NIKO-SEM

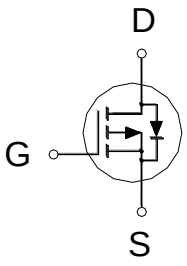
P-Channel Logic Level Enhancement Mode Field Effect Transistor

PK501BA
PDFN 5x6P
Halogen-Free & Lead-Free

RoHS Compliant

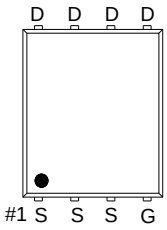
PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-30V	7mΩ	-70A



Features
- Pb−Free, Halogen Free and RoHS compliant.
- Low $R_{DS(on)}$ to Minimize Conduction Losses.
- Ohmic Region Good $R_{DS(on)}$ Ratio.
- Optimized Gate Charge to Minimize Switching Losses.
- ESD Protected up to 2KV.

Applications
- Protection Circuits Applications.
- Logic/Load Switch Circuits Applications.



G : GATE
D : DRAIN
S : SOURCE

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}	±25	V
Continuous Drain Current	T_C = 25 °C	I_D	-70	A
	T_C = 100 °C		-44	
	T_A = 25 °C		-16	
	T_A = 70 °C		-13	
Pulsed Drain Current[1]		I_{DM}	-110	
Avalanche Current		I_{AS}	-38	
Avalanche Energy	L = 0.1mH	E_{AS}	72	mJ
Power Dissipation	T_C = 25 °C	P_D	59	W
	T_C = 100 °C		23	
	T_A = 25 °C		3.2	
	T_A = 70 °C		2	
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]	t ≦10s			39	°C / W
	Steady-State	$R_{\theta JA}$		56	
Junction-to-Case		$R_{\theta JC}$		2.1	

[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. The value in any given application depends on the user's specific board design.

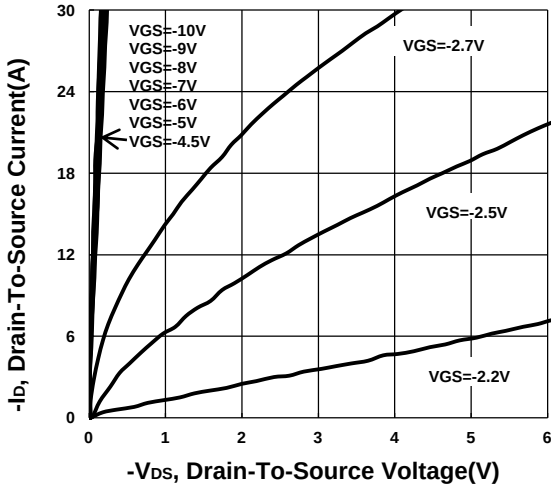
ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS MIN	LIMITS TYP	LIMITS 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	-1.5	-3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±25V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -24V, V_{GS} = 0V			-1	uA
		V_{DS} = -20V, V_{GS} = 0V, T_J = 125 °C			-10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -13A		8.4	12	mΩ
		V_{GS} = -10V, I_D = -13A		5.7	7	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -13A		40		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz		2822		pF
Output Capacitance	C_{oss}			452		
Reverse Transfer Capacitance	C_{rss}			364		
Gate Resistance	Rg	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		4		Ω
Total Gate Charge[2]	$Q_{g(VGS=-10V)}$	V_{DS} =-15V, I_D = -13A		60		nC
	$Q_{g(VGS=-4.5V)}$			30		
Gate-Source Charge[2]	Q_{gs}			6.1		
Gate-Drain Charge[2]	Q_{gd}			14		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = -15V, I_D ≅ -13A, V_{GS} = -10V, R_{GS} = 6Ω		39		nS
Rise Time[2]	t_r			26		
Turn-Off Delay Time[2]	$t_{d(off)}$			161		
Fall Time[2]	t_f			100		

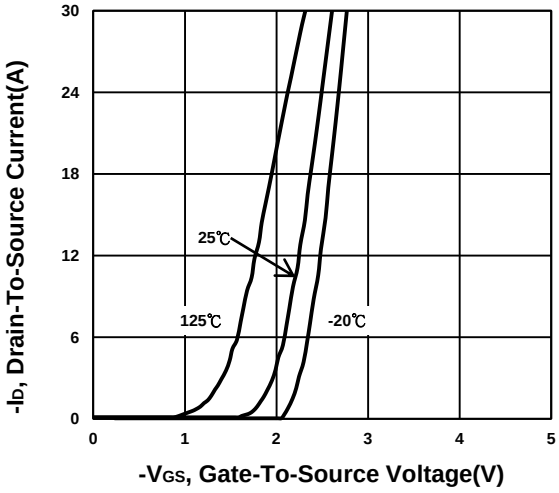
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current	I_S				-49	A
Forward Voltage[1]	V_{SD}	I_F = -13A, V_{GS} = 0V			-1.3	V
Reverse Recovery Time	t_{rr}	I_F = -13A , dI_F/dt = 100 A / µS		23		nS
Reverse Recovery Charge	Q_{rr}			6		nC

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

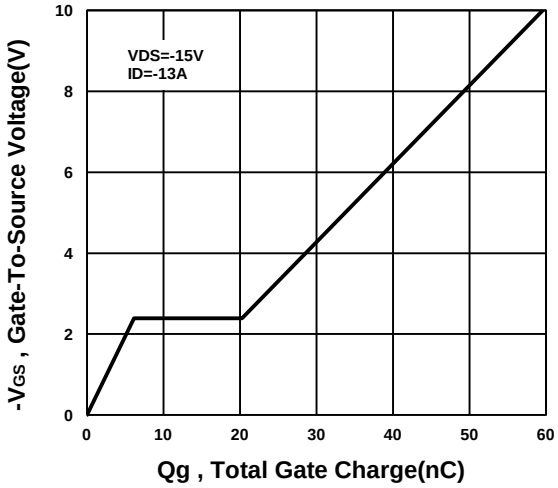
Output Characteristics



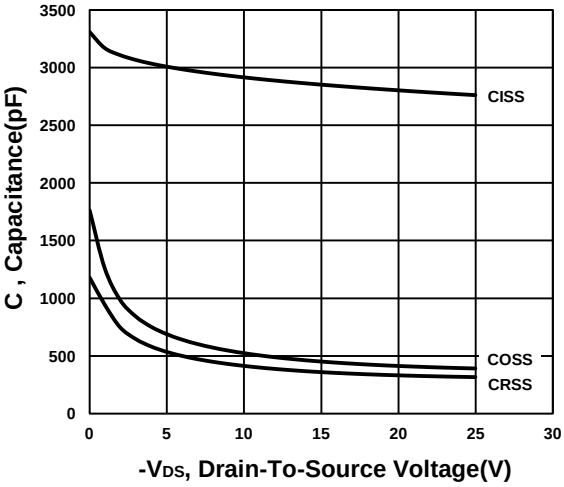
Transfer Characteristics



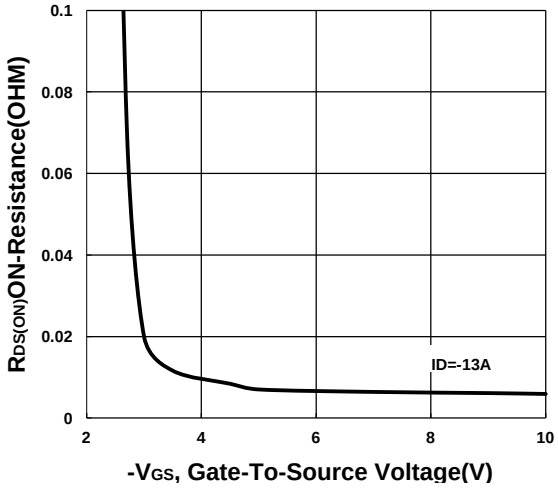
Gate charge Characteristics



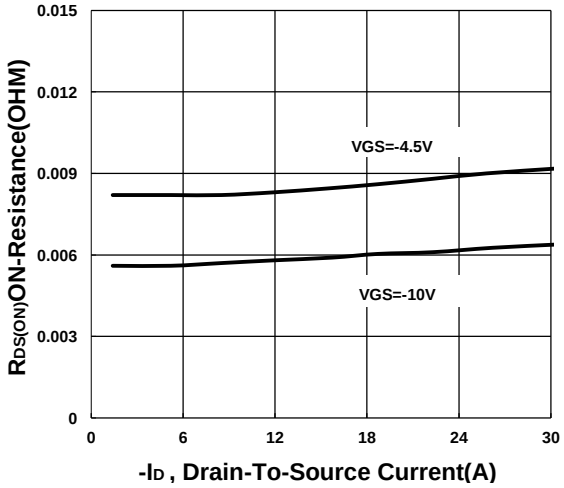
Capacitance Characteristic



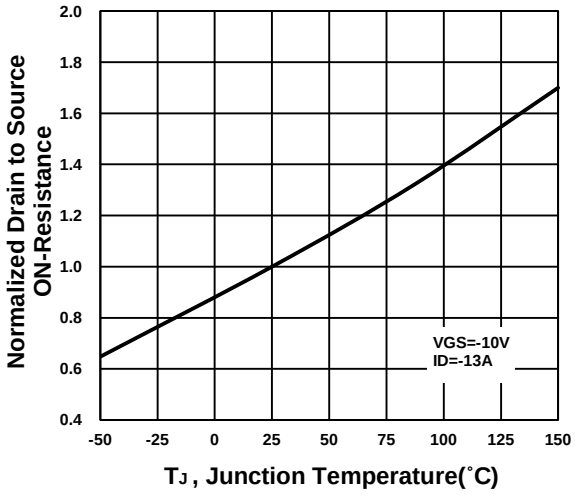
On-Resistance VS Gate-To-Source



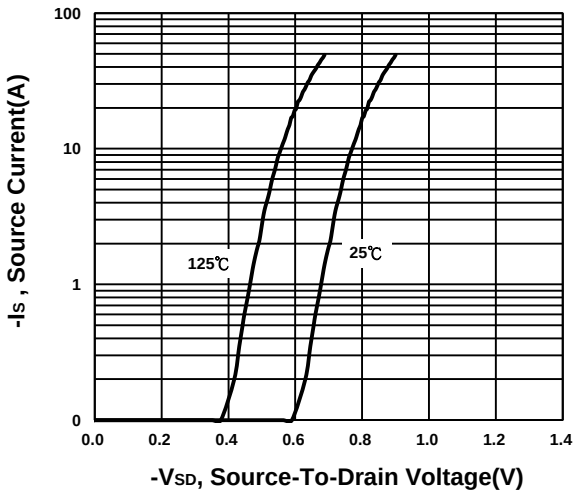
On-Resistance VS Drain Current



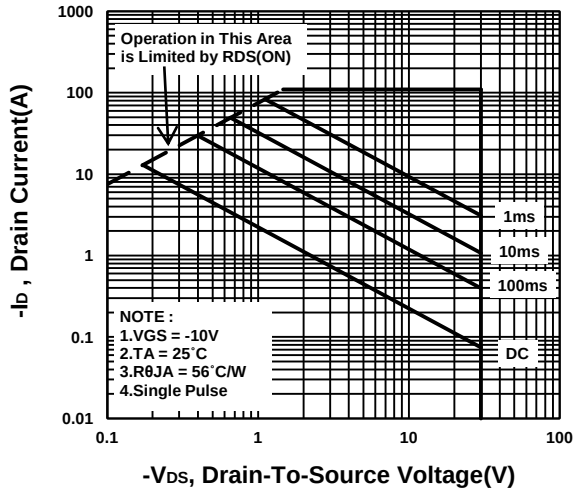
On-Resistance VS Temperature



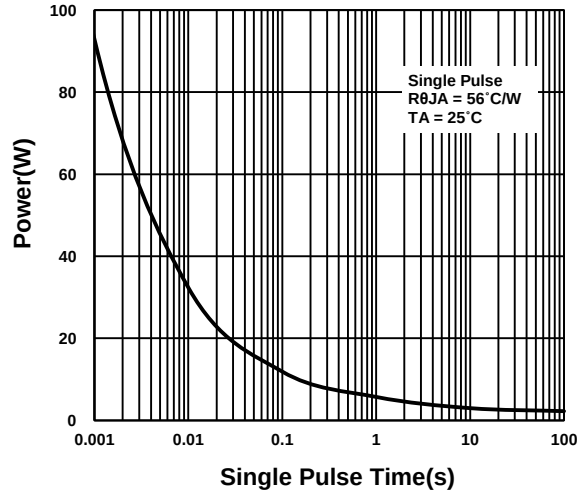
Source-Drain Diode Forward Voltage



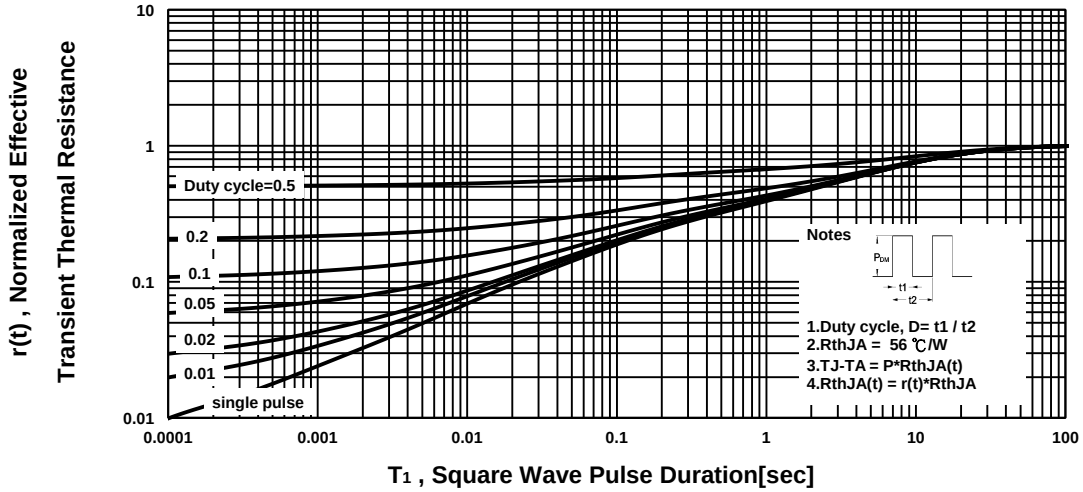
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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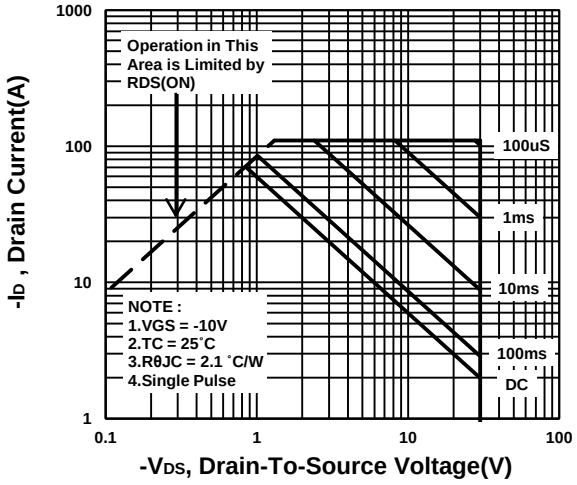
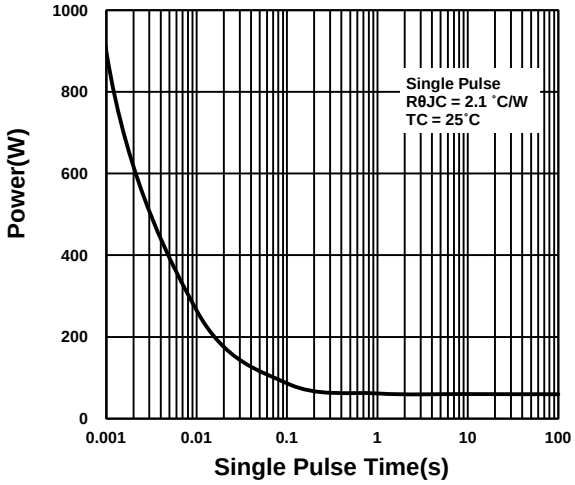


Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve