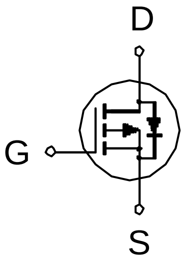
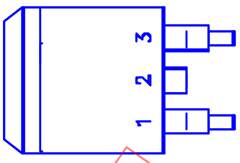
NIKO-SEM

P-Channel Logic Level Enhancement
Mode Field Effect Transistor

P9006ESG
TO-263
Lead-Free





1. GATE
2. DRAIN
3. SOURCE

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-60V	90mΩ	-18A

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	-18	A
	T_C = 70 °C		-12	
Pulsed Drain Current[1]		I_{DM}	-30	
Power Dissipation	T_C = 25 °C	P_D	48	W
	T_C = 70 °C		32	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C
Lead Temperature ($^1/_{16}$" from case for 10 sec.)		T_L	275	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		2.6	°C / W
Junction-to-Ambient	$R_{\theta JA}$		60	°C / W

[1] Pulse width limited by maximum junction temperature.

[2] Duty cycle ≤ 1%

ELECTRICAL CHARACTERISTICS (T_C = 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	-2	-3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -48V, V_{GS} = 0V			1	µA
		V_{DS} = -44V, V_{GS} = 0V, T_J = 125 °C			10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V	-40			A

Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -6A		100	135	mΩ
		V_{GS} = -10V, I_D = -12A		70	90	
Forward Transconductance[1]	g_{fs}	V_{DS} = -10V, I_D = -12A		9		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -30V, f = 1MHz		760		pF
Output Capacitance	C_{oss}			90		
Reverse Transfer Capacitance	C_{rss}			40		
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -10V, I_D = -12A		15		nC
Gate-Source Charge[2]	Q_{gs}			2.5		
Gate-Drain Charge[2]	Q_{gd}			3.0		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = -20V I_D ≅ -1A, V_{GS} = -10V, R_{GS} = 6Ω		7	14	nS
Rise Time[2]	t_r			10	20	
Turn-Off Delay Time[2]	$t_{d(off)}$			19	34	
Fall Time[2]	t_f			12	22	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				-18	A
Pulsed Current[3]	I_{SM}				-40	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			-1	V
Reverse Recovery Time	t_{rr}	I_F = -12 A, dI_F/dt = 100A / µS		15.5		nS
Reverse Recovery Charge	Q_{rr}			7.9		nC

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

[2] Independent of operating temperature.

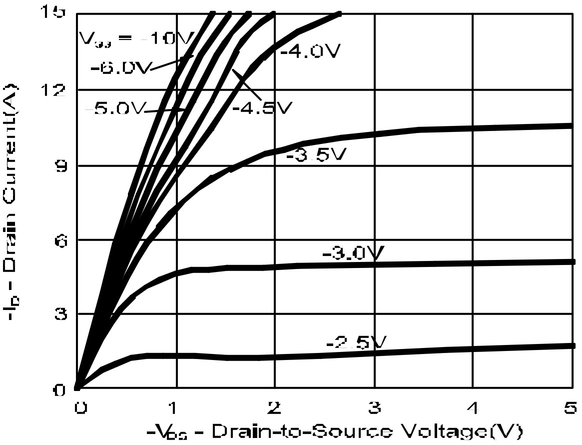
[3] Pulse width limited by maximum junction temperature.

REMARK: THE PRODUCT MARKED WITH "P9006ESG", DATE CODE or LOT #

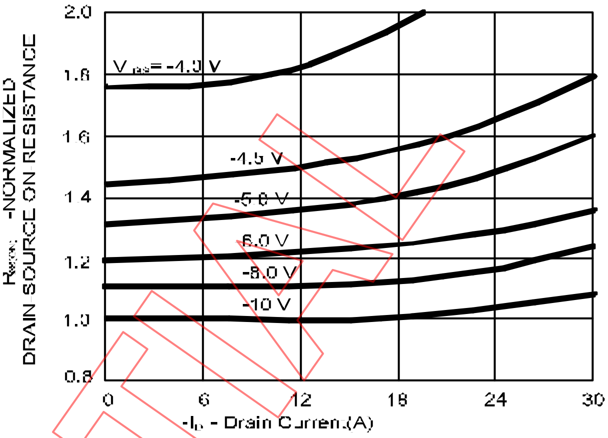
Orders for parts with Lead-Free plating can be placed using the PXXXXXXG parts name.

TYPICAL PERFORMANCE CHARACTERISTICS

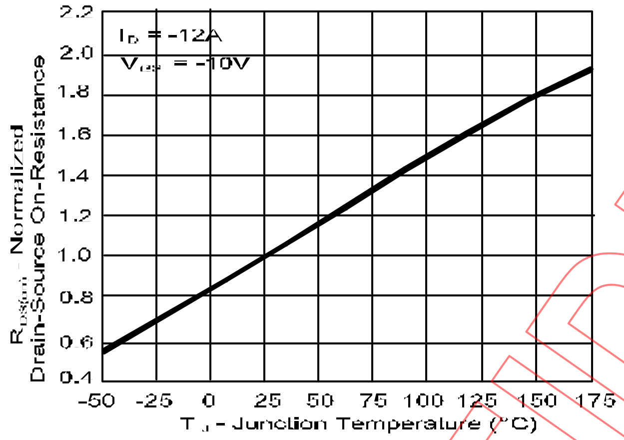
On-Region Characteristics



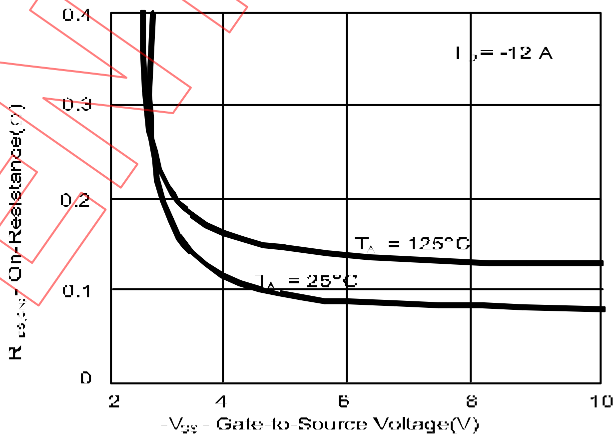
On-Resistance Variation with Drain Current and Gate Voltage



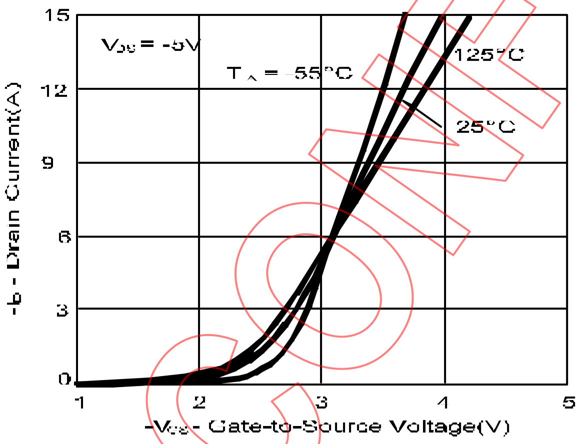
On-Resistance Variation with Temperature



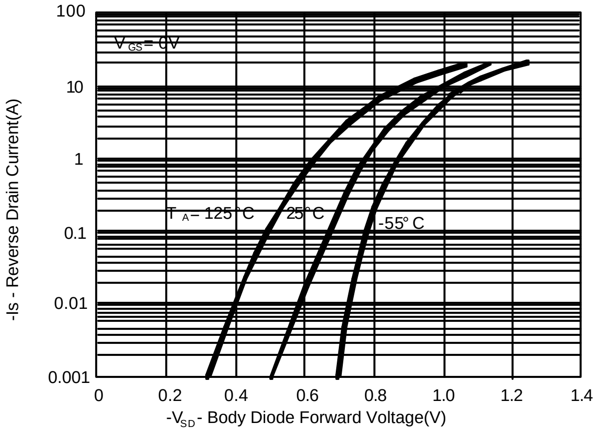
On-Resistance Variation with Gate-to-Source Voltage



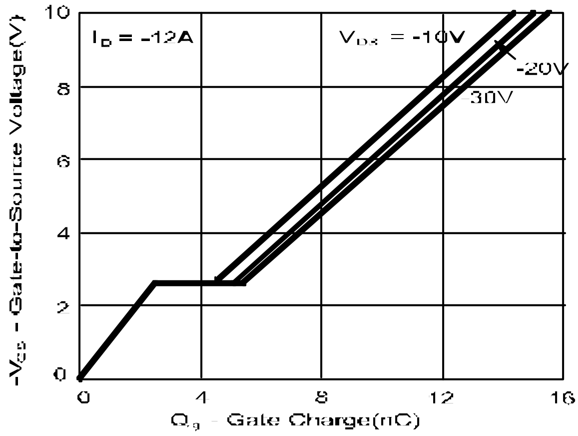
Transfer Characteristics



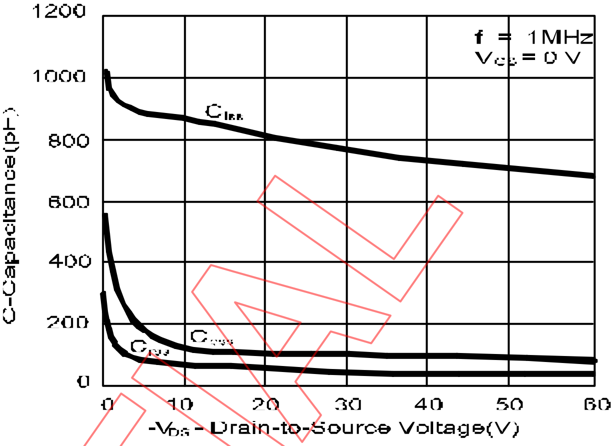
Body Diode Forward Voltage Variation with Source Current and Temperature



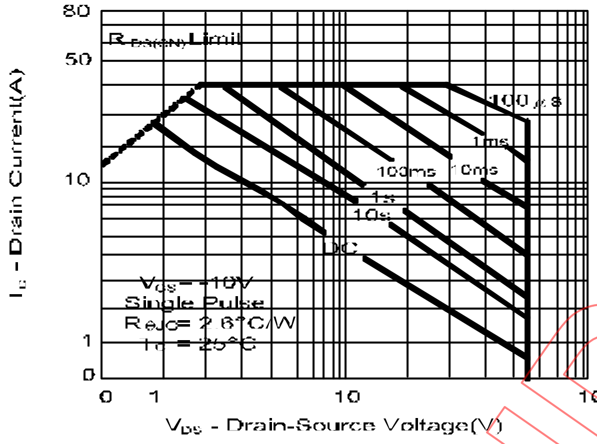
Gate Charge Characteristics



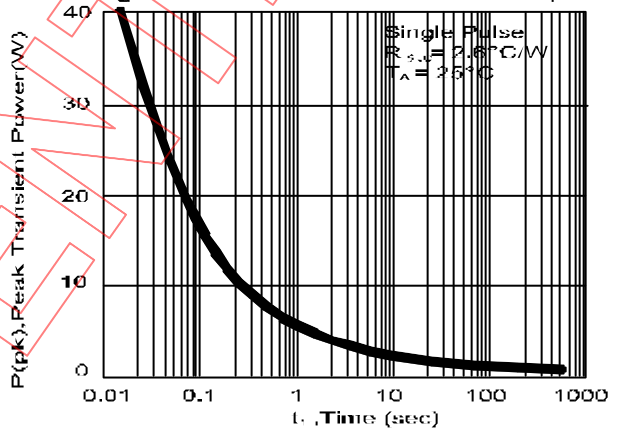
Capacitance Characteristics



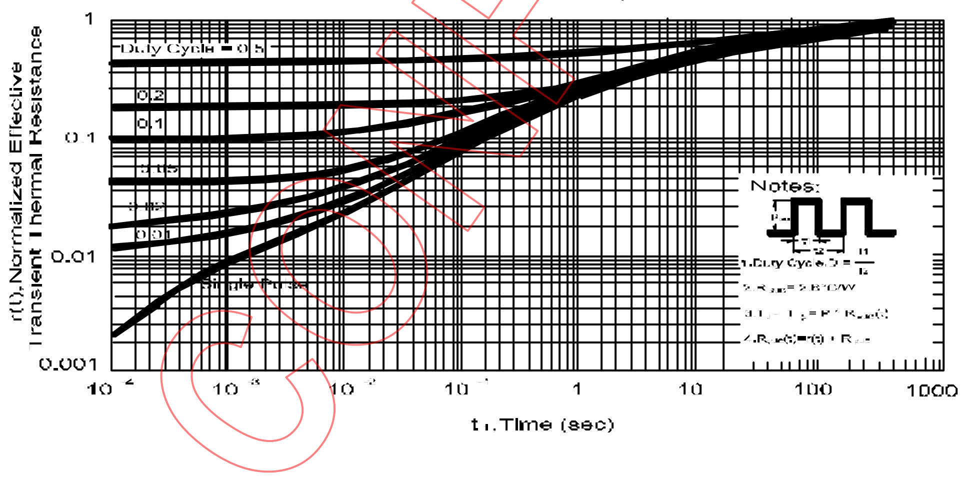
Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



TO-263 (D^{2}PAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	14.5	15	15.8	H	1.0	1.5	1.8
B	4.2		4.7	I	9.8		10.3
C	1.20		1.35	J		6.5	
D		2.8		K		1.5	
E	0.3	0.4	0.5	L	0.7		1.4
F	-0.102		0.203	M	4.83	5.08	5.33
G	8.5	9	9.5	N