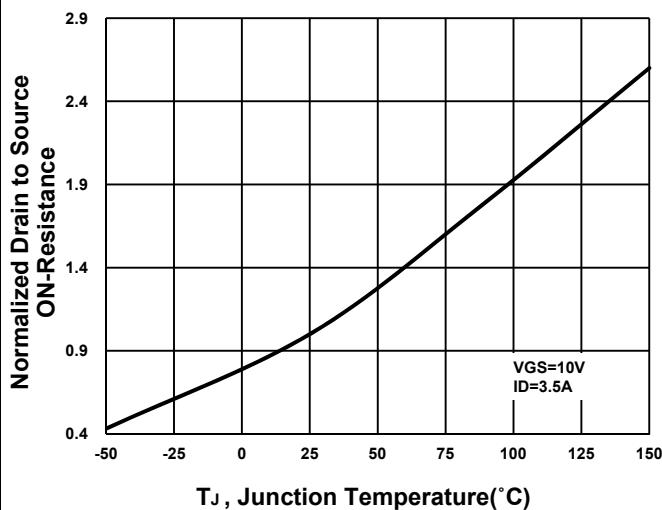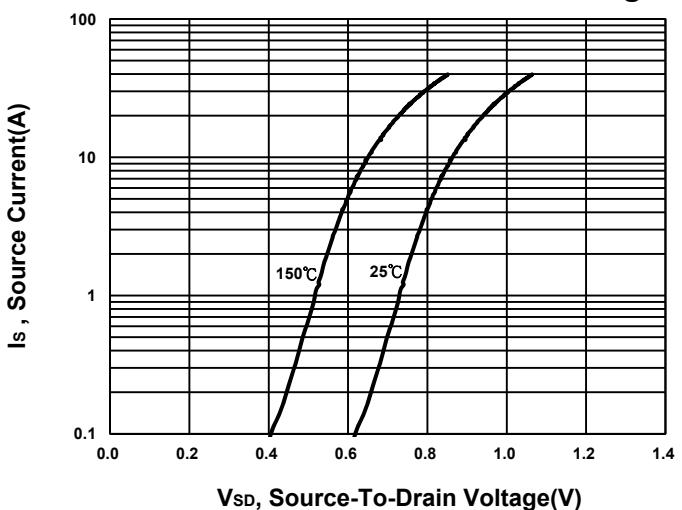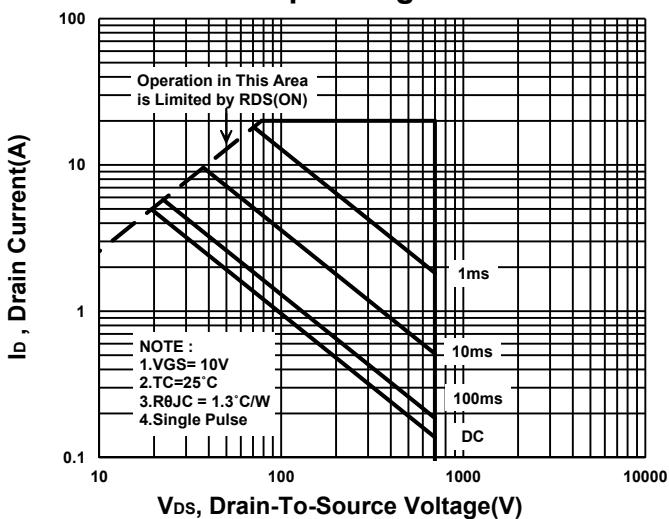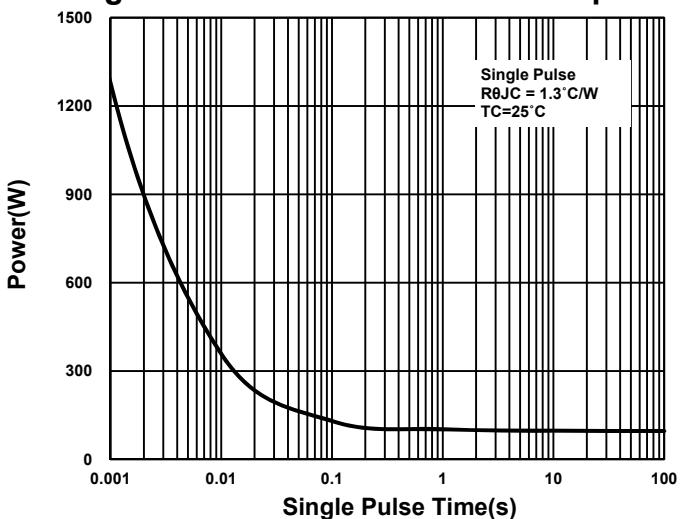
On-Resistance VS Gate-To-Source

On-Resistance VS Drain Current

NIKO-SEM

N-Channel Enhancement Mode
Field Effect Transistor

P0770EI
TO-251
Halogen-Free & Lead-Free

On-Resistance VS Temperature

VGS=10V
ID=3.5A

T_J, Junction Temperature(°C)

Normalized Drain to Source ON-Resistance

Source-Drain Diode Forward Voltage

150°C   25°C

I_S, Source Current(A)

V_{SD}, Source-To-Drain Voltage(V)

Safe Operating Area

Operation in This Area
is Limited by RDS(ON)

NOTE :
1.VGS= 10V
2.TC=25°C
3.RθJC = 1.3°C/W
4.Single Pulse

1ms
10ms
100ms
DC

I_D, Drain Current(A)

V_{DS}, Drain-To-Source Voltage(V)

Single Pulse Maximum Power Dissipation

Single Pulse
RθJC = 1.3°C/W
TC=25°C

Power(W)

Single Pulse Time(s)

Transient Thermal Response Curve

Duty cycle=0.5
0.2
0.1
0.05
0.02
0.01

single pulse

Notes

P_{DM}

t1
t2

1.Duty cycle, D= t1 / t2
2.RthJC = 1.3 °C/W
3.TJ-TC = P*RthJC(t)
4.RthJC(t) = r(t)*RthJC

r(t), Normalized Effective Transient Thermal Resistance

T_1, Square Wave Pulse Duration[sec]