NIKO-SEM

N-Channel Enhancement Mode Field Effect Transistor

PE552BA
PDFN 3x3P
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D{}^3$
20V	5mΩ	47A

D

G

S

D D D D

#1 S S S G

RoHS Compliant
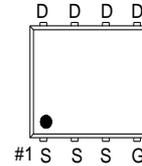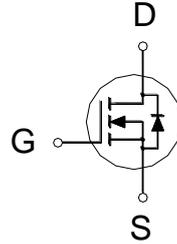
G : GATE
D : DRAIN
S : SOURCE

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current[3]	T_C = 25 °C	I_D	47	A
	T_C = 100 °C		30	
	T_A = 25 °C		17	
	T_A = 70 °C		14	
Pulsed Drain Current[1]		I_{DM}	70	
Avalanche Current		I_{AS}	38.6	
Avalanche Energy	L = 0.1mH	E_{AS}	74.6	mJ
Power Dissipation	T_C = 25 °C	P_D	19	W
	T_C = 100 °C		7	
	T_A = 25 °C		2.6	
	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]	t $\leqq$ 10s	$R_{\theta JA}$		48	°C / W
Junction-to-Ambient[2]	Steady-State	$R_{\theta JA}$		60	
Junction-to-Case		$R_{\theta JC}$		6.5	

[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]Package limitation current is 22A

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	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	0.4	0.7	0.9	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±8V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V			1	μA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 55 °C			5	μA
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 5A		4.1	5	mΩ
		V_{GS} = 2.5V, I_D = 5A		4.7	5.7	mΩ
		V_{GS} = 1.8V, I_D = 5A		6	8.2	mΩ
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 5A		70		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 10V, f = 1MHz		4407		pF
Output Capacitance	C_{oss}			469		pF
Reverse Transfer Capacitance	C_{rss}			381		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		0.7		Ω
Total Gate Charge[2]	Q_g	V_{GS}=4.5V , V_{DS} = 10V , I_D = 5A		49		nC
Gate-Source Charge[2]	Q_{gs}			6		nC
Gate-Drain Charge[2]	Q_{gd}			13		nC
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 4.5V $I_D \cong$ 5A, V_{GEN} = 10V, R_G =6Ω		20		nS
Rise Time[2]	t_r			25		nS
Turn-Off Delay Time[2]	$t_{d(off)}$			180		nS
Fall Time[2]	t_f			85		nS
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				14	A
Forward Voltage[1]	V_{SD}	I_F = 5A, V_{GS} = 0V			1	V
Reverse Recovery Time	t_{rr}	I_F = 5A , dI_F/dt = 100A / μS		24		nS
Reverse Recovery Charge	Q_{rr}			12		nC

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

Output Characteristics
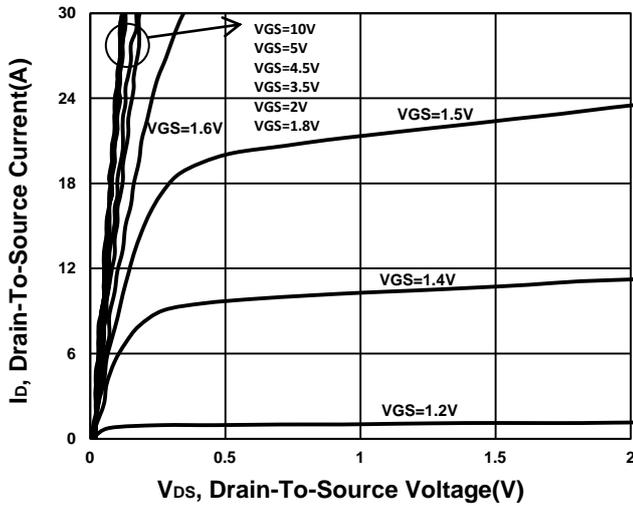

Transfer Characteristics
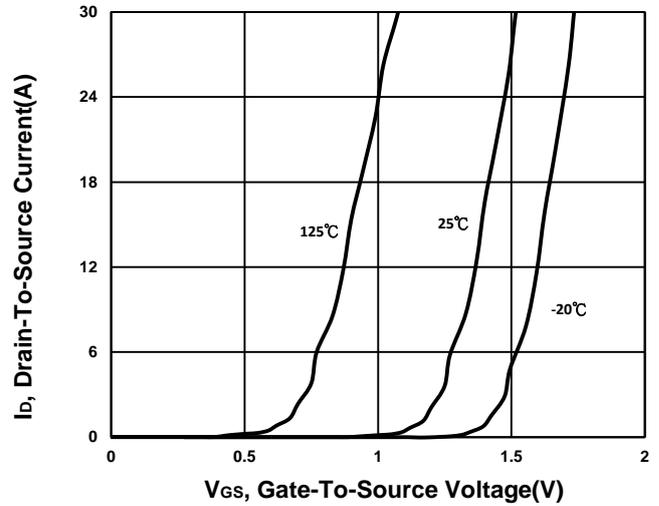
On-Resistance VS Temperature
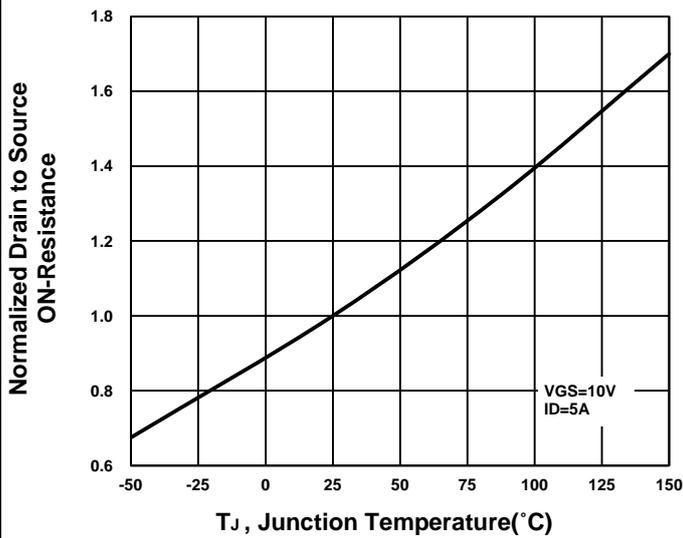
Capacitance Characteristic
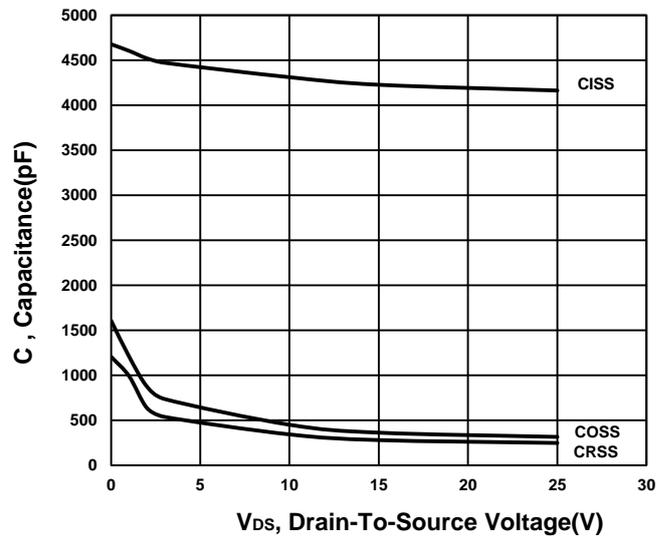
Gate charge Characteristics
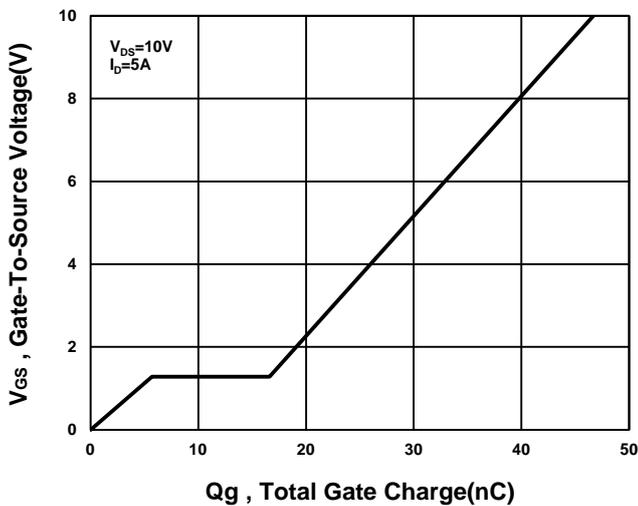
Source-Drain Diode Forward Voltage

Safe Operating Area

Operation in This Area is Limited by RDS(ON)

I_D , Drain Current(A)

1ms
10ms
100ms
DC

NOTE :
1.VGS= 4.5V
2.TA=25˚C
3.RθJA = 60˚C/W
4.Single Pulse

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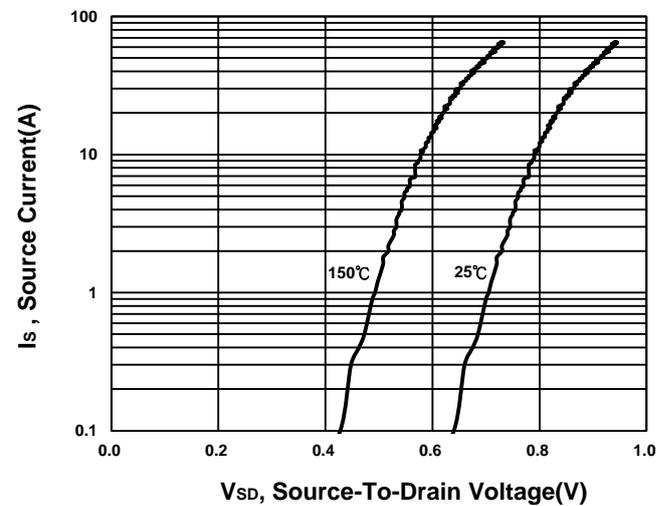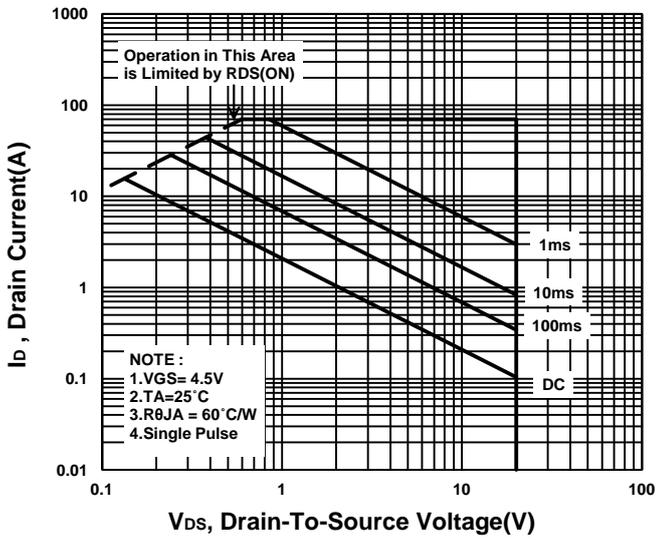
Single Pulse Maximum Power Dissipation

Single Pulse
RθJA = 60˚C/W
TA=25˚C

Power(W)

Single Pulse Time(s)
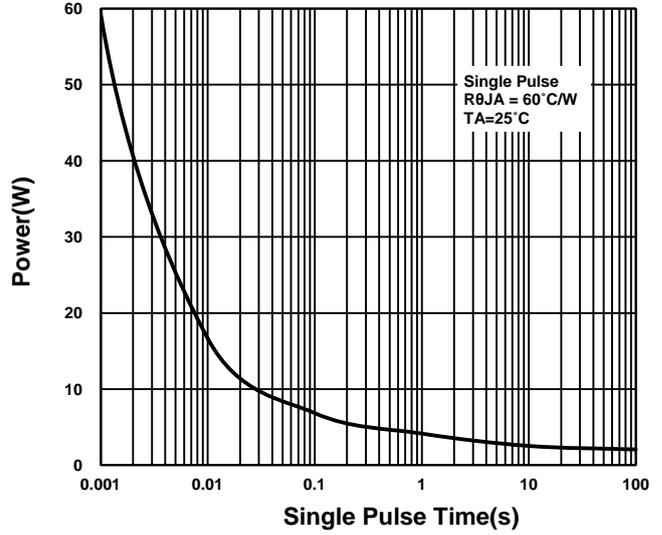
Transient Thermal Response Curve

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 = 60 ℃/W
3.TJ-TA = P*RthJA(t)
4.RthJA(t) = r(t)*RthJA

T_1 , Square Wave Pulse Duration[sec]