NIKO-SEM

P-Channel Enhancement Mode Field Effect Transistor

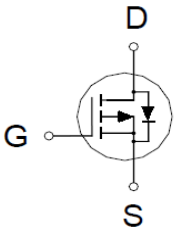
P1604ES

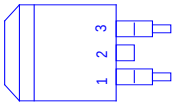
TO-263

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-40V	16mΩ	-65A





RoHS Compliant

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}	±20	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	-65	A
	T_C = 100°C		-42	
Pulsed Drain Current[1,2]		I_{DM}	-120	
Avalanche Current		I_{AS}	-46	
Avalanche Energy	L = 0.1 mH	E_{AS}	107	mJ
Power Dissipation	T_C = 25 °C	P_D	104	W
	T_C = 100°C		41	
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	$R_{\theta JC}$		1.2	°C / W

[1]Pulse width limited by maximum junction temperature.
[2]Limited only by maximum temperature allowed.

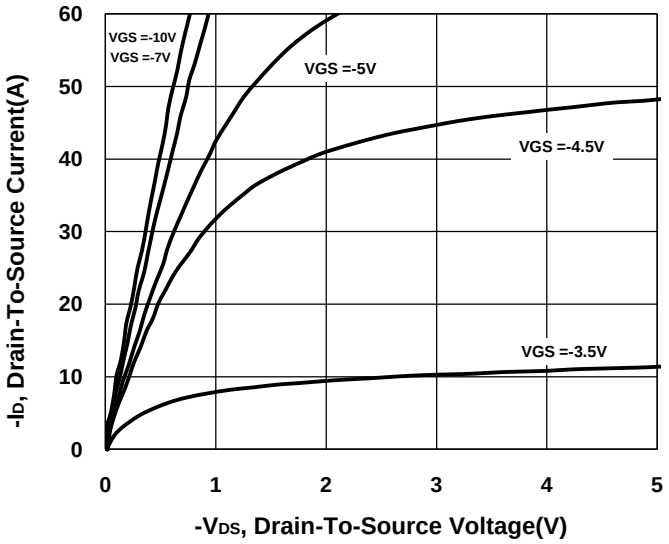
ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

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	-1.5	-2.2	-3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±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 = 70 °C			10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V	-120			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -7V, I_D = -15A		14	20	mΩ
		V_{GS} = -10V, I_D = -25A		12	16	
Forward Transconductance[1]	g_{fs}	V_{DS} = -10V, I_D = -25A		29		S

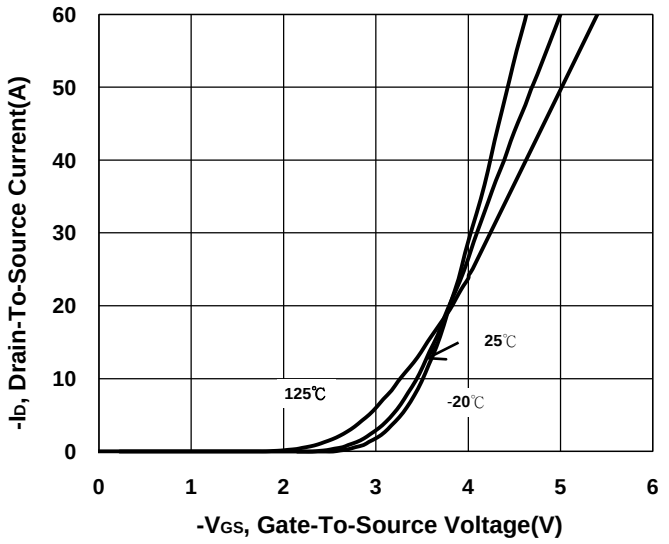
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz		2229		pF
Output Capacitance	C_{oss}			334		
Reverse Transfer Capacitance	C_{rss}			293		
Gate Resistance	Rg	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		4.3		Ω
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -10V, I_D = -25A		48		nC
Gate-Source Charge[2]	Q_{gs}			9		
Gate-Drain Charge[2]	Q_{gd}			15		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = 0.5$V_{(BR)DSS}$, I_D ≅ -25A, V_{GS} = -10V, R_{GEN} =6Ω		15		nS
Rise Time[2]	t_r			43		
Turn-Off Delay Time[2]	$t_{d(off)}$			62		
Fall Time[2]	t_f			50		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Current	I_S				-65	A
Forward Voltage[1]	V_{SD}	I_F = -25A, V_{GS} = 0V			-1.3	V
Reverse Recovery Time	t_{rr}	I_F = -25A, dI_F/dt = 100A / μS		27		nS
Reverse Recovery Charge	Q_{rr}			16		nC

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

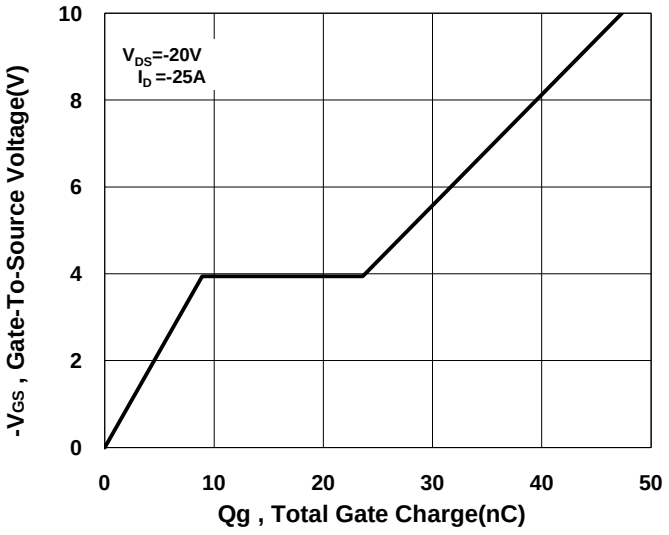
Output Characteristics



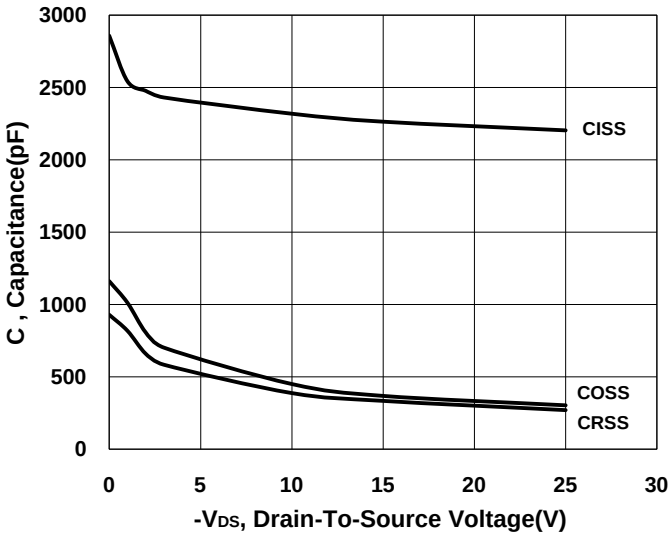
Transfer Characteristics



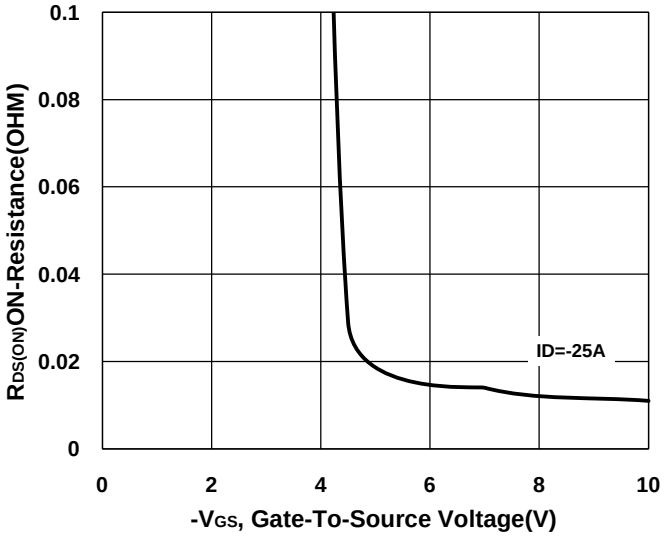
Gate charge Characteristics



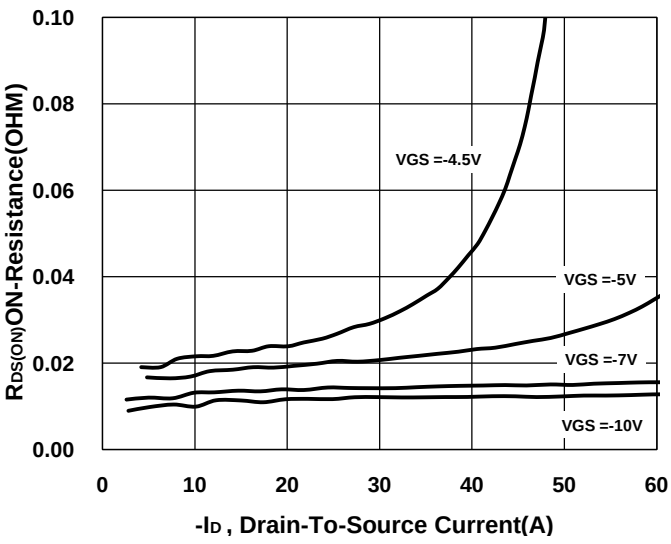
Capacitance Characteristic



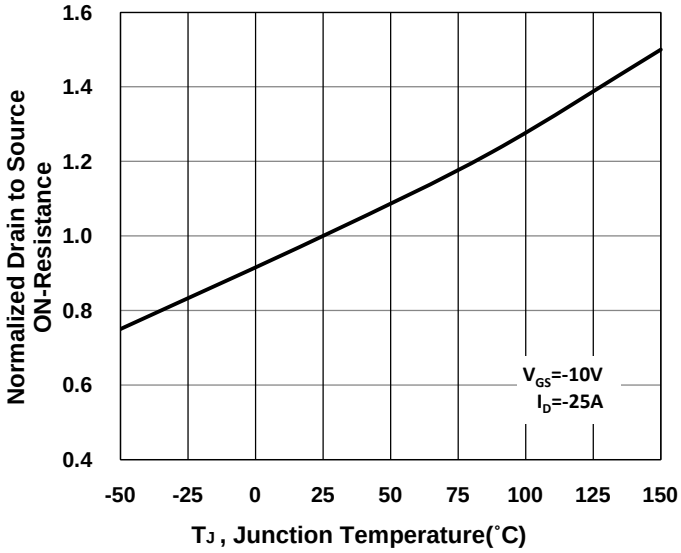
On-Resistance VS Temperature



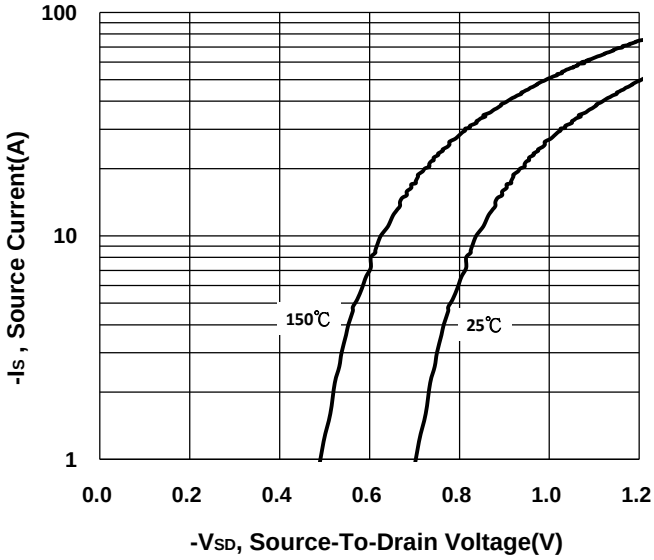
On-Resistance VS Drain Current



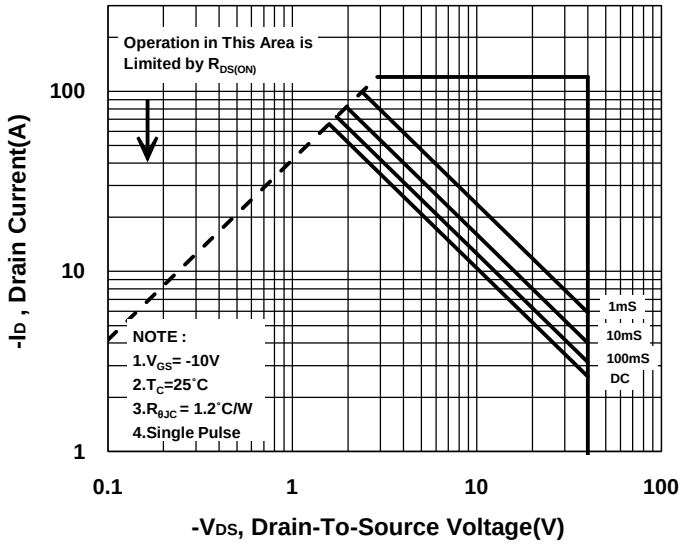
On-Resistance VS Gate-To-Source



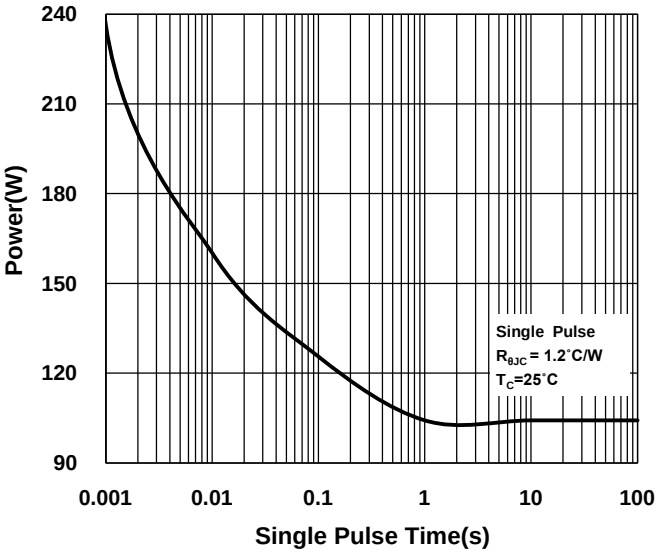
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve