NIKO-SEM

N-Channel Enhancement Mode Field Effect Transistor

PV510BA
SOP-8
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
30V	4mΩ	22A

D

G

S

TOP VIEW

D D D D

S S S G
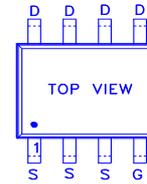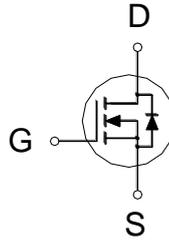
G: GATE
D: DRAIN
S: SOURCE

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	T_A = 25 °C	I_D	22	A
	T_A = 70 °C		17	
Pulsed Drain Current[1]		I_{DM}	100	
Avalanche Current		I_{AS}	37	
Avalanche Energy	L = 0.1mH	E_{AS}	68	mJ
Power Dissipation	T_A = 25 °C	P_D	2.7	W
	T_A = 70 °C		1.7	
Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	$R_{\theta JA}$		45	°C / W
Junction-to-Case	$R_{\theta JC}$		25	

[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.

.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	1.5	3	
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 = 16A		3.7	5	mΩ
		V_{GS} =10V, I_D = 20A		3.2	4	

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		2210		pF
Output Capacitance	C_{oss}			390		
Reverse Transfer Capacitance	C_{rss}			234		
Gate Resistance	R_g	$V_{GS} = 0V$, $V_{DS} = 0V$, f = 1MHz		1.4		Ω
Total Gate Charge[2]	$Q_{g(VGS=10V)}$	$V_{DS} = 15V$, $I_D = 20A$		44		nC
	$Q_{g(VGS=4.5V)}$			23		
Gate-Source Charge[2]	Q_{gs}			5.7		
Gate-Drain Charge[2]	Q_{gd}			13		
Turn-On Delay Time[2]	$t_{d(on)}$	$V_{DS} = 15V$, $I_D \cong 20A$, $V_{GS} = 20V$, $R_{GEN} = 6\Omega$		25		nS
Rise Time[2]	t_r			12		
Turn-Off Delay Time[2]	$t_{d(off)}$			56		
Fall Time[2]	t_f			10		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J = 25$ °C)						
Continuous Current	I_S				22	A
Forward Voltage[1]	V_{SD}	$I_F = 20A$, $V_{GS} = 0V$			1	V
Diode Reverse Recovery Time	t_{rr}	$I_F = 20A$, dI/dt=100A/µs		27		nS
Diode Reverse Recovery Charge	Q_{rr}			15		nC

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

## Output Characteristics
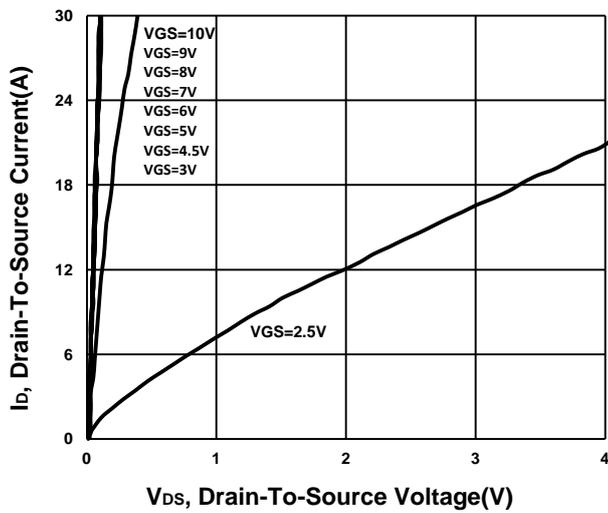
Transfer Characteristics
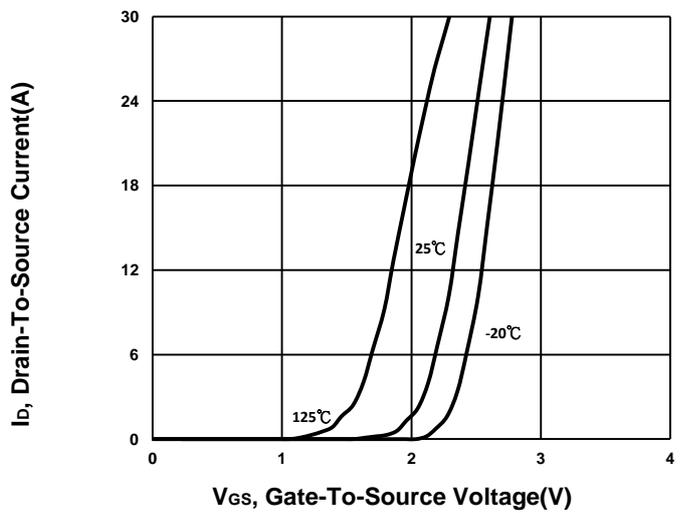
On-Resistance VS Temperature
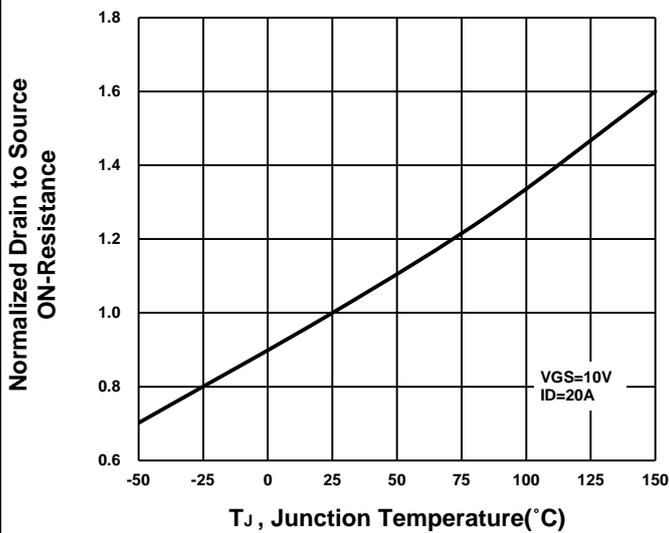
Capacitance Characteristic
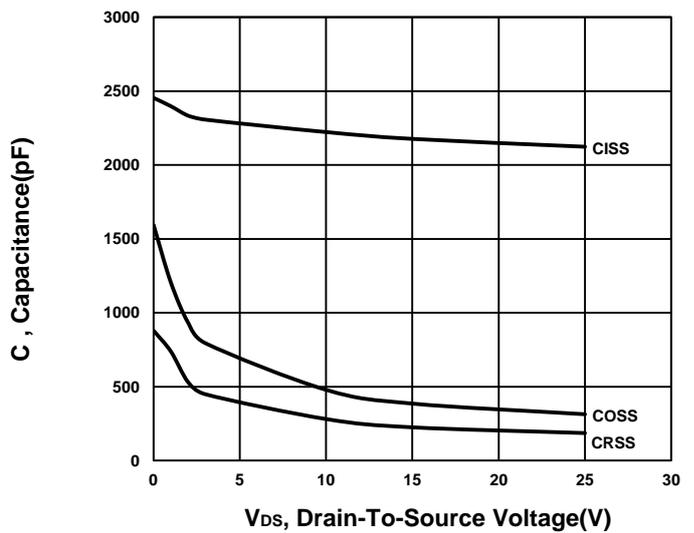
Gate charge Characteristics
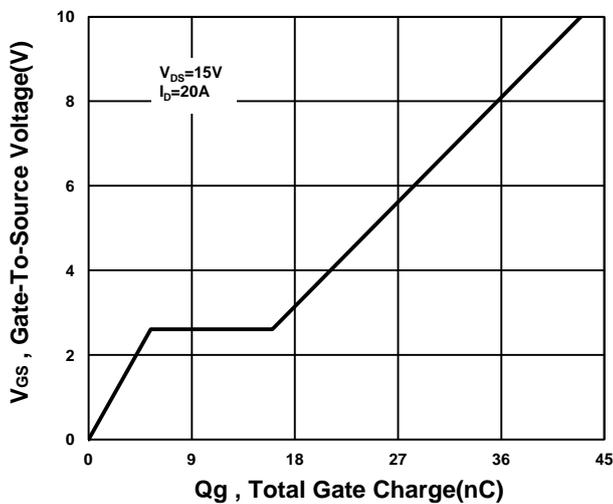
Source-Drain Diode Forward Voltage

NIKO-SEM

N-Channel Enhancement Mode
Field Effect Transistor

PV510BA
SOP-8
Halogen-Free & Lead-Free

Safe Operating Area

Operation in This Area is Limited by RDS(ON)

I_D , Drain Current(A)

1ms
10ms
100ms
DC

NOTE :
1.VGS= 10V
2.TA=25°C
3.RθJA = 45°C/W
4.Single Pulse

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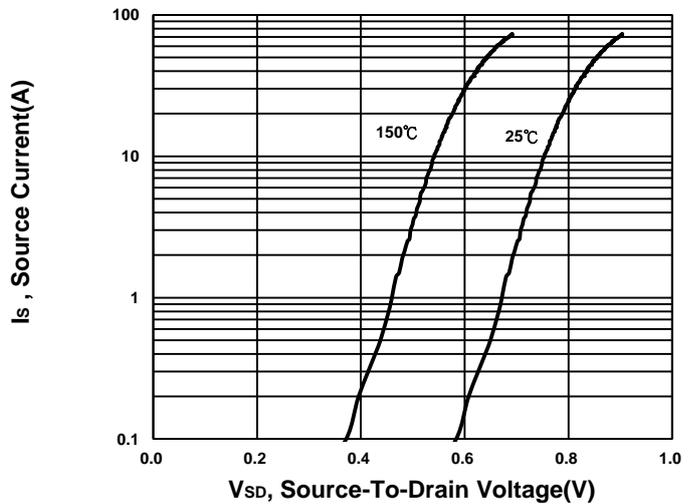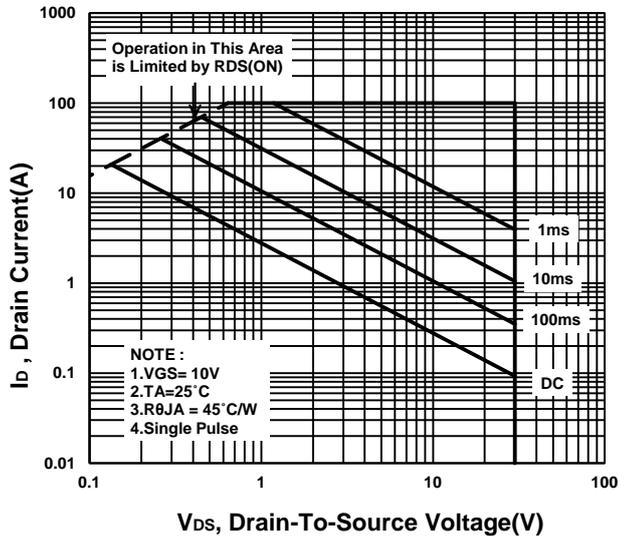
Single Pulse Maximum Power Dissipation

Power(W)

Single Pulse
RθJA = 45°C/W
TA=25°C

Single Pulse Time(s)
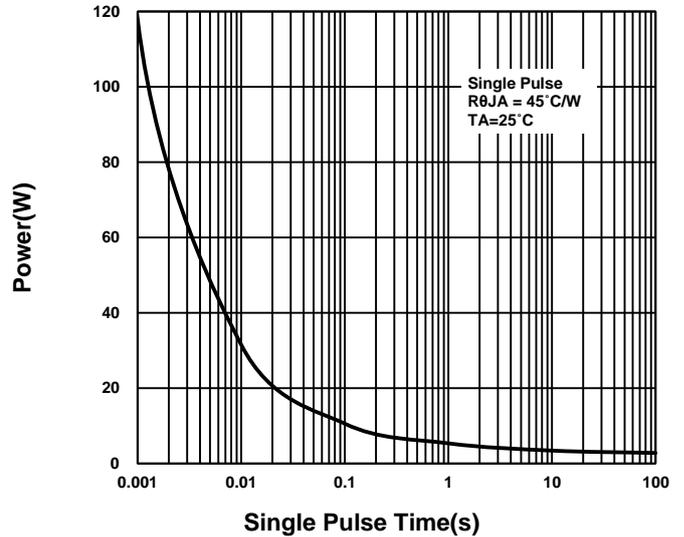
Transient Thermal Response Curve

$r(t)$, Normalized Effective Transient Thermal Resistance

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 = 45 °C/W
3.TJ-TA = P*RthJA(t)
4.RthJA(t) = r(t)*RthJA

T_1 , Square Wave Pulse Duration[sec]