NIKO-SEM

N-Channel Enhancement Mode Field Effect Transistor

PK618BA
PDFN 5x6P
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
30V	5.5mΩ	59A

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G
S

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#1 S S S G
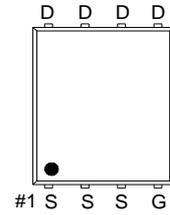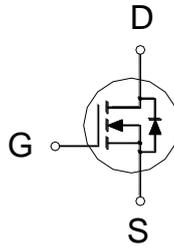
G. GATE
D. DRAIN
S. SOURCE

RoHS Compliant

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[3]	T_C = 25 °C	I_D	59	A
	T_C = 100 °C		37	
Pulsed Drain Current[1]		I_{DM}	150	
Continuous Drain Current	T_A = 25 °C	I_D	15	
	T_A = 70 °C		12	
Avalanche Current		I_{AS}	31	
Avalanche Energy	L = 0.1mH	E_{AS}	48	mJ
Power Dissipation	T_C = 25 °C	P_D	34	W
	T_C = 100 °C		13	
Power Dissipation	T_A = 25 °C	P_D	2.5	W
	T_A = 70 °C		1.6	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient[2]	$R_{\theta JA}$		50	°C / W
Junction-to-Case	$R_{\theta JC}$		3.6	

[1] Pulse width limited by maximum junction temperature.
[2] The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.
[3] Package limitation current is 26A.

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	30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.5	1.75	2.35	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V			1	μA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 55 °C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 15A		4.5	6.8	mΩ
		V_{GS} = 10V, I_D = 20A		3.7	5.5	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 20A		60		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		1330		pF
Output Capacitance	C_{oss}			257		
Reverse Transfer Capacitance	C_{rss}			154		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		1.6		Ω
Total Gate Charge[2]	Q_g (V_{GS} = 10V)	V_{DS} = 15V , V_{GS} = 10V, I_D = 20A		28		nC
	Q_g (V_{GS} = 4.5V)			15		
Gate-Source Charge[2]	Q_{gs}			4		
Gate-Drain Charge[2]	Q_{gd}			7.1		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = 15V , $I_D \cong$ 20A, V_{GS} = 10V, R_{GEN} =6Ω		19		nS
Rise Time[2]	t_r			10		
Turn-Off Delay Time[2]	$t_{d(off)}$			40		
Fall Time[2]	t_f			12		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				59	A
Forward Voltage[1]	V_{SD}	I_F = 20A, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	I_F = 20A, dI_F/dt = 100A / μS		22		nS
Reverse Recovery Charge	Q_{rr}			8		nC

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current is 26A.

Output Characteristics

I_D, Drain-To-Source Current(A) vs V_{DS}, Drain-To-Source Voltage(V)

VGS=3V, VGS=10V, VGS=9V, VGS=8V, VGS=7V, VGS=6V, VGS=5V, VGS=4.5V, VGS=2.5V
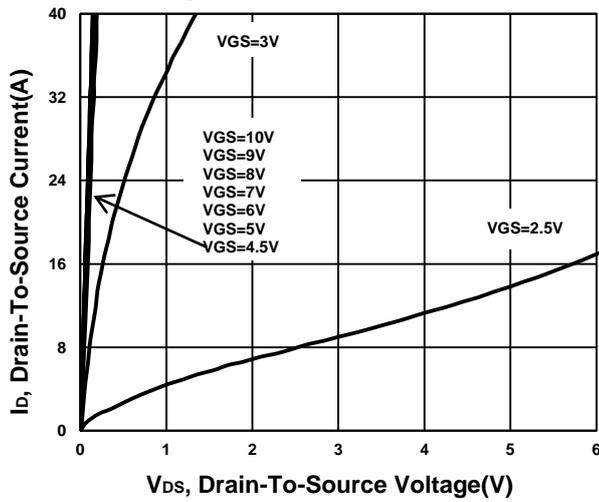
Transfer Characteristics

I_D, Drain-To-Source Current(A) vs V_{GS}, Gate-To-Source Voltage(V)

25℃, 125℃, -20℃
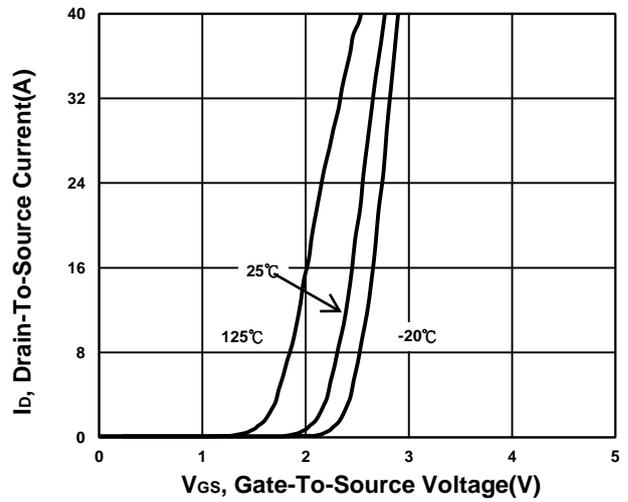
On-Resistance VS Temperature

Normalized Drain to Source ON-Resistance vs T_J, Junction Temperature(℃)

VGS=10V, ID=20A
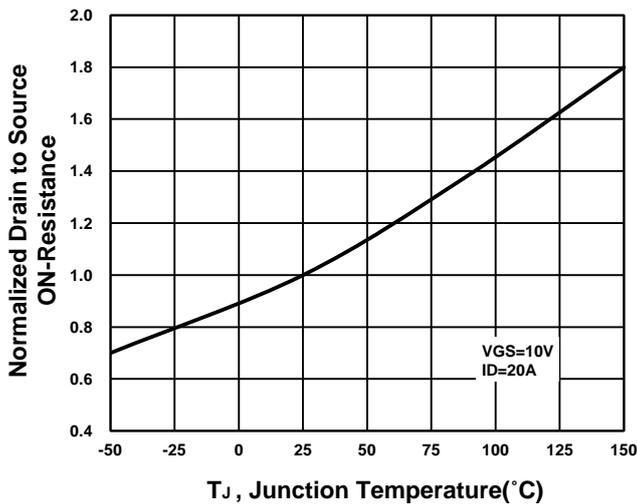
Capacitance Characteristic

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

CISS, COSS, CRSS
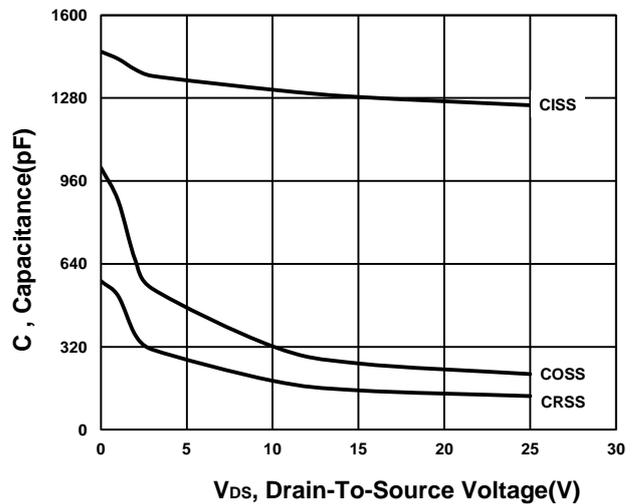
Gate charge Characteristics

V_{GS}, Gate-To-Source Voltage(V) vs Q_g, Total Gate Charge(nC)

VDS=15V, ID=20A
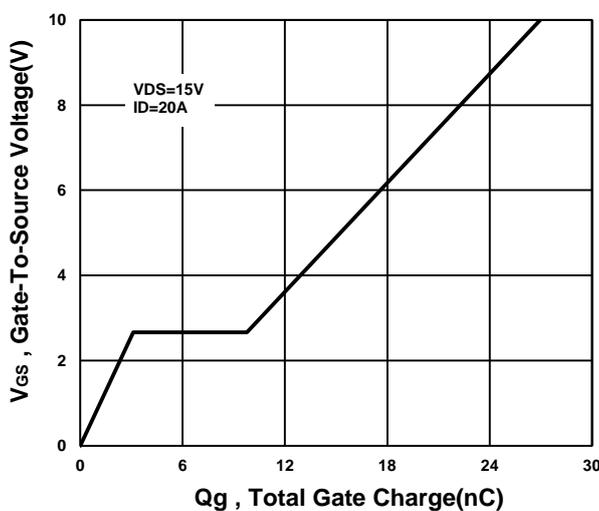
Source-Drain Diode Forward Voltage

I_S, Source Current(A) vs V_{SD}, Source-To-Drain Voltage(V)

150℃, 25℃

Safe Operating Area

I_D , Drain Current(A) vs V_DS, Drain-To-Source Voltage(V)

Operation in This Area is Limited by RDS(ON)

1ms
10ms
100ms
DC

NOTE :
1.VGS= 10V
2.TA=25°C
3.RθJA = 50 °C/W
4.Single Pulse
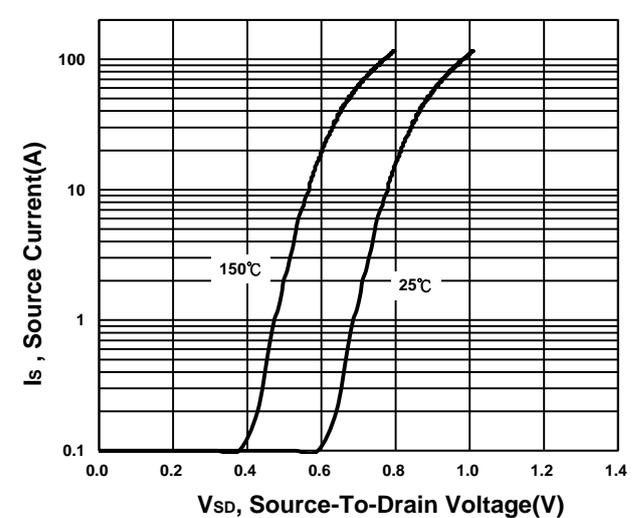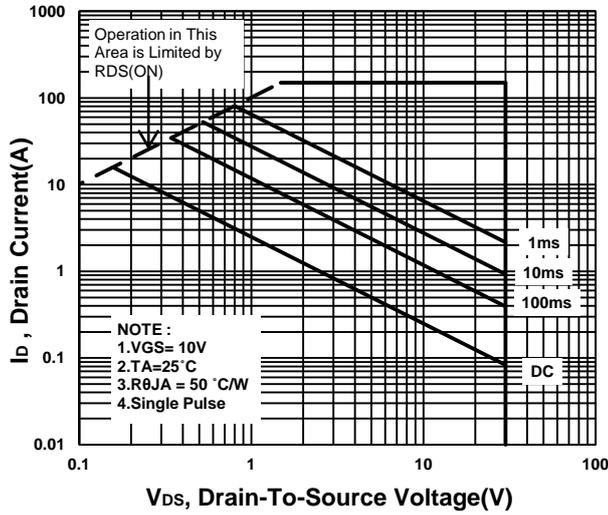
Single Pulse Maximum Power Dissipation

Power(W) vs Single Pulse Time(s)

Single Pulse
RθJA = 50 °C/W
TA=25°C
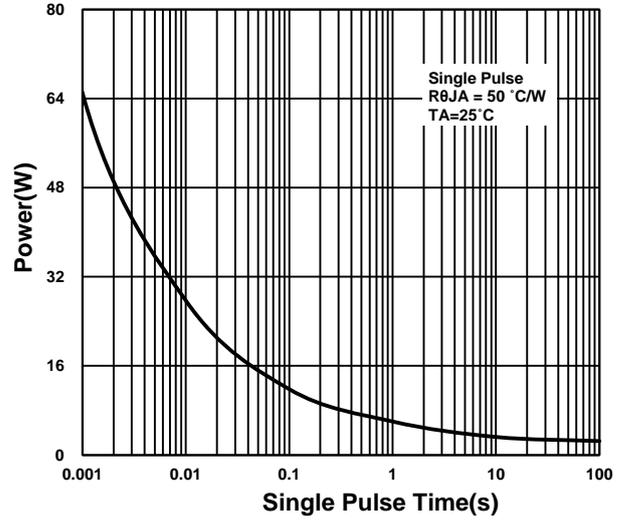
Transient Thermal Response Curve

r(t) , Normalized Effective Transient Thermal Resistance vs T_1 , Square Wave Pulse Duration[sec]

Duty cycle=0.5
0.2
0.1
0.05
0.02
0.01
single pulse

Notes

1.Duty cycle, D= t1 / t2
2.RthJA = 50 ℃/W
3.TJ-TA = P*RthJA(t)
4.RthJA(t) = r(t)*RthJA