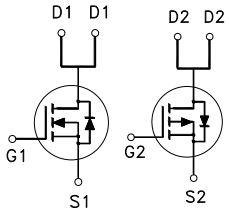
NIKO-SEM

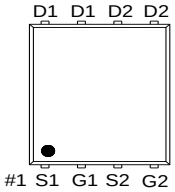
N- & P-Channel Enhancement Mode Field Effect Transistor

PE601CA
PDFN 3x3P
Halogen-Free & Lead-Free

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	30V	22mΩ	20A
P-Channel	-30V	28mΩ	-19A





G. GATE
D. DRAIN
S. SOURCE

100% UIS Tested
100% Rg Tested

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.
- DC Motor for BLDC Applications.

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

PARAMETERS/TEST CONDITIONS		SYMBOL	N-Channel	P-Channel	UNITS
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current[4]	T_C = 25 °C	I_D	20	-19	A
	T_C = 100 °C		13	-12	
	T_A = 25 °C		8.1	-7.4	
	T_A = 70 °C		6.5	-5.9	
Pulsed Drain Current[1]		I_{DM}	40	-35	
Avalanche Current		I_{AS}	11.9	-19.3	
Avalanche Energy	L = 0.1mH	E_{AS}	7.1	18.7	mJ
Power Dissipation	T_C = 25 °C	P_D	17	18	W
	T_C = 100 °C		7.1	7.3	
Power Dissipation[3]	T_A = 25 °C		2.7	2.7	
	T_A = 70 °C		1.7	1.7	
Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE		SYMBOL		TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient[2]	t ≦10s	$R_{\theta JA}$	N-ch		45	°C / W
			P-ch		45	
Junction-to-Ambient[2]	Steady-State		N-ch		71	
			P-ch		69	
Junction-to-Case	Steady-State	$R_{\theta JC}$	N-ch		7	
			P-ch		6.8	

[1]Pulse width limited by maximum junction temperature.
[2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.
[3]The Power dissipation is based on $R_{\theta JA}$ t ≦10s value.
[4]Package limitation current is N-Ch=8.3A, P-Ch=-6.9A.

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

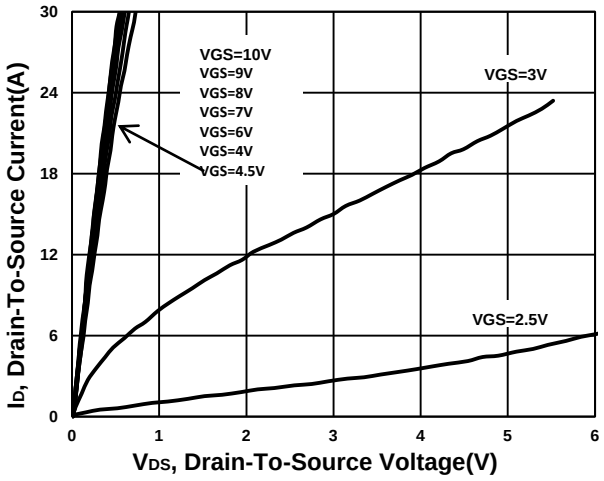
PARAMETER	SYMBOL	TEST CONDITIONS		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	N-Ch	30			V
		V_{GS} = 0V, I_D = -250μA	P-Ch	-30			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	N-Ch	1	1.6	2.5	
		V_{DS} = V_{GS}, I_D = -250μA	P-Ch	-1	-1.5	-2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	N-Ch			±100	nA
		V_{DS} = 0V, V_{GS} = ±20V	P-Ch			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V	N-Ch			1	μA
		V_{DS} = -24V, V_{GS} = 0V	P-Ch			-1	
		V_{DS} = 20V, V_{GS} = 0V, T_J = 55 °C	N-Ch			10	
		V_{DS} = -20V, V_{GS} = 0V, T_J = 55 °C	P-Ch			-10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 6A	N-Ch		17.1	32	mΩ
		V_{GS} = -4.5V, I_D = -5A	P-Ch		28.2	45	
		V_{GS} = 10V, I_D = 7A	N-Ch		12.6	22	
		V_{GS} = -10V, I_D = -6A	P-Ch		20.2	28	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 7A	N-Ch		40		S
		V_{DS} = -10V, I_D = -6A	P-Ch		17.5		

DYNAMIC							
Input Capacitance	C_{iss}	N-Channel V_{GS} = 0V, V_{DS} = 15V, f = 1MHz P-Channel V_{GS} = 0V, V_{DS} = -15V, f = 1MHz	N-Ch P-Ch	275 723	344 904	412 1084	pF
Output Capacitance	C_{oss}		N-Ch P-Ch	57 114	72 143	86.4 171.6	
Reverse Transfer Capacitance	C_{rss}		N-Ch P-Ch	30 73	50 123	70 172	
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	N-Ch P-Ch	1.4 5.7	2.8 11.3	4.2 17	Ω
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 15V , V_{GS} = 10V, I_D = 7A P-Channel V_{DS} = -15V , V_{GS} = -10V, I_D = -6A	N-Ch P-Ch	5.2 16	7.8 21	9.4 25	nC
Gate-Source Charge[2]	Q_{gs}		N-Ch P-Ch	0.8 1.6	1 2	1.2 2.4	
Gate-Drain Charge[2]	Q_{gd}		N-Ch P-Ch	1.2 3.7	2 6.1	2.8 8.5	
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DS} = 15V, $I_D \cong$ 7A, V_{GS} = 10V, R_{GEN} = 6Ω P-Channel V_{DS} = -15V, $I_D \cong$ -6A, V_{GS} = -10V, R_{GEN} = 6Ω	N-Ch P-Ch		15 15		nS
Rise Time[2]	t_r		N-Ch P-Ch		30 30		
Turn-Off Delay Time[2]	$t_{d(off)}$		N-Ch P-Ch		20 50		
Fall Time[2]	t_f		N-Ch P-Ch		13 41		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current[3]	I_S		N-Ch P-Ch			15 -18	A
Forward Voltage[1]	V_{SD}	I_F = 7A, V_{GS} = 0V I_F = -6A, V_{GS} = 0V	N-Ch P-Ch			1.1 -1	V
Reverse Recovery Time	t_{rr}	I_F = 7A, dI_F/dt = 100A / µS I_F = -6A, dI_F/dt = 100A / µS	N-Ch P-Ch	4.3 6.1	8.6 12.2	13 18.3	nS
Reverse Recovery Charge	Q_{rr}		N-Ch P-Ch	1.1 1.9	2.1 3.7	3.2 5.6	nC

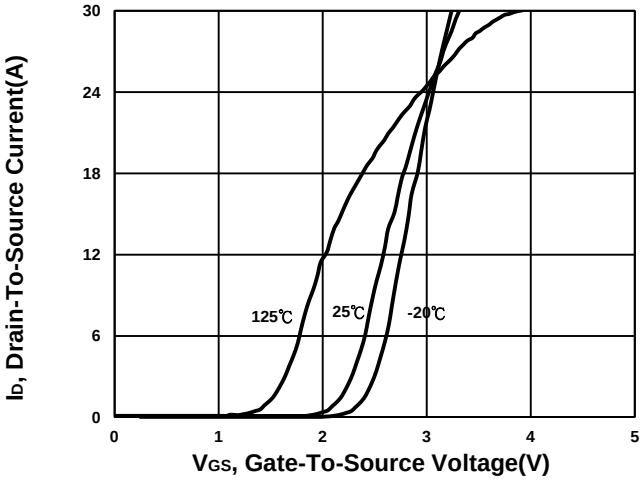
[1]Pulse test : Pulse Width ≤ 300 µsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current is N-Ch=8.3A, P-Ch=-6.9A.

TYPICAL PERFORMANCE CHARACTERISTICS
N-CHANNEL

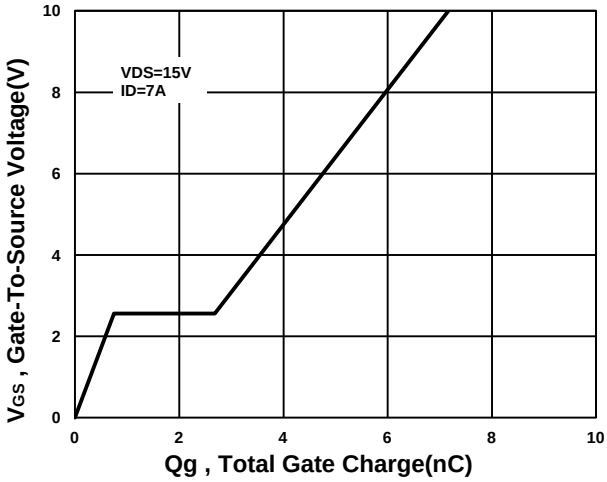
Output Characteristics



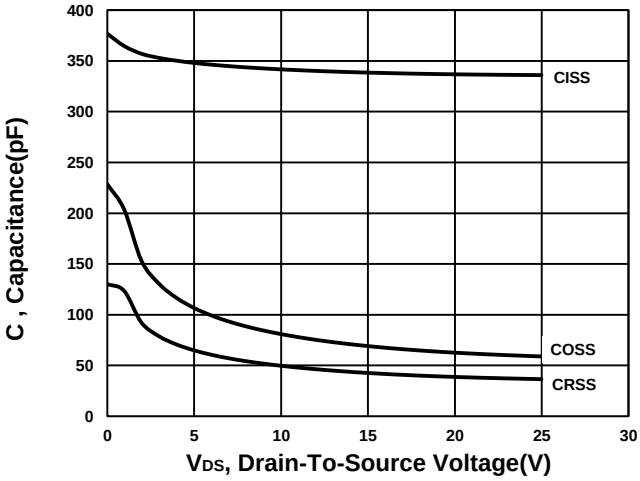
Transfer Characteristics



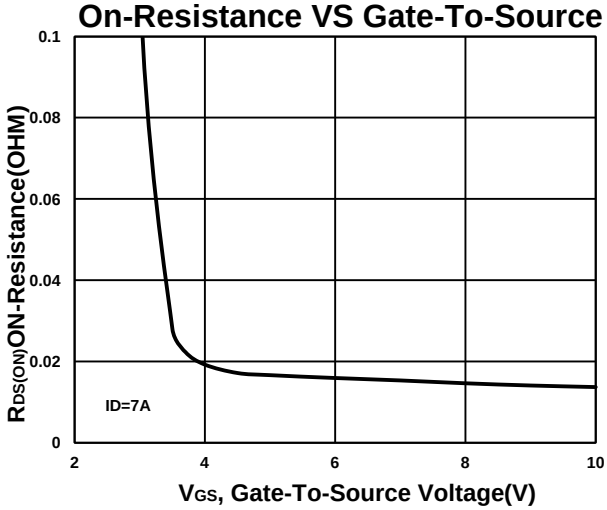
Gate charge Characteristics



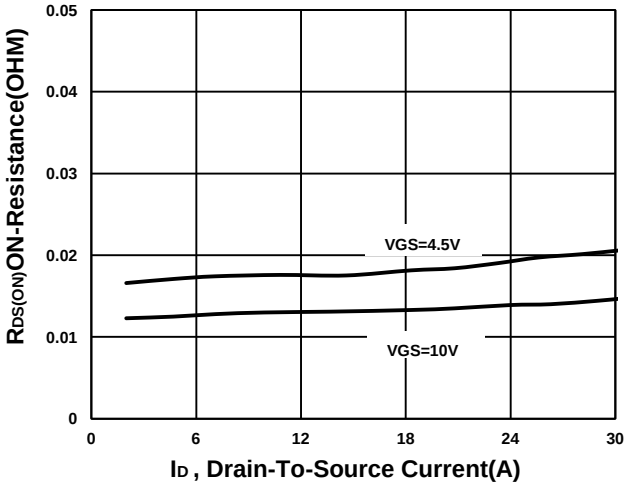
Capacitance Characteristic



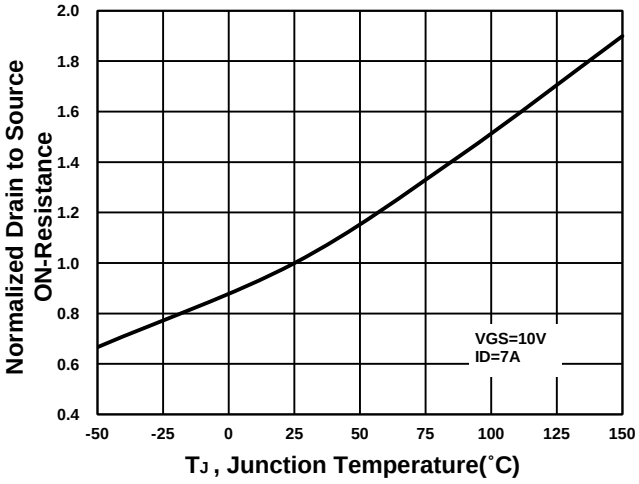
On-Resistance VS Gate-To-Source



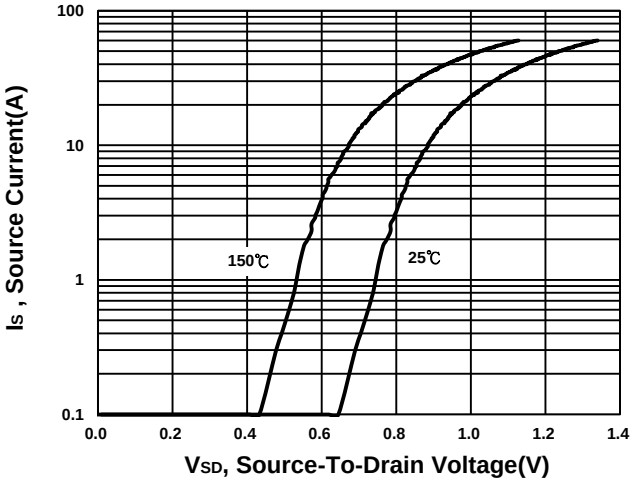
On-Resistance VS Drain Current



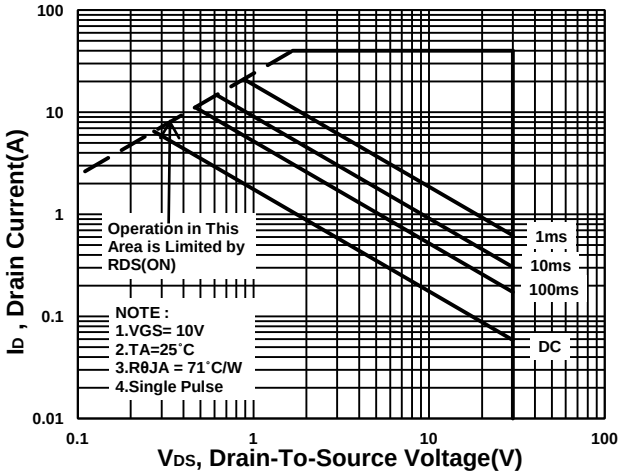
On-Resistance VS Temperature



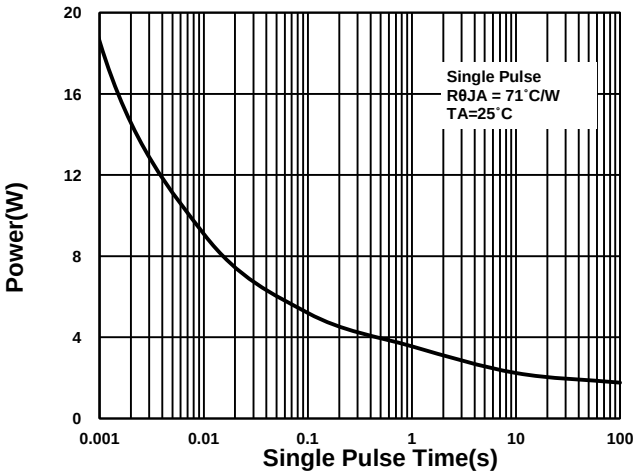
Source-Drain Diode Forward Voltage



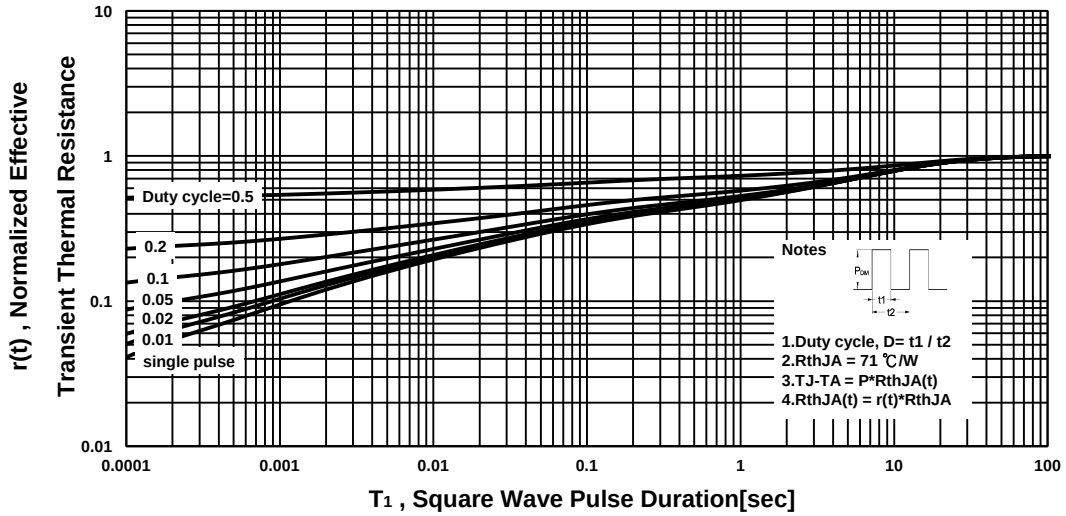
Safe Operating Area



Single Pulse Maximum Power Dissipation

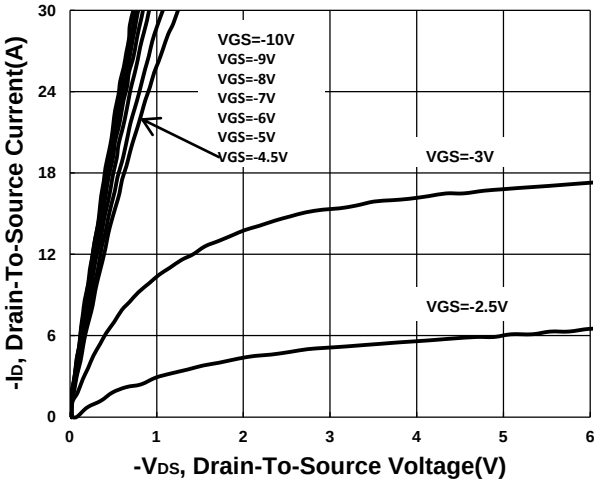


Transient Thermal Response Curve

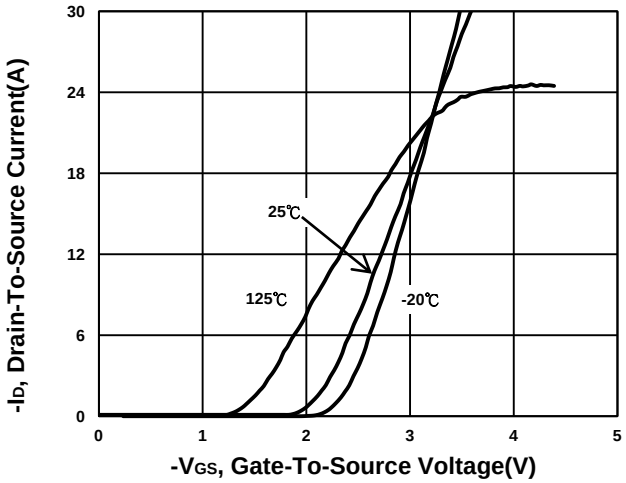


P-CHANNEL

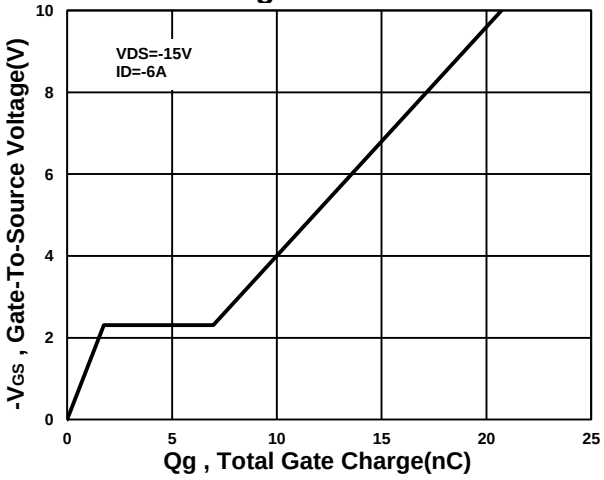
Output Characteristics



Transfer Characteristics



Gate charge Characteristics



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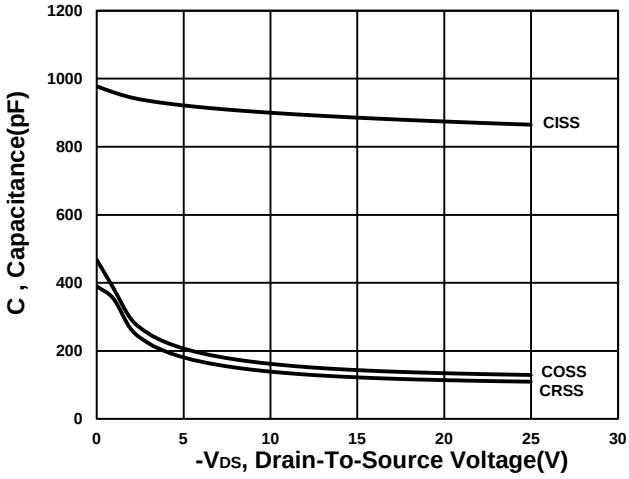
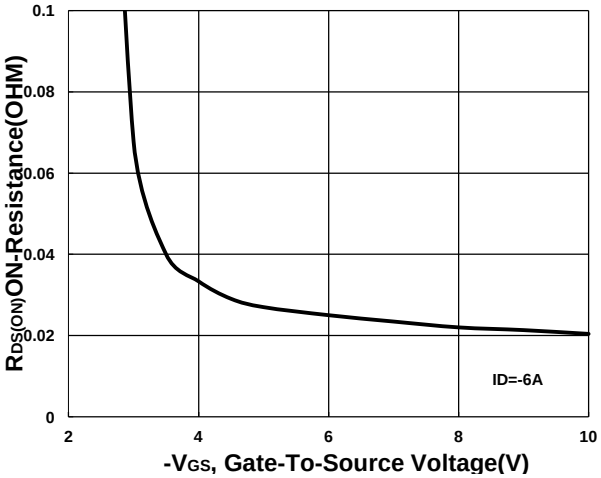
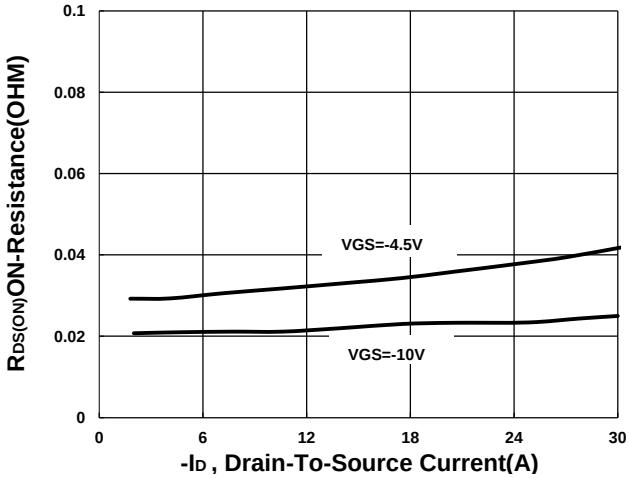


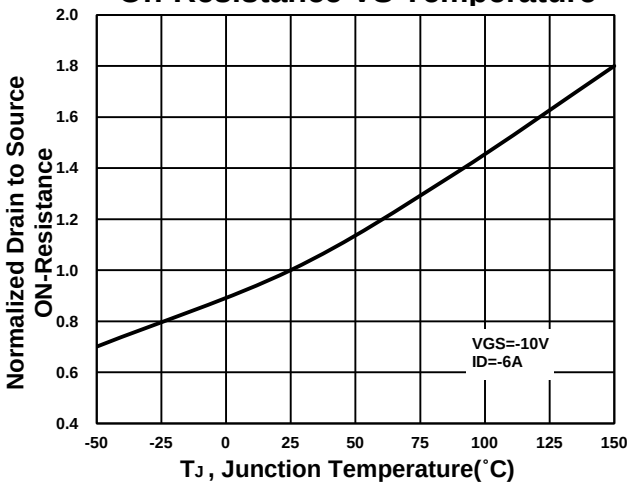
On-Resistance VS Gate-To-Source



On-Resistance VS Drain Current



On-Resistance VS Temperature



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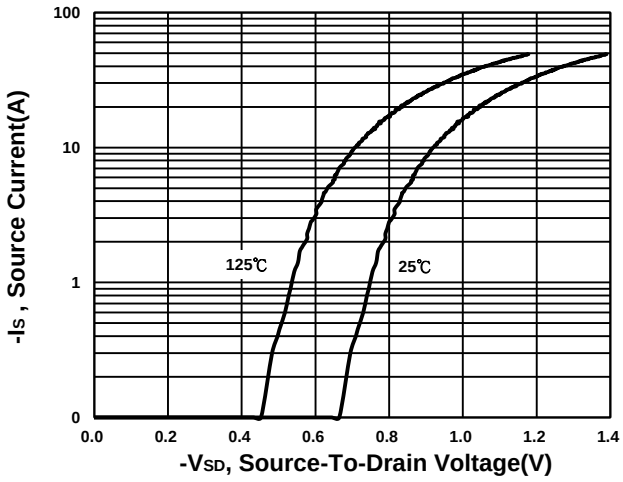

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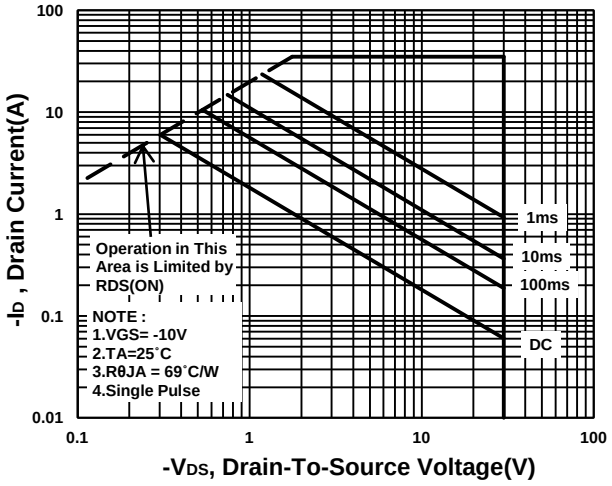

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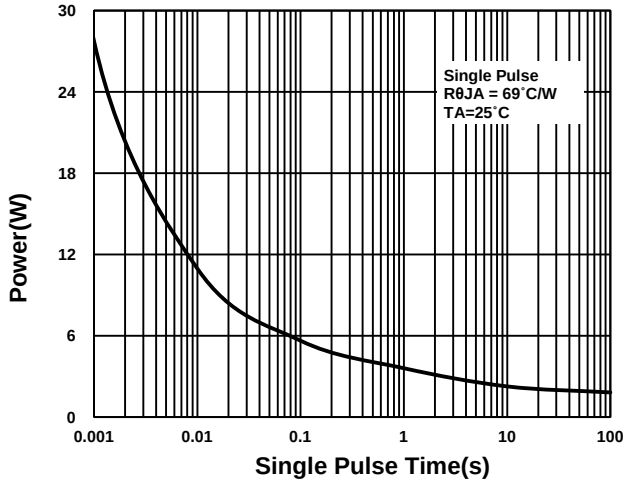

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