NIKO-SEM

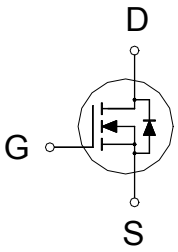
N-Channel Enhancement Mode Field Effect Transistor

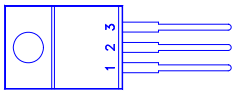
P0510AT
TO-220
Halogen-Free & Lead-Free

RoHS Compliant

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
100V	5.5mΩ	143A





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}	100	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	143	A
	T_C = 100 °C		90	
Pulsed Drain Current[1]		I_{DM}	350	
Avalanche Current		I_{AS}	36	
Avalanche Energy	L = 1mH	E_{AS}	648	mJ
Power Dissipation	T_C = 25 °C	P_D	227	W
	T_C = 100 °C		90	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	° C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		0.55	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.
[2]Package limitation current is 111A.

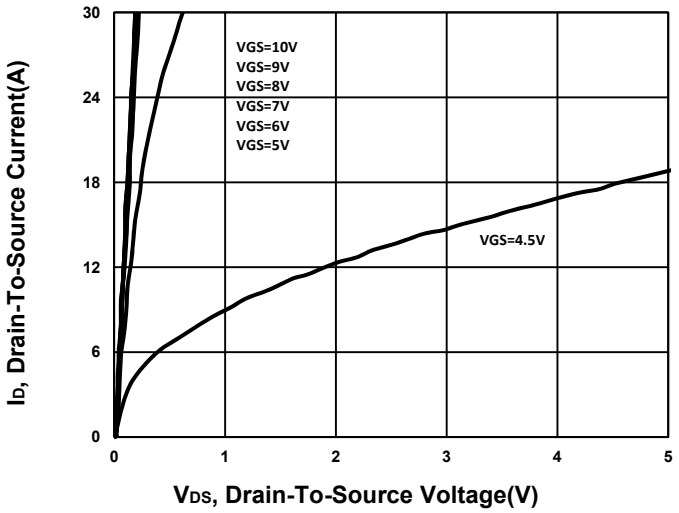
ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNITS
			MIN	TYP	MAX	
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	2	3	4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±25V			±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 = 125 °C			10	

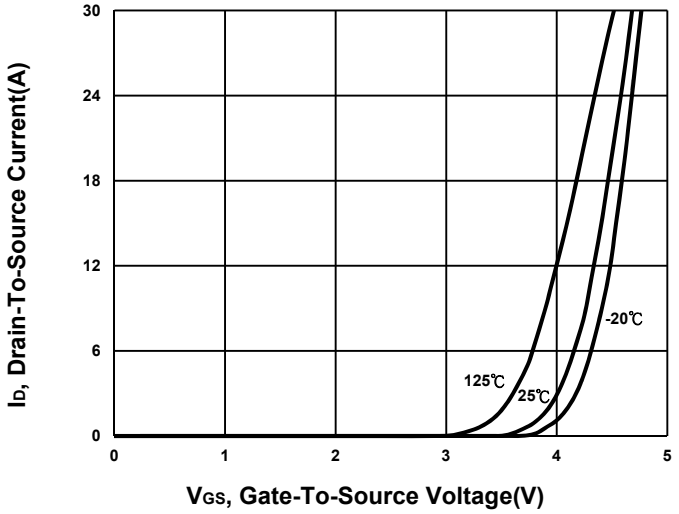
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 7V, I_D = 15A		4.4	7.5	mΩ
		V_{GS} = 10V, I_D = 20A		4	5.5	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 20A		50		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		6716		pF
Output Capacitance	C_{oss}			851		
Reverse Transfer Capacitance	C_{rss}			555		
Gate Resistance	Rg	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		1		Ω
Total Gate Charge[2]	$Q_{g(VGS=10V)}$	V_{DS} =50V,I_D = 20A		146		nC
	$Q_{g(VGS=7V)}$			113		
Gate-Source Charge[2]	Q_{gs}			30		
Gate-Drain Charge[2]	Q_{gd}			56		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 50V, $I_D \cong$ 20A, V_{GS} = 10V, R_{GEN} =6Ω		98		nS
Rise Time[2]	t_r			194		
Turn-Off Delay Time[2]	$t_{d(off)}$			170		
Fall Time[2]	t_f			88		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				143	A
Forward Voltage[1]	V_{SD}	I_F = 20A, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	I_F = 20A, dIs/dt= 100A/μs		53		nS
Reverse Recovery Charge	Q_{rr}			98		nC

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current is 111A.

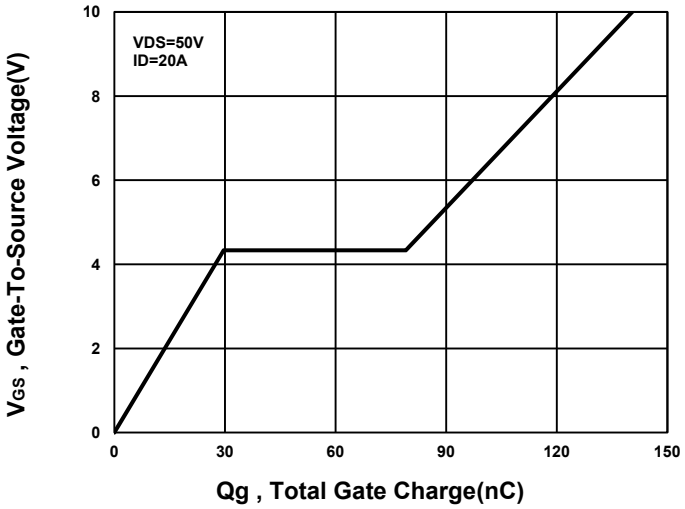
Output Characteristics



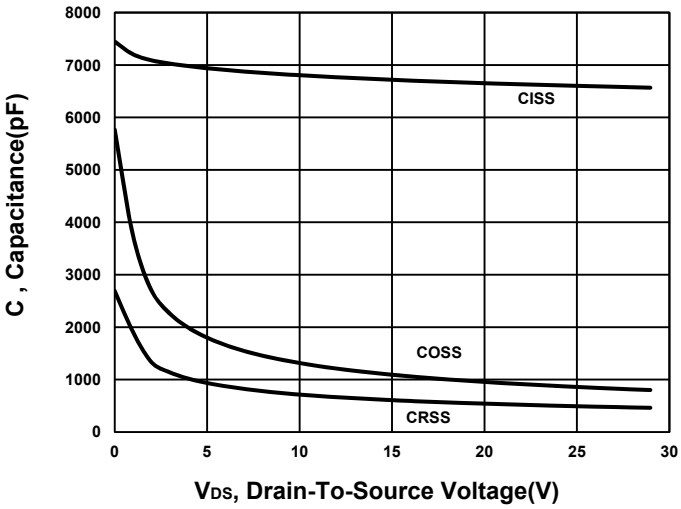
Transfer Characteristics



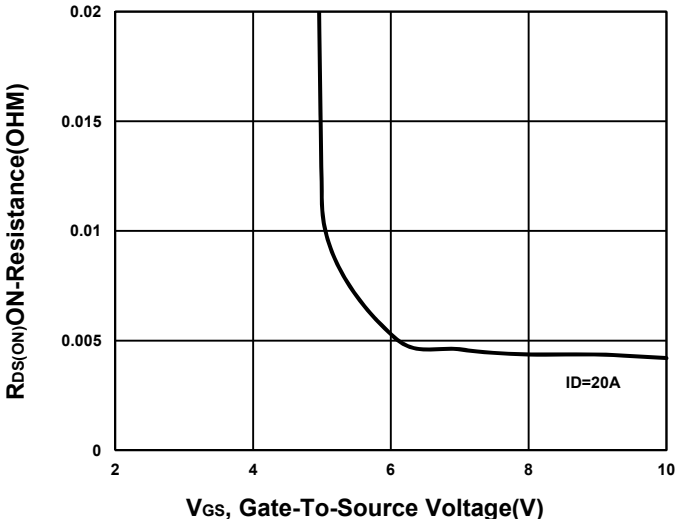
Gate charge Characteristics



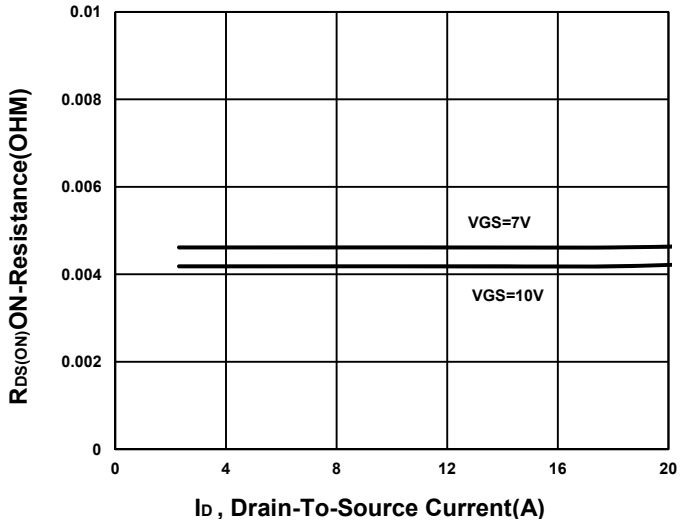
Capacitance Characteristic



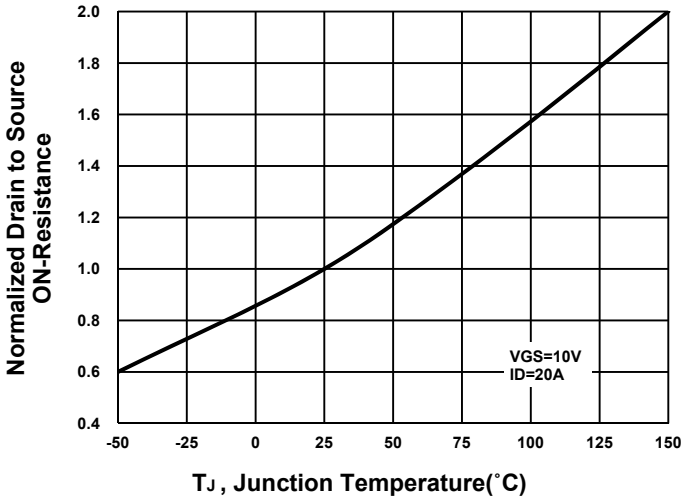
On-Resistance VS Gate-To-Source



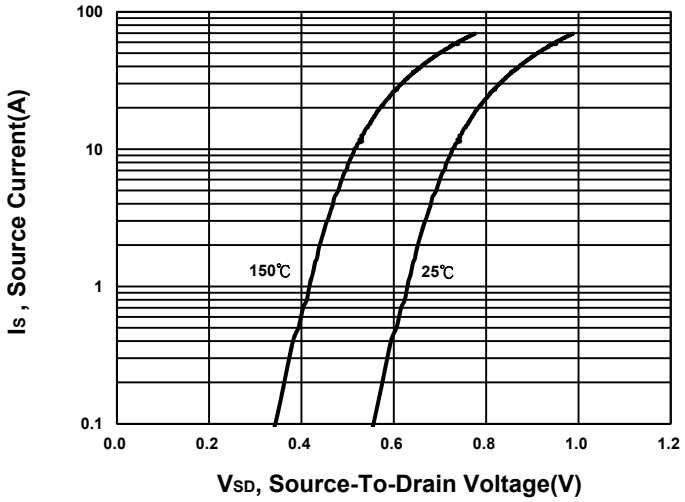
On-Resistance VS Drain Current



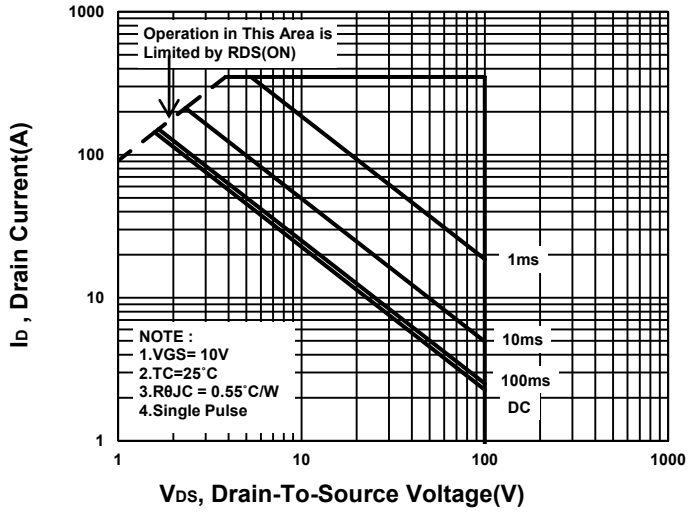
On-Resistance VS Temperature



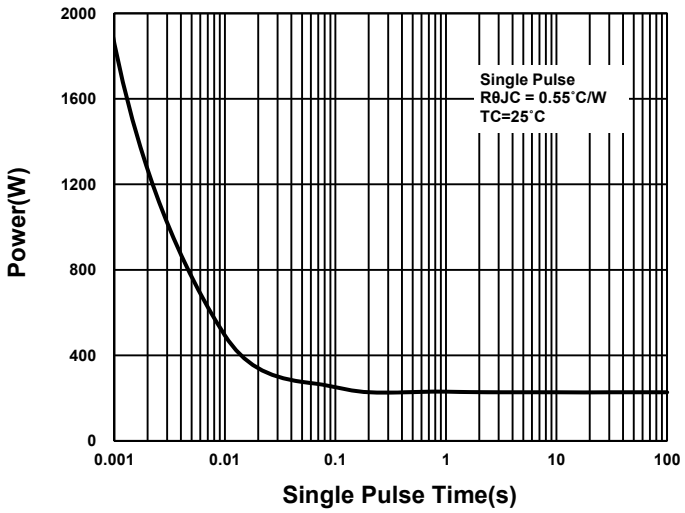
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve