NIKO-SEM

Dual N-Channel Enhancement Mode Field Effect Transistor

P5506HVA
SOP-8
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
60V	55mΩ	4A

D1 D1 D2 D2

TOP VIEW

D1 D1 D2 D2

1

S1 G1 S2 G2

G1 G2 S1 S2
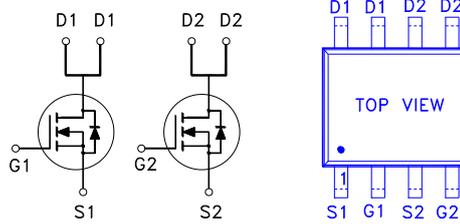
G: GATE
D: DRAIN
S: SOURCE

RoHS Compliant

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A = 25 ° C	I_D	4	A
	T_A = 70 ° C		3.2	
Pulsed Drain Current[1]		I_{DM}	16	
Avalanche Current		I_{AS}	14.5	
Avalanche Energy	L = 0.1mH	E_{AS}	10.6	mJ
Power Dissipation[3]	T_A = 25 ° C	P_D	2	W
	T_A = 70 ° C		1.28	
Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	° C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE		SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	t $\leq$10s	$R_{\theta JA}$		62.5	° C / W
Junction-to-Ambient	Steady-State	$R_{\theta JA}$		110	
Junction-to-Case	Steady-State	$R_{\theta JC}$		60	

[1]Pulse width limited by maximum junction temperature.
[2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C.
[3]The Power dissipation is based on $R_{\theta JA}$ t $\leq$10s value.

## .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	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1.3	1.75	2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA

Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V			1	μA
		V_{DS} = 48V, V_{GS} = 0V, T_J = 55 °C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 3A		50	72	mΩ
		V_{GS} = 10V, I_D = 3A		42	55	
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	308	385	462	pF
Output Capacitance	C_{oss}		44	55	66	
Reverse Transfer Capacitance	C_{rss}		23	39	55	
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	1	2	3	Ω
Total Gate Charge[2]	$Q_{g(VGS=10V)}$	V_{DS} = 30V , I_D = 3A	8.8	11	13.2	nC
	$Q_{g(VGS=4.5V)}$		5	6.3	7.6	
Gate-Source Charge[2]	Q_{gs}		1	1.2	1.4	
Gate-Drain Charge[2]	Q_{gd}		2.3	3.9	5.5	
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = 30V , $I_D \cong$ 3A, V_{GS} = 10V, R_{GEN} = 6Ω		9.9		nS
Rise Time[2]	t_r			16		
Turn-Off Delay Time[2]	$t_{d(off)}$			23		
Fall Time[2]	t_f			12		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current	I_S				0.9	A
Forward Voltage[1]	V_{SD}	I_F = 3A, V_{GS} = 0V			1.2	V
Diode Reverse Recovery Time	t_{rr}	I_F = 3A, dI/dt=100A/μs	8	16	24	nS
Diode Reverse Recovery Charge	Q_{rr}		3	6	9	nC

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

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Output Characteristics

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

VGS=3.3V
VGS=10V
VGS=9V
VGS=8V
VGS=7V
VGS=6V
VGS=5V
VGS=4.5V
VGS=2.9V
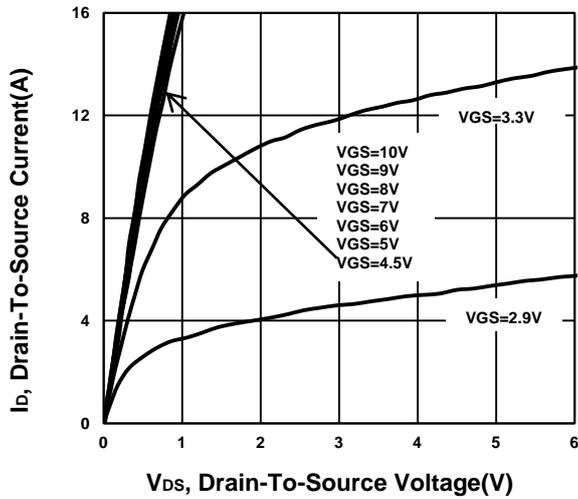
Transfer Characteristics

I$_D$, Drain-To-Source Current(A) vs V$_{GS}$, Gate-To-Source Voltage(V)

25℃
125℃
-20℃
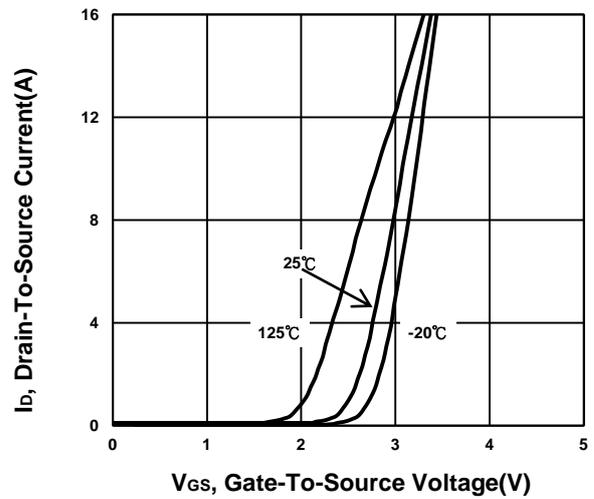
On-Resistance VS Gate-To-Source Voltage

R$_{DS(ON)}$ ON-Resistance(OHM) vs V$_{GS}$, Gate-To-Source Voltage(V)

ID=3A
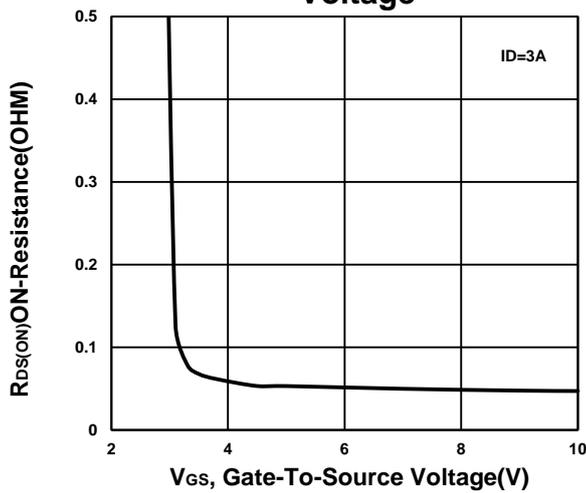
On-Resistance VS Drain Current

R$_{DS(ON)}$ ON-Resistance(OHM) vs I$_D$, Drain-To-Source Current(A)

VGS=4.5V
VGS=10V
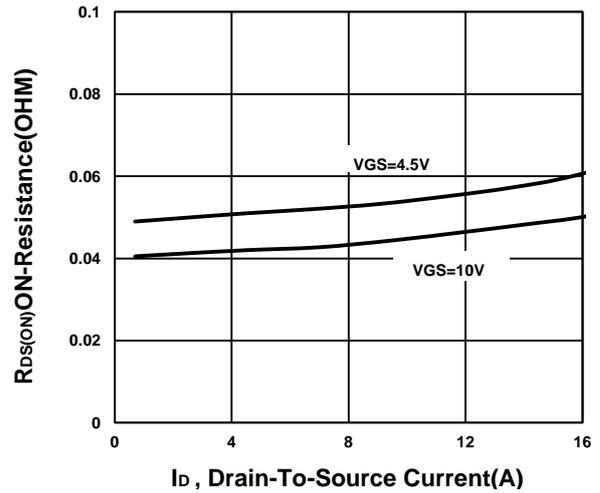
On-Resistance VS Temperature

Normalized Drain to Source ON-Resistance vs T$_J$, Junction Temperature(℃)

VGS=10V
ID=3A
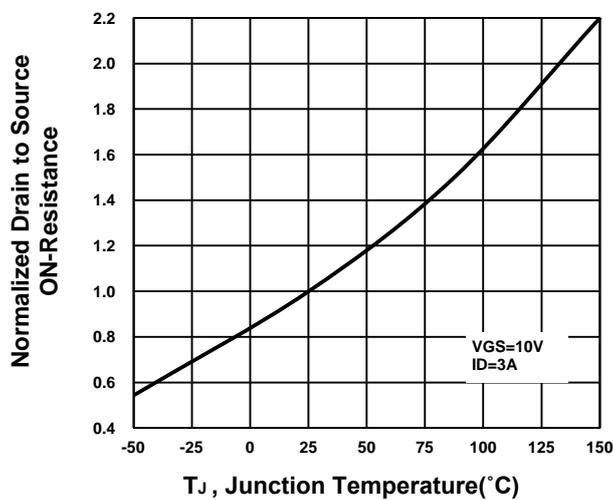
Capacitance Characteristic

C, Capacitance(pF) vs V$_{DS}$, Drain-To-Source Voltage(V)

CISS
COSS
CRSS

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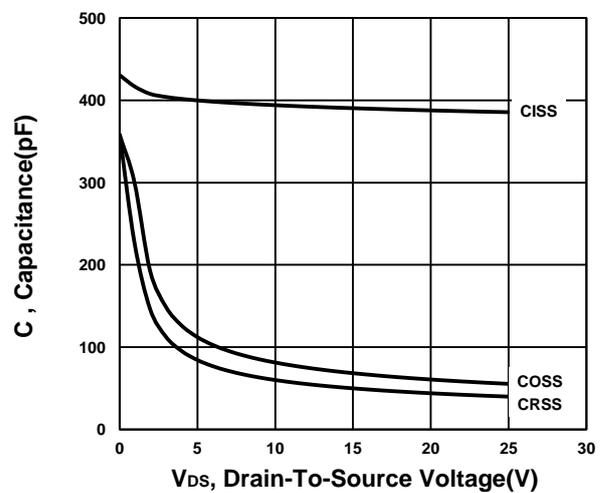
Gate charge Characteristics

VDS=30V
ID=3A

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

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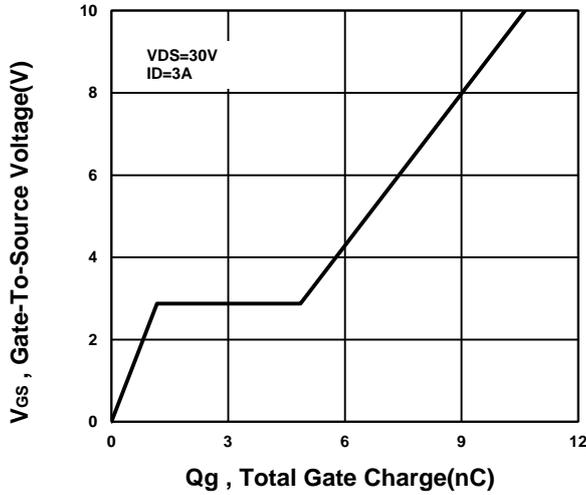
Source-Drain Diode Forward Voltage

150℃ 25℃

I$_S$, Source Current(A)

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.TA=25˚C
3.RθJA = 110˚C/W
4.Single Pulse

I$_D$, Drain Current(A)

V$_{DS}$, Drain-To-Source Voltage(V)
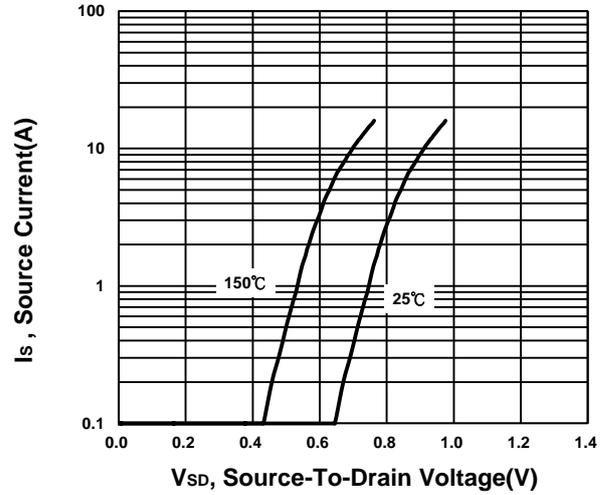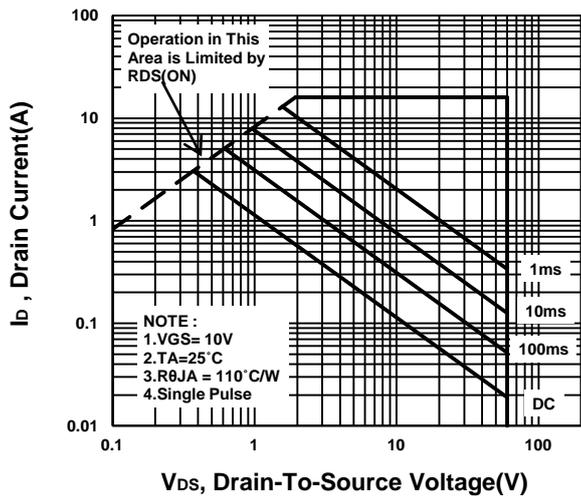
Single Pulse Maximum Power Dissipation

Single Pulse
RθJA = 110℃/W
TA=25˚C

Power(W)

Single Pulse Time(s)
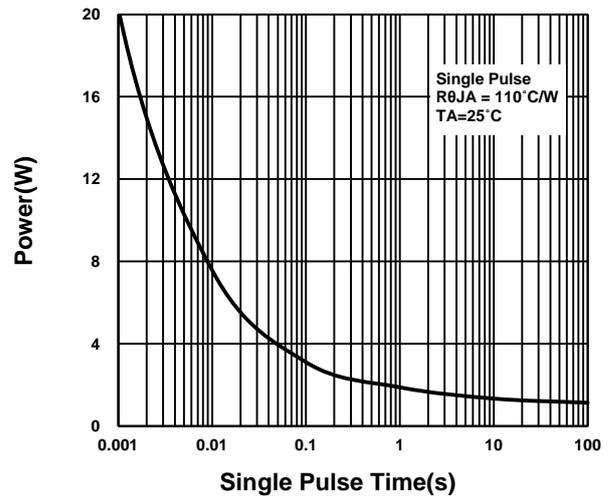
Transient Thermal Response Curve

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.RthJA = 110 ℃/W
3.TJ-TA = P*RthJA(t)
4.RthJA(t) = r(t)*RthJA

r(t) , Normalized Effective Transient Thermal Resistance

T$_1$, Square Wave Pulse Duration(S)