NIKO-SEM

P-Channel Enhancement Mode Field Effect Transistor

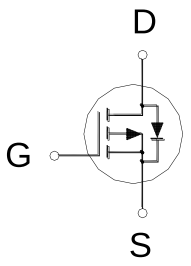
PD5B3BA

TO-252

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-40V	8mΩ	-70A

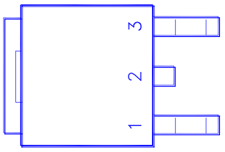


Features

- 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.

Applications

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



1. GATE
2. DRAIN
3. SOURCE

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current	T_C = 25 °C	I_D	-70	A
	T_C = 100 °C		-44	
Pulsed Drain Current[1]		I_{DM}	-200	
Avalanche Current		I_{AS}	-48	
Avalanche Energy	L = 0.1mH	E_{AS}	115	mJ
Power Dissipation	T_C = 25 °C	P_D	71	W
	T_C = 100 °C		45	
Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		1.75	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	

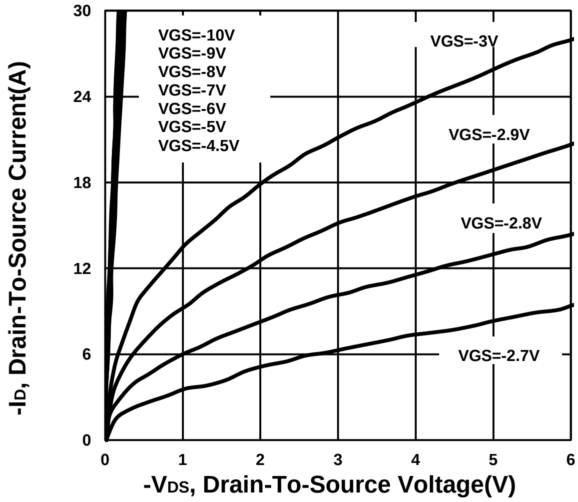
[1] Pulse width limited by maximum junction temperature.

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

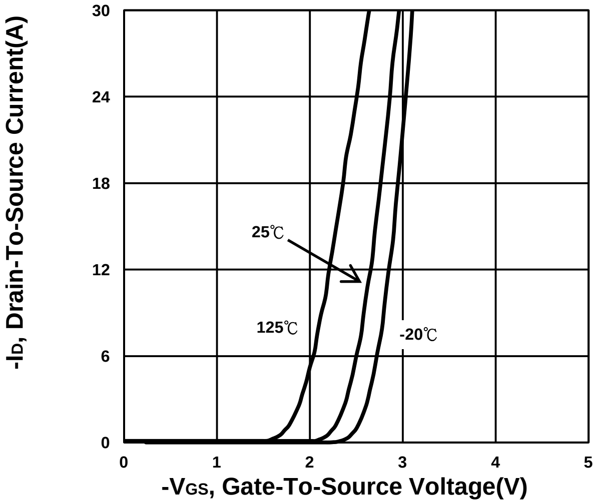
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250µA	-40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250µA	-1.3	-1.75	-2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±25V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -32V, V_{GS} = 0V			-1	µA
		V_{DS} = -30V, V_{GS} = 0V, T_J = 125 °C			-10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -15A		8.5	14	mΩ
		V_{GS} = -10V, I_D = -20A		6.1	8	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -20A		57.5		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -20V, f = 1MHz		4173		pF
Output Capacitance	C_{oss}			507		
Reverse Transfer Capacitance	C_{rss}			401		
Gate Resistance	R_g	V_{GS} =0V, V_{DS} = 0V, f = 1MHz		3.3		Ω
Total Gate Charge[2]	Q_g (V_{GS}=-10V)	V_{DS} = -20V , V_{GS} = -10V, I_D = -20A		87		nC
	Q_g(V_{GS}=-4.5V)			45		
Gate-Source Charge[2]	Q_{gs}			12		
Gate-Drain Charge[2]	Q_{gd}			20		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = -20V , I_D ≅ -20A, V_{GS} = -10V, R_{GEN} =6Ω		22		nS
Rise Time[2]	t_r			100		
Turn-Off Delay Time[2]	$t_{d(off)}$			157		
Fall Time[2]	t_f			159		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current	I_S				-54	A
Forward Voltage[1]	V_{SD}	I_F = -20A, V_{GS} = 0V			-1.3	V
Reverse Recovery Time	t_{rr}	I_F = -20A, dI_F/dt = 100A / µS		30		nS
Reverse Recovery Charge	Q_{rr}			18		nC

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

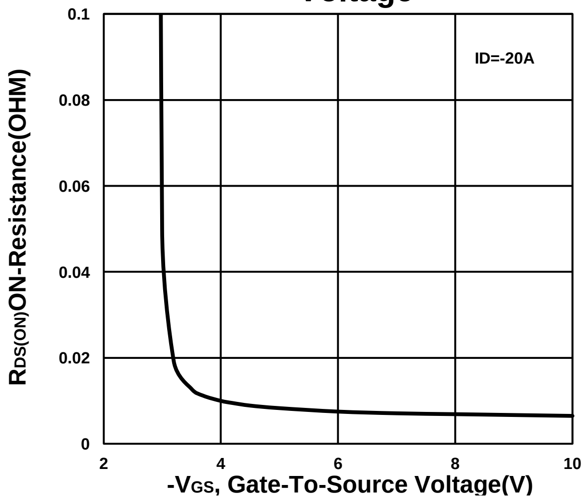
Output Characteristics



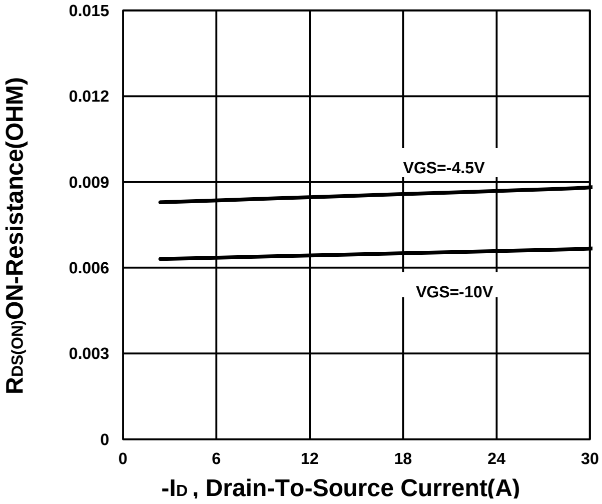
Transfer Characteristics



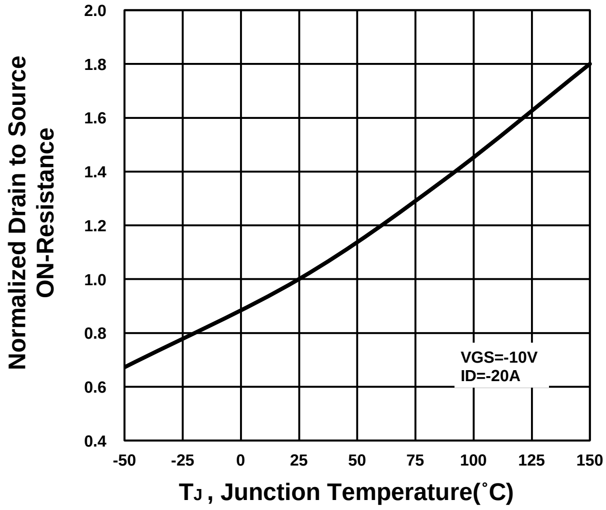
On-Resistance VS Gate-To-Source Voltage



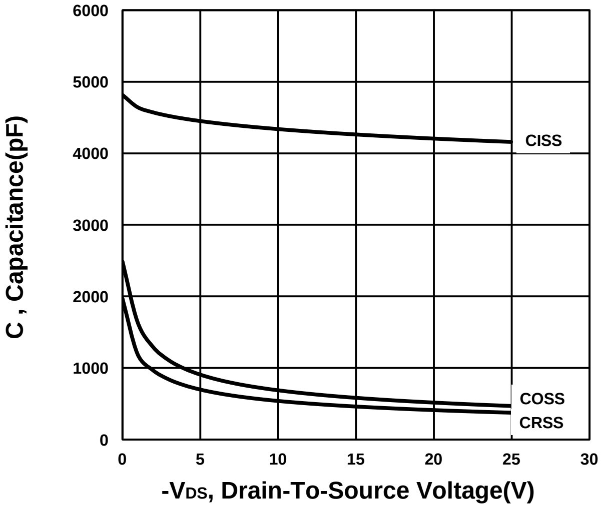
On-Resistance VS Drain Current

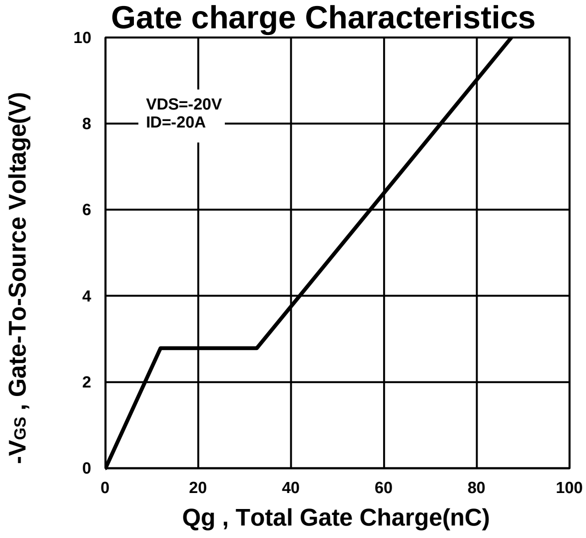


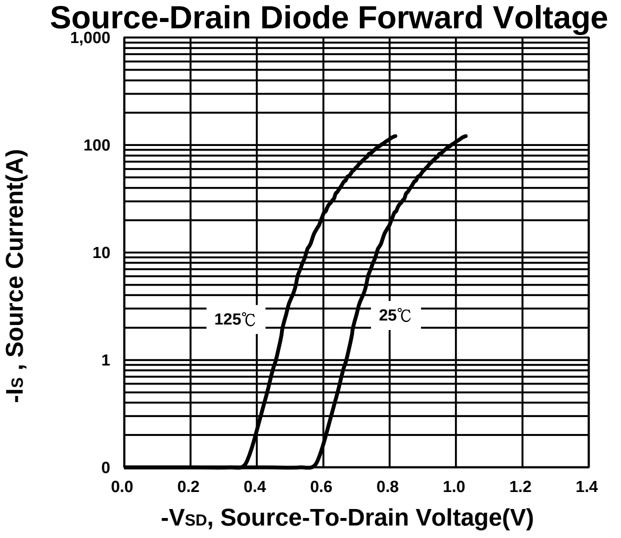
On-Resistance VS Temperature

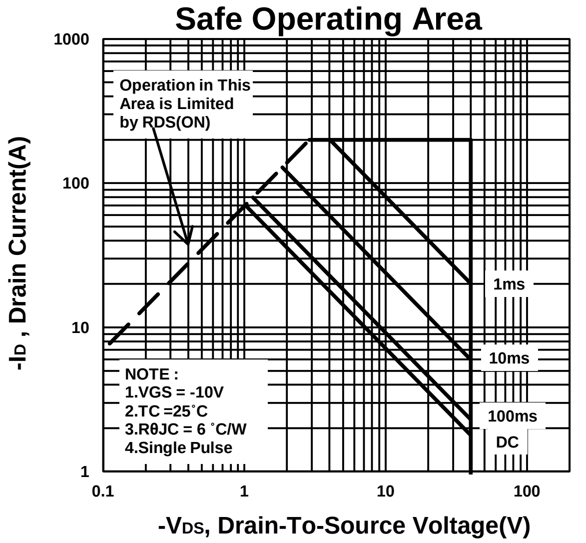


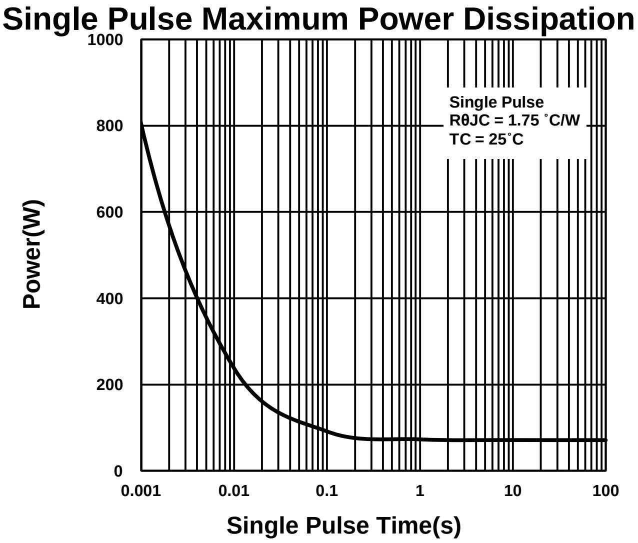
Capacitance Characteristic

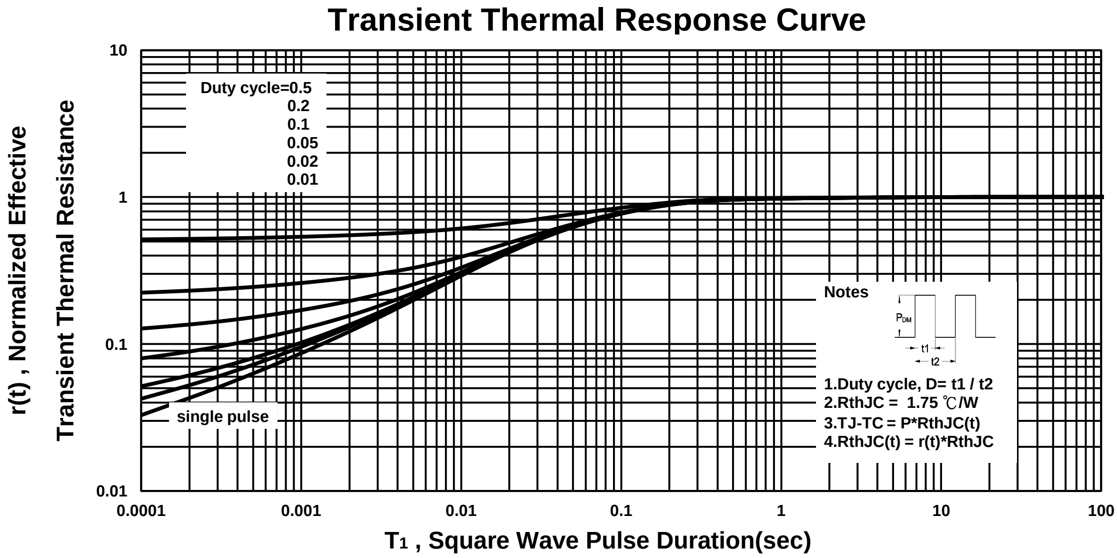



Gate charge Characteristics


Source-Drain Diode Forward Voltage


Safe Operating Area


Single Pulse Maximum Power Dissipation


Transient Thermal Response Curve