NIKO-SEM

N-Channel Enhancement Mode Field Effect Transistor

PA910BD
TO-252

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
100V	190mΩ	8.1A
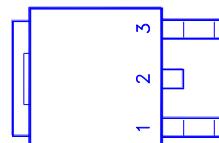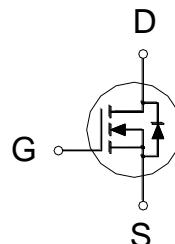
1. GATE
2. DRAIN
3. SOURCE

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	8.1	A
	T_C = 100 °C		5.7	
Pulsed Drain Current[1]		I_{DM}	12	
Avalanche Current		I_{As}	2.8	
Avalanche Energy	L = 1mH	E_{AS}	4	mJ
Power Dissipation	T_C = 25 °C	P_D	30	W
	T_C = 100 °C		15	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		5	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.
[2]Package limitation current is 5.3A.

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	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1.3	1.9	2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V			1	µA
		V_{DS} = 80V, V_{GS} = 0V, T_J = 100 °C			10	

Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 3A		143	190	mΩ
		V_{GS} = 4.5V, I_D = 3A		153	205	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 3A		13		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		306		pF
Output Capacitance	C_{oss}			35		
Reverse Transfer Capacitance	C_{rss}			21		
Gate Resistance	Rg	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		2.2		Ω
Total Gate Charge[2]	Q_g	V_{DS} = 50V, V_{GS} = 10V, I_D = 3A		8.6		nC
Gate-Source Charge[2]	Q_{gs}			1		
Gate-Drain Charge[2]	Q_{gd}			3.6		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 50V, $I_D \cong$ 3A, V_{GS} = 10V, R_{GS} = 6Ω		10		nS
Rise Time[2]	t_r			20		
Turn-Off Delay Time[2]	$t_{d(off)}$			75		
Fall Time[2]	t_f			22		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				7.4	A
Forward Voltage[1]	V_{SD}	I_F = 3A, V_{GS} = 0V			1.4	V
Reverse Recovery Time	t_{rr}	I_F = 3A, dI/dt=100A/µs		19		nS
Reverse Recovery Charge	Q_{rr}			10		nC

[1]Pulse test : Pulse Width $\leq$ 300 μsec, Duty Cycle $\leq$ 2%.
[2]Independent of operating temperature.
[3]Package limitation current is 5.3A.

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Output Characteristics

VGS=10V
VGS=9V
VGS=8V
VGS=7V
VGS=6V
VGS=5V
VGS=4.5V

VGS=3.2V

VGS=3V

I_D, Drain-To-Source Current(A)

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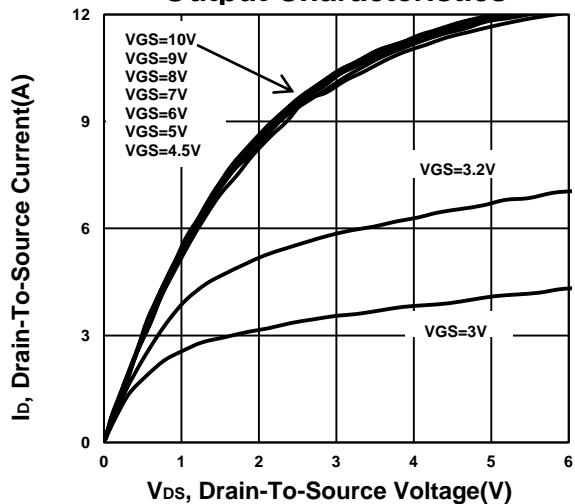
Transfer Characteristics

25℃

125℃

-20℃

I_D, Drain-To-Source Current(A)

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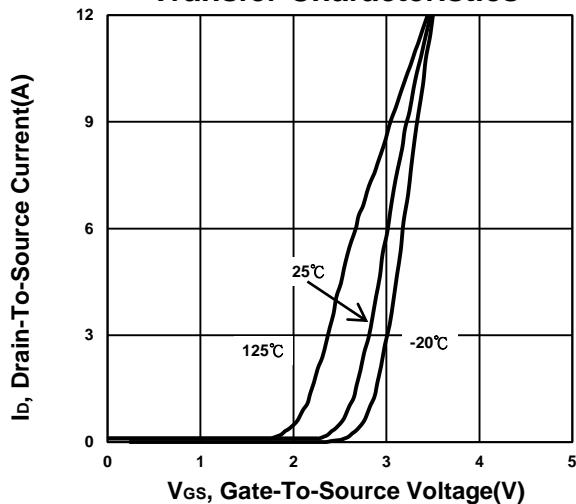
On-Resistance VS Gate-To-Source

ID=3A

$R_{DS(ON)}$ON-Resistance(OHM)

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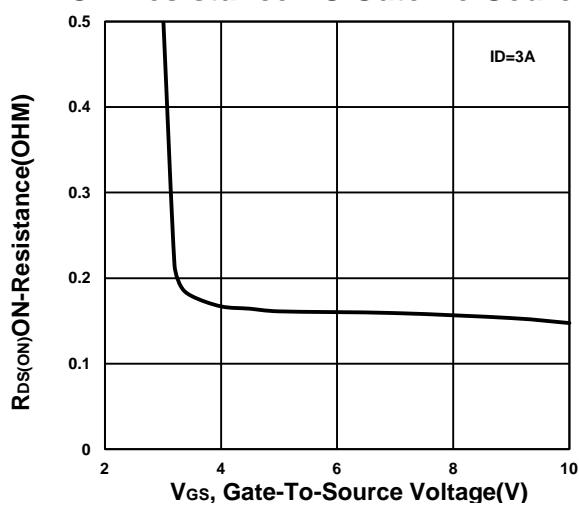
On-Resistance VS Drain Current

VGS=4.5V

VGS=10V

$R_{DS(ON)}$ON-Resistance(OHM)

I_D, Drain-To-Source Current(A)
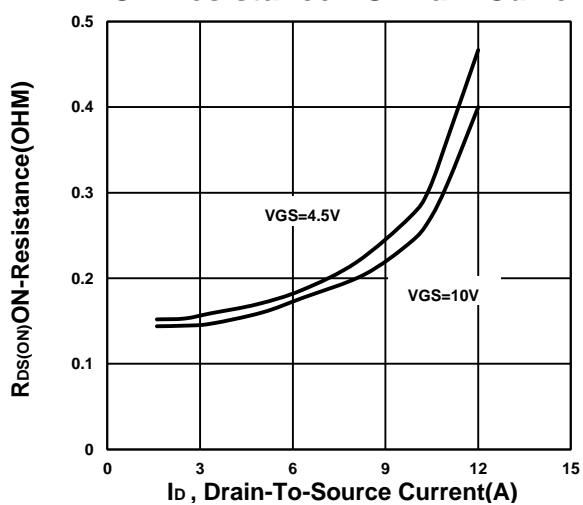
On-Resistance VS Temperature

VGS=10V
ID=3A

Normalized Drain to Source ON-Resistance

T_J, Junction Temperature(℃)
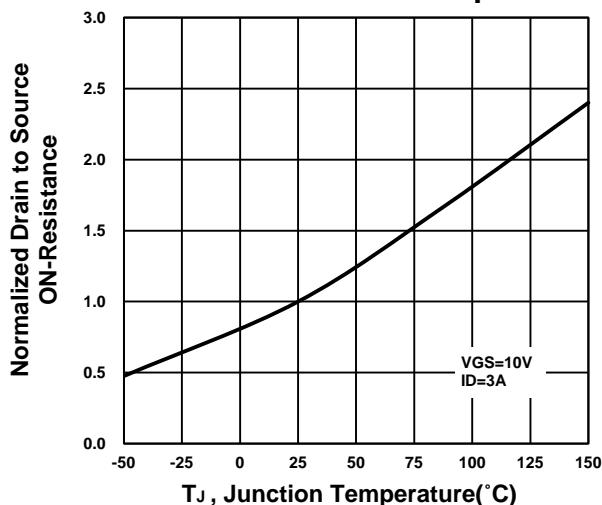
Capacitance Characteristic
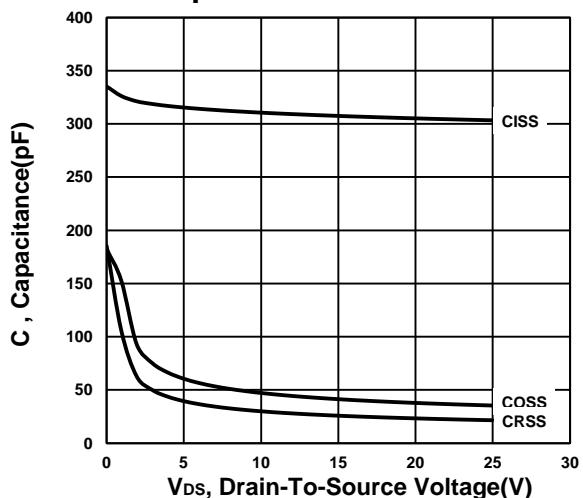
CISS

COSS
CRSS

C , Capacitance(pF)

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

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Gate charge Characteristics

VDS=50V
ID=3A

V$_{GS}$, Gate-To-Source Voltage(V) vs Qg, Total Gate Charge(nC)
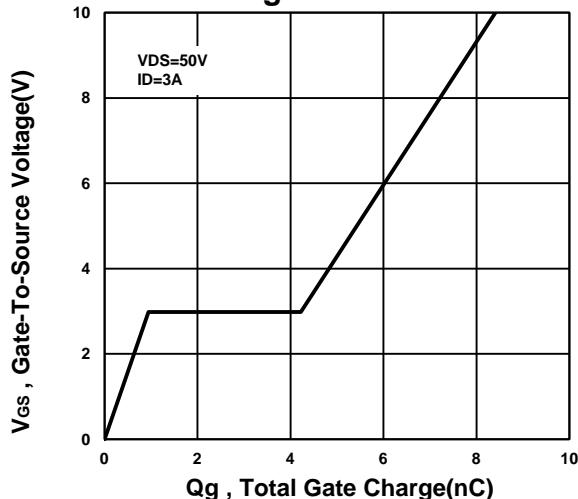
Source-Drain Diode Forward Voltage

150℃   25℃

I$_S$, Source Current(A) vs V$_{SD}$, Source-To-Drain Voltage(V)

Safe Operating Area

Operation in This
Area is Limited by
RDS(ON)

1ms
10ms
100ms
DC

NOTE :
1.VGS= 10V
2.TC=25˚C
3.RθJC = 5 ˚C/W
4.Single Pulse

I$_D$, Drain Current(A) vs V$_{DS}$, Drain-To-Source Voltage(V)
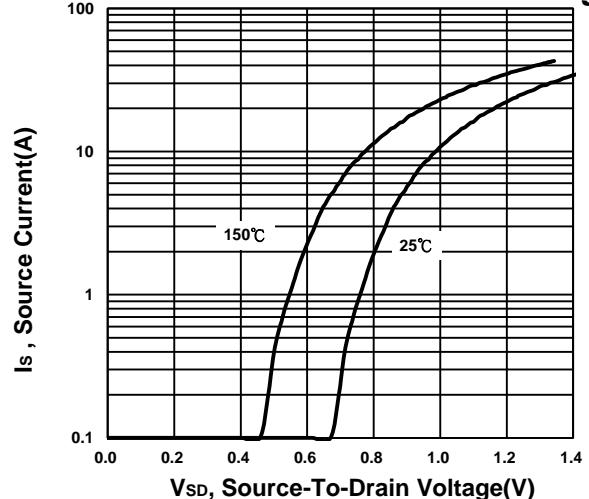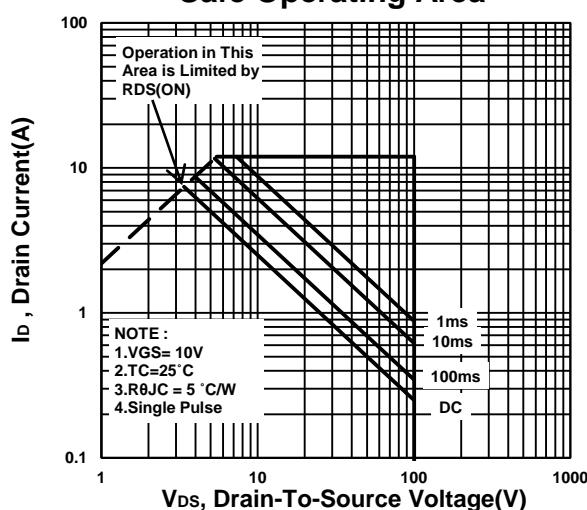
Single Pulse Maximum Power Dissipation

Single Pulse
RθJC = 5˚C/W
TC=25˚C

Power(W) vs Single Pulse Time(s)
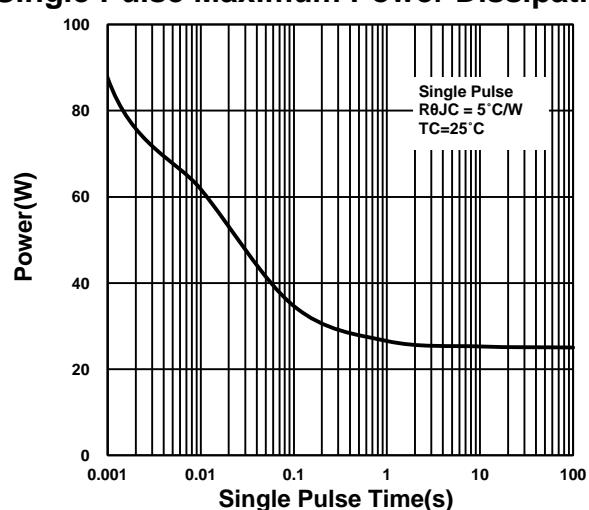
Transient Thermal Response Curve

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 = 5 ℃/W
3.TJ-TC = P*RthJC(t)
4.RthJC(t) = r(t)*RthJC

r(t), Normalized Effective Transient Thermal Resistance vs T$_1$, Square Wave Pulse Duration[sec]
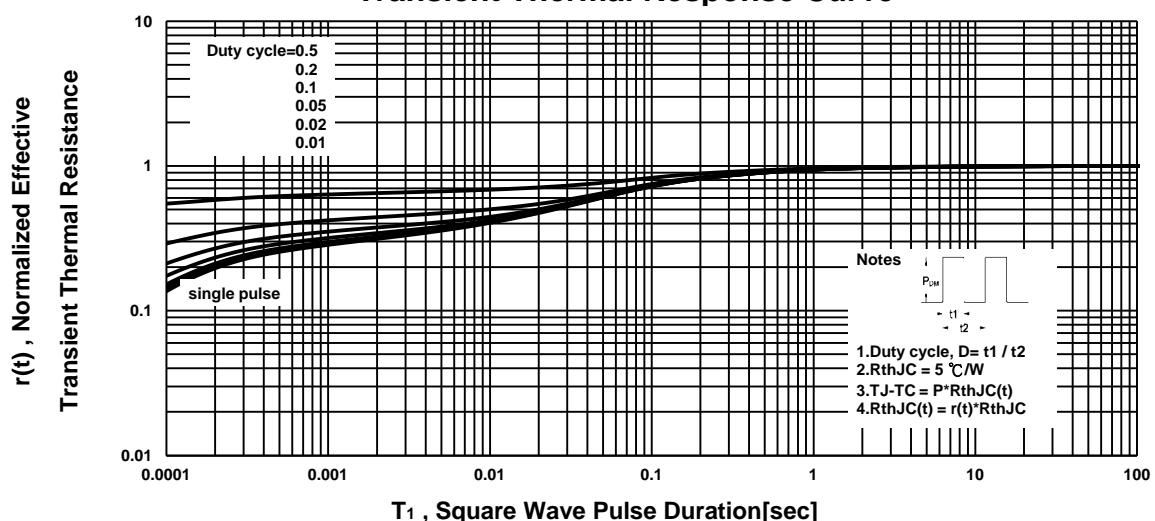
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