NIKO-SEM

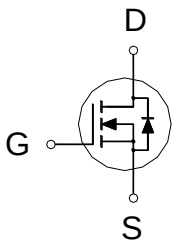
N-Channel Logic Level Enhancement Mode Field Effect Transistor

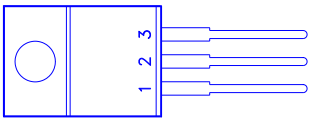
P0306BT
TO-220

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
60V	3.4mΩ	162A





1.GATE
2.DRAIN
3.SOURCE

RoHS Compliant

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[2,3]	T_C = 25 °C	I_D	162	A
	T_C = 100 °C		102	
Pulsed Drain Current[1,2]		I_{DM}	300	
Avalanche Current		I_{AS}	119	
Avalanche Energy	L = 0.1mH	E_{AS}	708	mJ
Power Dissipation	T_C = 25 °C	P_D	178	W
	T_C = 100 °C		71	
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	$R_{\theta JC}$		0.7	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	°C / W

[1]Pulse width limited by maximum junction temperature.
[2]Limited only by maximum temperature allowed.
[3]Package limitation current is 110A.

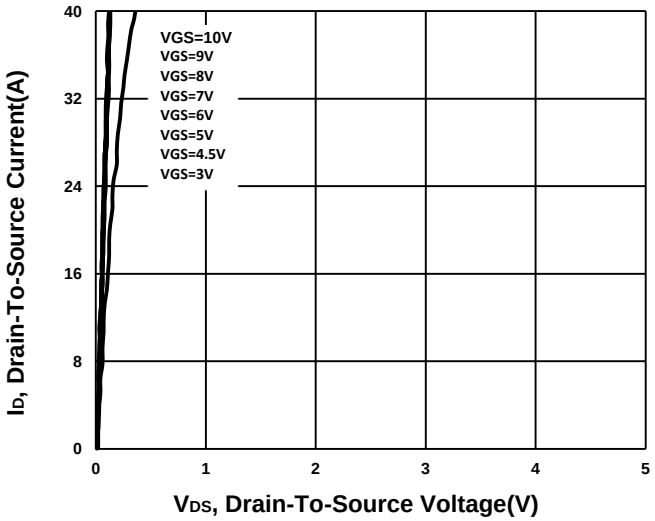
ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60			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} = 48V, V_{GS} = 0V			1	μA
		V_{DS} = 40V, V_{GS} = 0V, T_J = 125 °C			10	

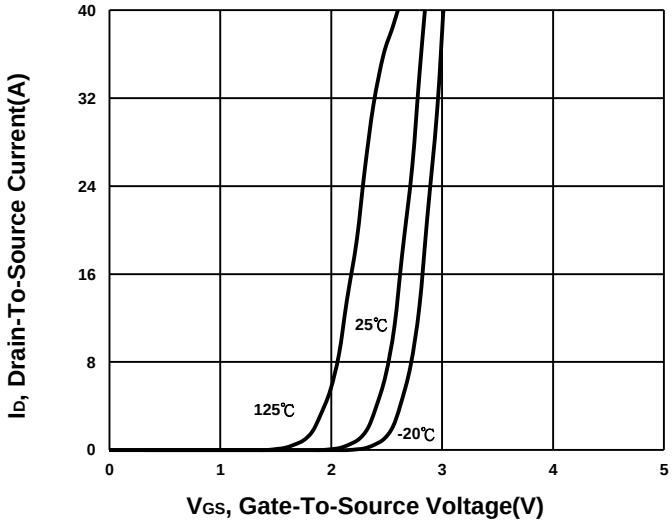
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 20A		3	4.5	mΩ
		V_{GS} = 10V, I_D = 20A		2.6	3.4	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 20A		80		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		5825		pF
Output Capacitance	C_{oss}			1162		
Reverse Transfer Capacitance	C_{rss}			385		
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} = 30V, V_{GS} = 10V, I_D = 20A		124		nC
	$Q_{g(VGS=4.5V)}$			67		
Gate-Source Charge[2]	Q_{gs}			15		
Gate-Drain Charge[2]	Q_{gd}			35		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 60V, $I_D \cong$ 20A, V_{GS} = 10V, R_{GEN} = 6Ω		25		nS
Rise Time[2]	t_r			65		
Turn-Off Delay Time[2]	$t_{d(off)}$			60		
Fall Time[2]	t_f			62		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				172	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		60		nS
Reverse Recovery Charge	Q_{rr}			127		nC

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current is 110A.

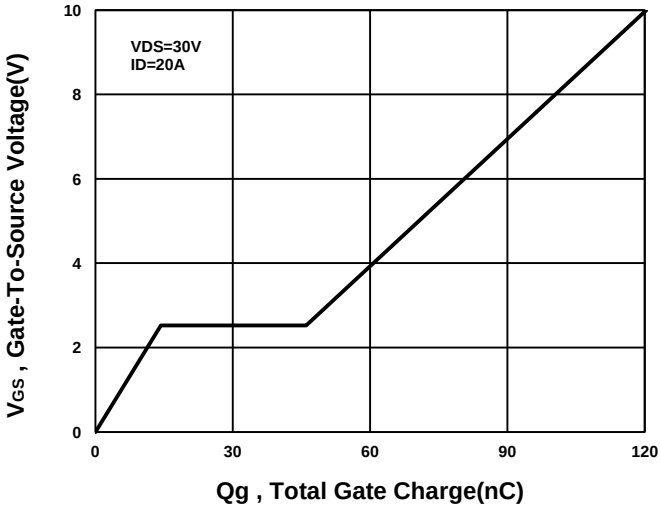
Output Characteristics



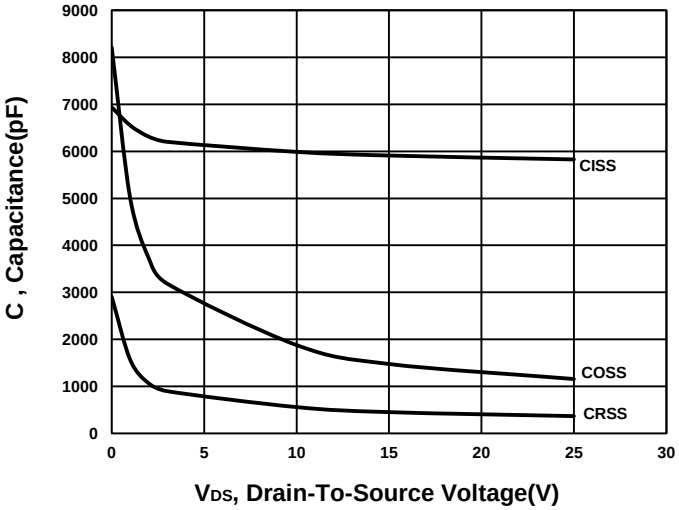
Transfer Characteristics



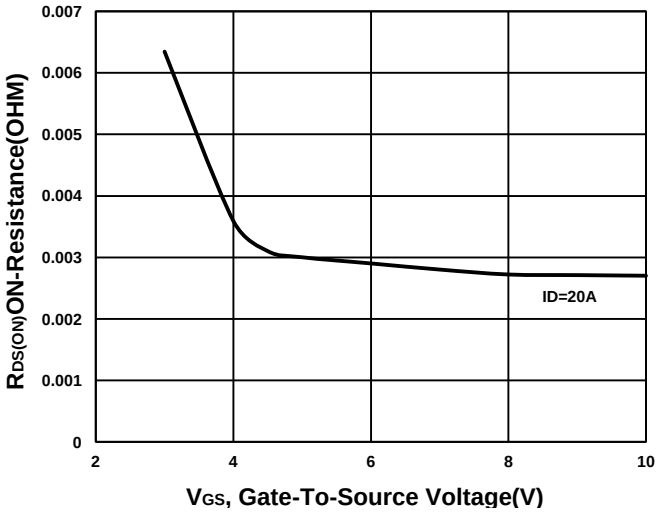
Gate charge Characteristics



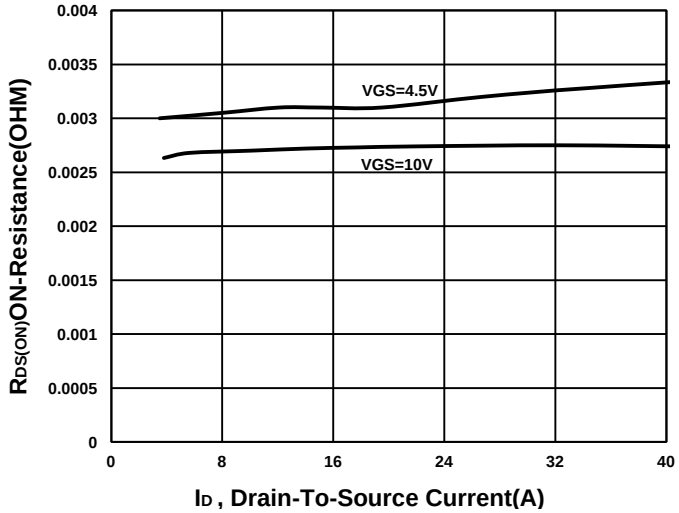
Capacitance Characteristic



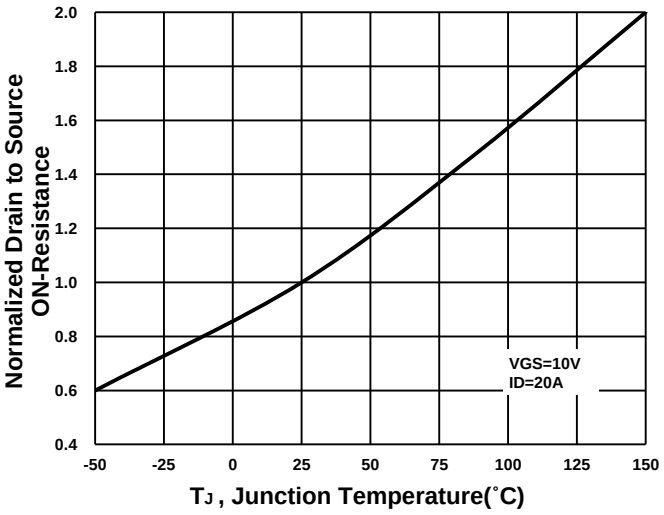
On-Resistance VS Gate-To-Source



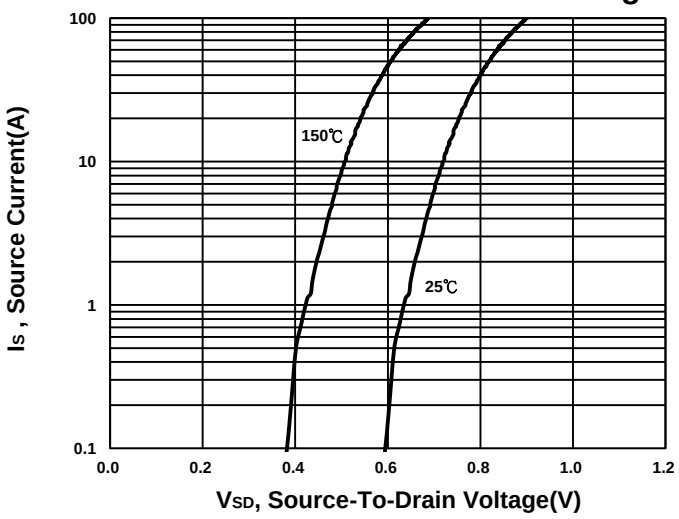
On-Resistance VS Drain Current



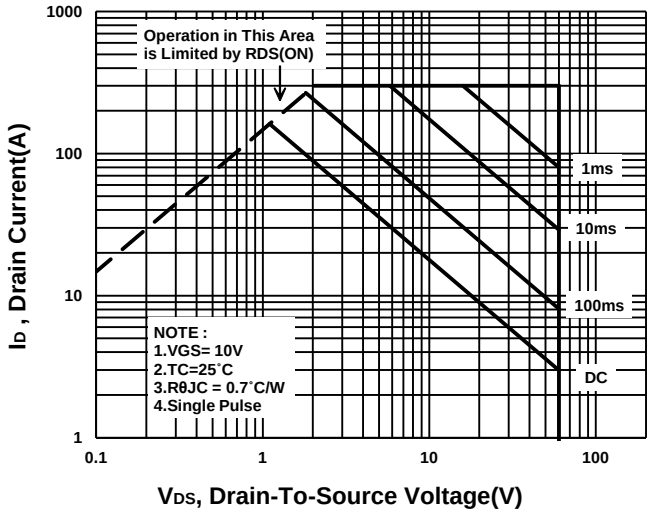
On-Resistance VS Temperature



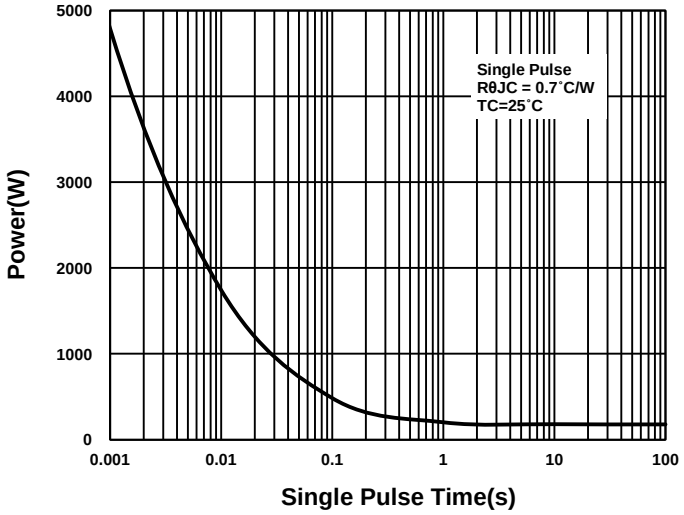
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve