NIKO-SEM

N-Channel Enhancement Mode Field Effect Transistor

P0925AD
TO-252
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
250V	0.48 Ω	9A

D

G

S

3
2
1
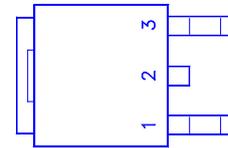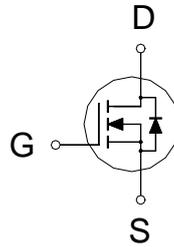
1. GATE
2. DRAIN
3. SOURCE

RoHS Compliant

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	9	A
	T_C = 100 °C		5.4	
Pulsed Drain Current[1]		I_{DM}	36	
Avalanche Current		I_{AS}	9	
Avalanche Energy	L = 1.8mH	E_{AS}	72	mJ
Power Dissipation	T_C = 25 °C	P_D	73	W
	T_C = 100 °C		29	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATING

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		1.7	°C / W

[1]Pulse width limited by maximum junction temperature.
[2]Limited only by maximum temperature allowed

### 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	250			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	2	2.6	4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 250V, V_{GS} = 0V			1	µA
		V_{DS} = 200V, V_{GS} = 0V, T_J = 125 °C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 4.5A		0.39	0.48	Ω
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 4.5A		11		S

REV 1.0

| DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		793		pF
Output Capacitance	C_{oss}			65		
Reverse Transfer Capacitance	C_{rss}			22		
Total Gate Charge[2]	Q_g	V_{DS} =200V, V_{GS} = 10V, I_D = 9A		29.7		nC
Gate-Source Charge[2]	Q_{gs}			4		
Gate-Drain Charge[2]	Q_{gd}			11.3		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 125V, $I_D \cong$ 9A, V_{GS} = 10V, R_{GEN} = 6Ω		12		nS
Rise Time[2]	t_r			39		
Turn-Off Delay Time[2]	$t_{d(off)}$			46		
Fall Time[2]	t_f			53		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[2]	I_S				9	A
Forward Voltage[1]	V_{SD}	I_F = 4.5A, V_{GS} = 0V			1.6	V
Reverse Recovery Time	t_{rr}	I_F = 9A, dI_F/dt = 100A / μS		143		nS
Reverse Recovery Charge	Q_{rr}			0.6		uC

[1]Pulse test : Pulse Width $\le$ 300 μsec, Duty Cycle $\le$ 2%.
[2]Independent of operating temperature.

Output Characteristics

VGS=10V
VGS=9V
VGS=8V
VGS=7V
VGS=6V
VGS=5V

VGS=4V

I_D, Drain-To-Source Current(A)

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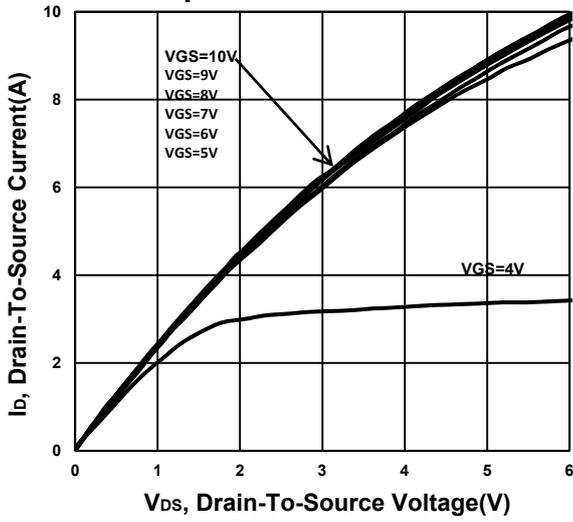
Transfer Characteristics

25℃
125℃
-20℃

I_D, Drain-To-Source Current(A)

V_{GS}, Gate-To-Source Voltage(V)
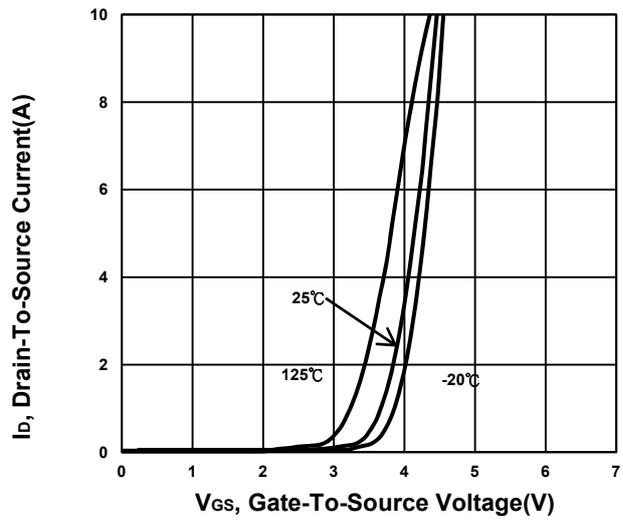
On-Resistance VS Temperature

VGS=10V
ID=4.5A

Normalized Drain to Source ON-Resistance

T_J, Junction Temperature(℃)
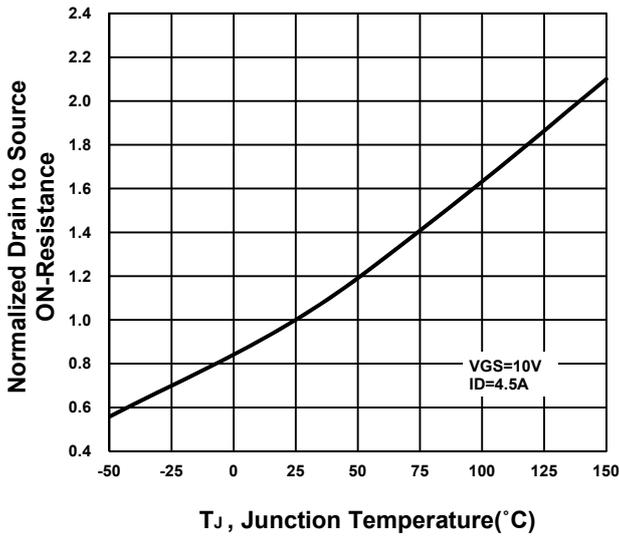
Capacitance Characteristic

CISS
COSS
CRSS

C , Capacitance(pF)

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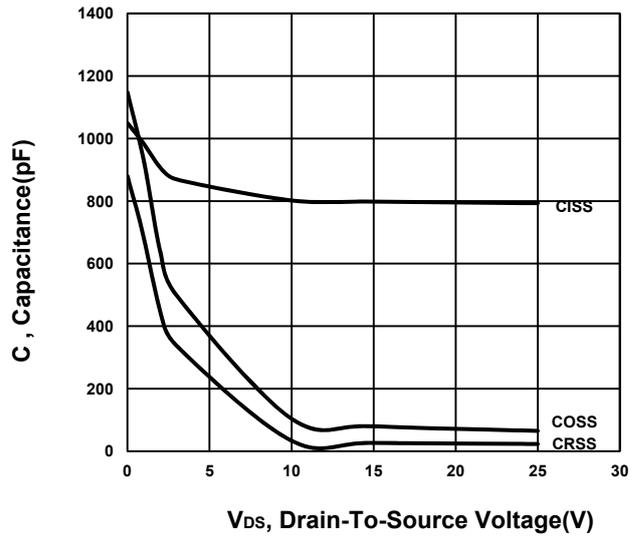
Gate charge Characteristics

VDS=200V
ID=9A

V_{GS}, Gate-To-Source Voltage(V)

Q_g, Total Gate Charge(nC)
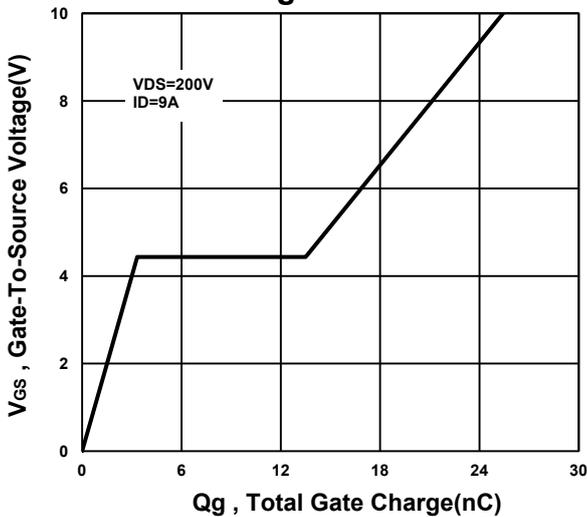
Source-Drain Diode Forward Voltage

150℃
25℃

I_S , Source Current(A)

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

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D-10-1

N-Channel Enhancement Mode
Field Effect Transistor

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Safe Operating Area

Operation in This Area is Limited by RDS(ON)

ID , Drain Current(A)

1ms
10ms
100ms
DC

NOTE :
1.VGS= 10V
2.TC=25˚C
3.RθJC = 1.7 ˚C/W
4.Single Pulse

VDS, Drain-To-Source Voltage(V)
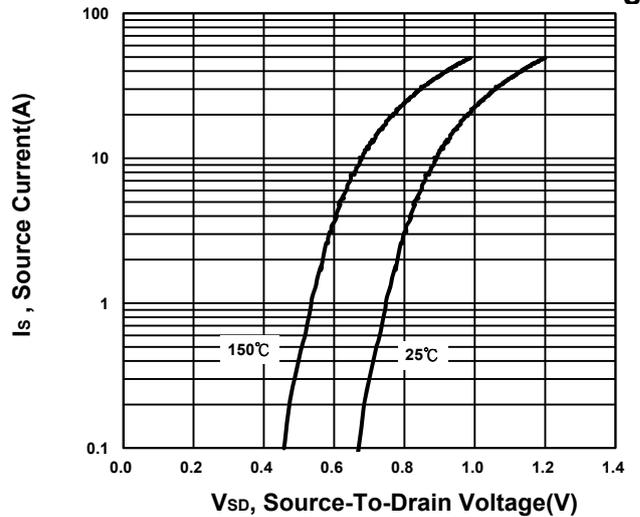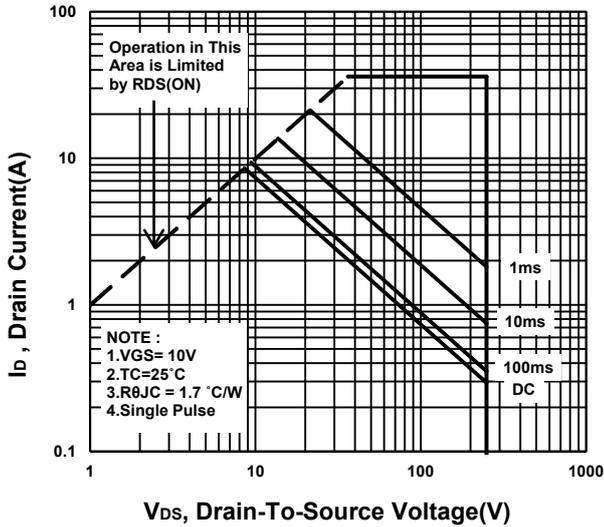
Single Pulse Maximum Power Dissipation

Power(W)

Single Pulse
RθJC = 1.7˚C/W
TC=25˚C

Single Pulse Time(s)
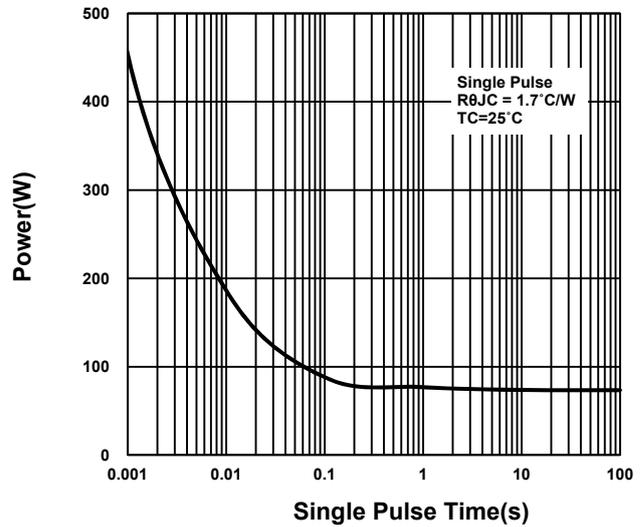
Transient Thermal Response Curve

Duty cycle=0.5
0.2
0.1
0.05
0.02
0.01

r(t) , Normalized Effective Transient Thermal Resistance

single pulse

Notes

P_{DM}

t1
t2

1.Duty cycle, D= t1 / t2
2.RthJC = 1.7 ℃/W
3.TJ-TC = P*RthJC(t)
4.RthJC(t) = r(t)*RthJC

T1 , Square Wave Pulse Duration[sec]

REV 1.0