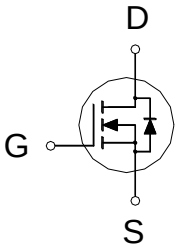
NIKO-SEM

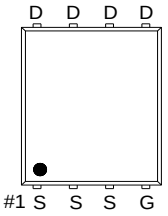
N-Channel Enhancement Mode Field Effect Transistor

P1410BK
PDFN 5x6P
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
100V	14.5mΩ	42A





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}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	42	A
	T_C = 100 °C		27	
Pulsed Drain Current[1]		I_{DM}	110	
Continuous Drain Current	T_A = 25 °C	I_D	12	
	T_A = 70 °C		9.8	
Avalanche Current		I_{AS}	21	
Avalanche Energy	L = 1mH	E_{AS}	224	mJ
Power Dissipation	T_C = 25 °C	P_D	60	W
	T_C = 100 °C		24	
Power Dissipation[3]	T_A = 25 °C	P_D	5	W
	T_A = 70 °C		3.2	
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	$R_{\theta JA}$		25	°C / W
Junction-to-Ambient[2]	Steady-State	$R_{\theta JA}$		50	
Junction-to-Case	Steady-State	$R_{\theta JC}$		2.1	

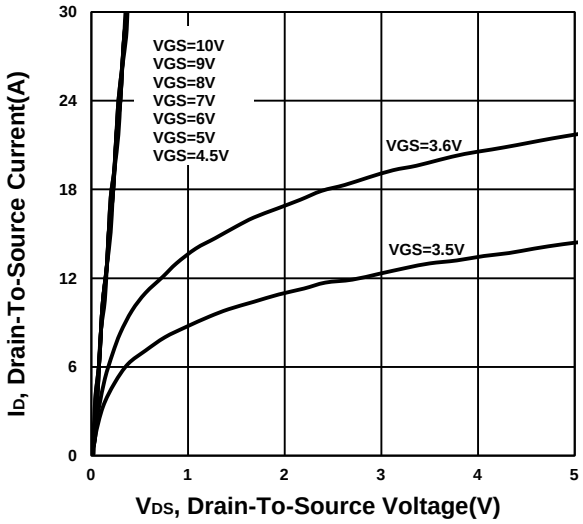
[1]Pulse width limited by maximum junction temperature.
[2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.
[3]The Power dissipation is based on $R_{\theta JA}$ t ≦10s value.

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

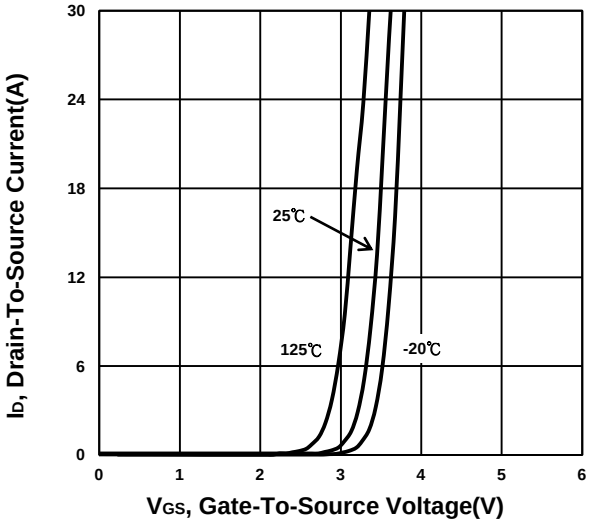
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.3	1.8	2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =80V, V_{GS} = 0V			1	μA
		V_{DS} = 80V, V_{GS} = 0V, T_J = 55 °C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		11	14.5	mΩ
		V_{GS} = 4.5V, I_D = 15A		12	16	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 20A		50		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		4032		pF
Output Capacitance	C_{oss}			276		
Reverse Transfer Capacitance	C_{rss}			224		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		0.67		Ω
Total Gate Charge[2]	Q_g V_{GS} = 10V	V_{DS} = 50V , V_{GS} = 10V, I_D = 20A		106		nC
	Q_g V_{GS} = 4.5V			56		
Gate-Source Charge[2]	Q_{gs}			15		
Gate-Drain Charge[2]	Q_{gd}			39		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = 50V , I_D ≅ 20A, V_{GS} = 10V, R_{GEN} =6Ω		25		nS
Rise Time[2]	t_r			30		
Turn-Off Delay Time[2]	$t_{d(off)}$			132		
Fall Time[2]	t_f			51		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current	I_S				50	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		40		nS
Reverse Recovery Charge	Q_{rr}			53		nC

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

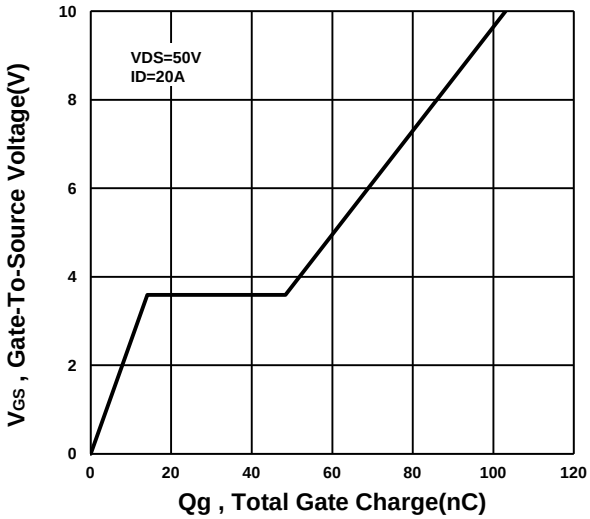
Output Characteristics



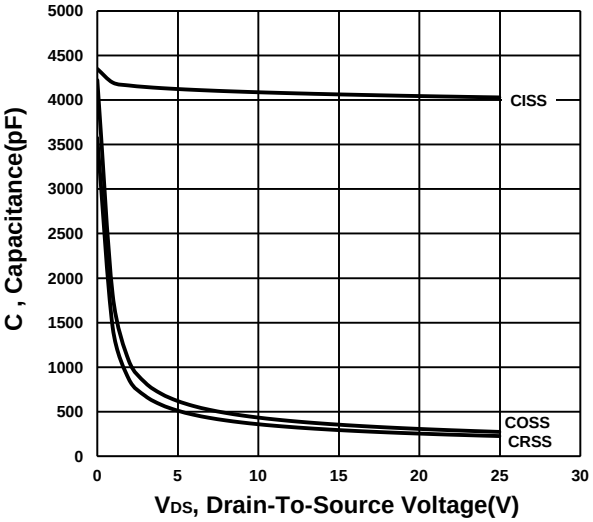
Transfer Characteristics



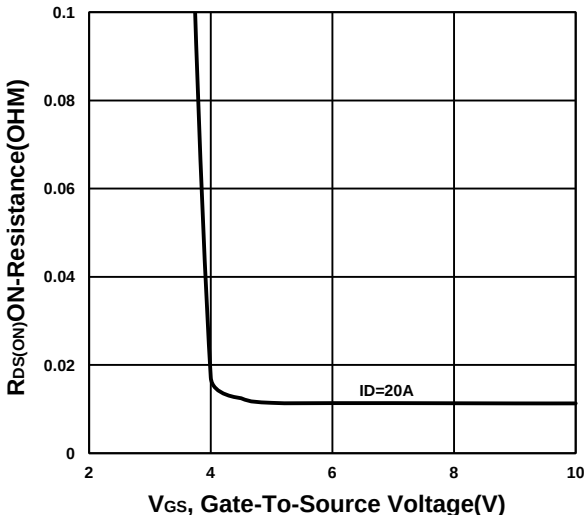
Gate charge Characteristics



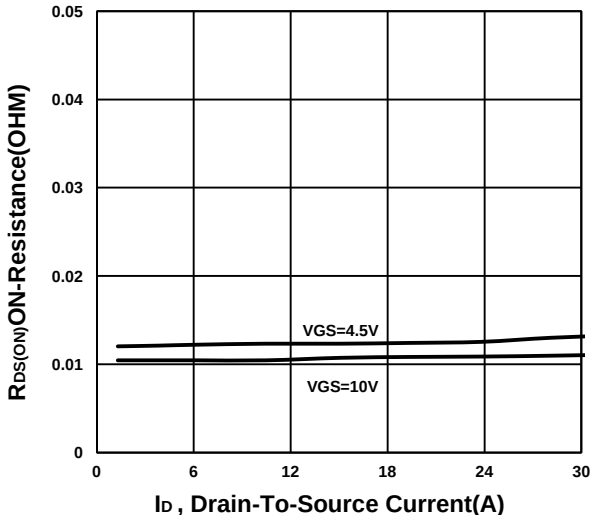
Capacitance Characteristic



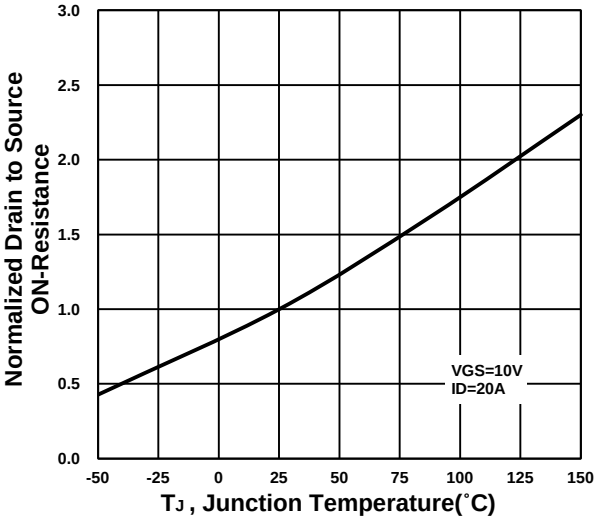
On-Resistance VS Gate-To-Source



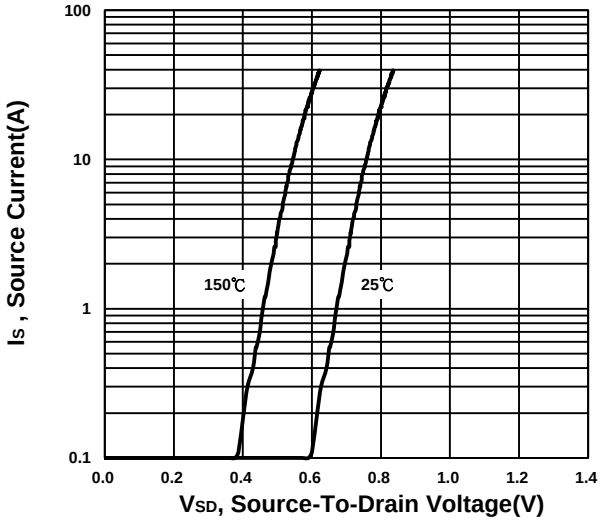
On-Resistance VS Drain Current



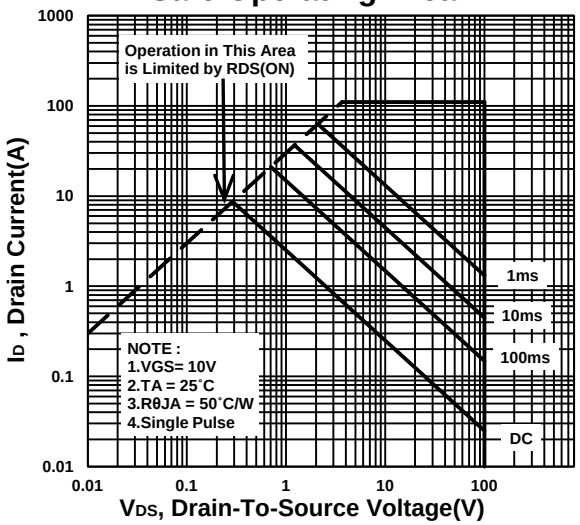
On-Resistance VS Temperature



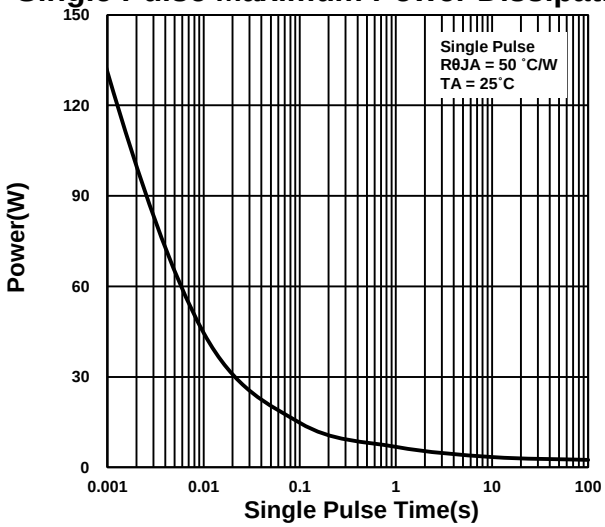
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve