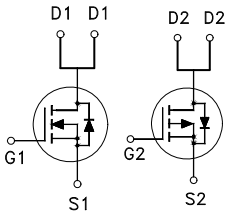
NIKO-SEM

N- & P-Channel Enhancement Mode Field Effect Transistor

PV609CA
SOP-8
Halogen-Free & Lead-Free

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	40V	25mΩ	6A
P-Channel	-40V	60mΩ	-4.3A

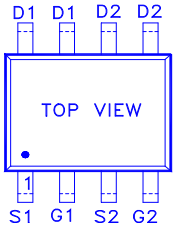


Features

- 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.



G : GATE
D : DRAIN
S : SOURCE

100% UIS Tested
100% Rg Tested

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

PARAMETERS/TEST CONDITIONS		SYMBOL	N-Channel	P-Channel	UNITS
Drain-Source Voltage		V_{DS}	40	-40	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_A = 25 °C	I_D	6	-4.3	A
	T_A = 70 °C		5	-3.4	
Pulsed Drain Current[1]		I_{DM}	30	-25	
Avalanche Current		I_{AS}	12	-21	
Avalanche Energy	L = 0.1mH	E_{AS}	7.2	22	mJ
Power Dissipation[3]	T_A = 25 °C	P_D	2	2.1	W
	T_A = 70 °C		1.3	1.37	
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		60	°C / W
	Steady-State				91	
Junction-to-Ambient[2]	t ≦10s	$R_{\theta JA}$	P-ch		58	
	Steady-State				88	

[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

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

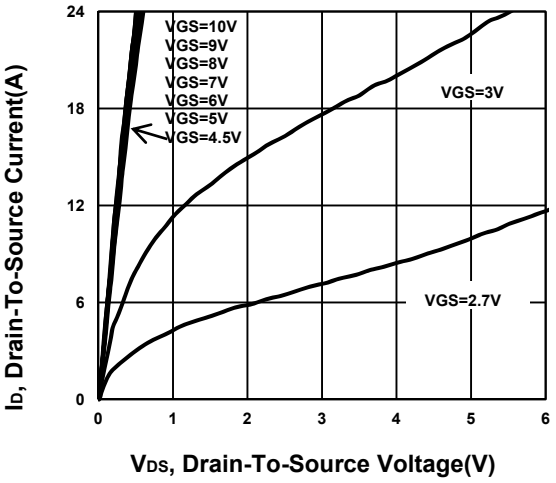
PARAMETER	SYMBOL	TEST CONDITIONS		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	N-Ch	40			V
		V_{GS} = 0V, I_D = -250μA	P-Ch	-40			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	N-Ch	1.3	1.8	2.3	
		V_{DS} = V_{GS}, I_D = -250μA	P-Ch	-1.3	-1.9	-2.3	
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} = 32V, V_{GS} = 0V	N-Ch			1	μA
		V_{DS} = -32V, V_{GS} = 0V	P-Ch			-1	
		V_{DS} = 30V, V_{GS} = 0V, T_J = 55 °C	N-Ch			10	
		V_{DS} = -30V, 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		22	35	mΩ
		V_{GS} = -4.5V, I_D = -4A	P-Ch		62	90	
		V_{GS} = 10V, I_D = 6A	N-Ch		19	25	
		V_{GS} = -10V, I_D = -4A	P-Ch		39	60	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 6A	N-Ch		24		S
		V_{DS} = -10V, I_D = -4A	P-Ch		11		

DYNAMIC							
Input Capacitance	C_{iss}	N-Channel V_{GS} = 0V, V_{DS} = 20V, f = 1MHz P-Channel V_{GS} = 0V, V_{DS} = -20V, f = 1MHz	N-Ch P-Ch		440 567		pF
Output Capacitance	C_{oss}		N-Ch P-Ch		62 126		
Reverse Transfer Capacitance	C_{rss}		N-Ch P-Ch		35 77		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	N-Ch P-Ch		4.3 12		Ω
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 20V , V_{GS} = 10V, I_D = 6A P-Channel V_{DS} = -20V , V_{GS} = -10V, I_D = -4A	N-Ch P-Ch		8.7 12		nC
Gate-Source Charge[2]	Q_{gs}		N-Ch P-Ch		1.1 1.8		
Gate-Drain Charge[2]	Q_{gd}		N-Ch P-Ch		2.5 3.5		
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DS} = 20V, $I_D \cong$ 6A, V_{GS} = 10V, R_{GEN} = 6Ω P-Channel V_{DS} = -20V, $I_D \cong$ -4A, V_{GS} = -10V, R_{GEN} = 6Ω	N-Ch P-Ch		6 10		nS
Rise Time[2]	t_r		N-Ch P-Ch		45 16		
Turn-Off Delay Time[2]	$t_{d(off)}$		N-Ch P-Ch		24 56		
Fall Time[2]	t_f		N-Ch P-Ch		12 30		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current	I_S		N-Ch P-Ch			1.6 -1.7	A
Forward Voltage[1]	V_{SD}	I_F = 6A, V_{GS} = 0V I_F = -4A, V_{GS} = 0V	N-Ch P-Ch			1.2 -1.2	V
Reverse Recovery Time	t_{rr}	I_F = 6A, dI_F/dt = 100A / µS I_F = -4A, dI_F/dt = 100A / µS	N-Ch P-Ch		10.4 13		nS
Reverse Recovery Charge	Q_{rr}		N-Ch P-Ch		3.1 5.6		nC

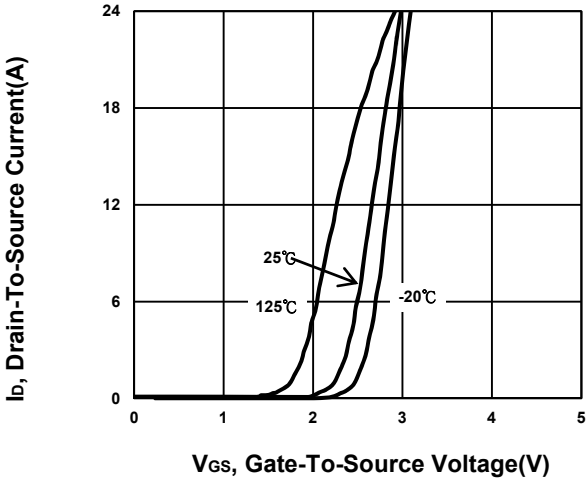
[1]Pulse test : Pulse Width ≤ 300 µsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.

TYPICAL PERFORMANCE CHARACTERISTICS
N-CHANNEL

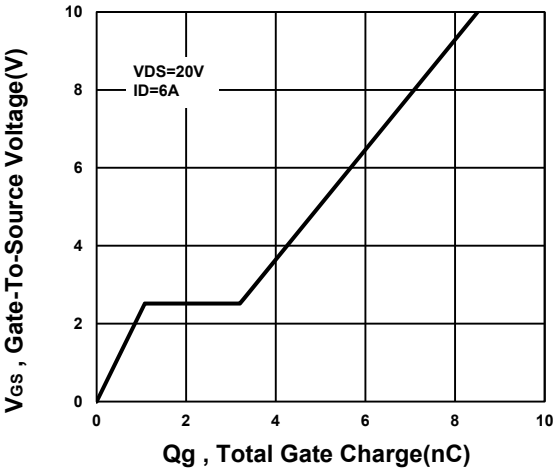
Output Characteristics



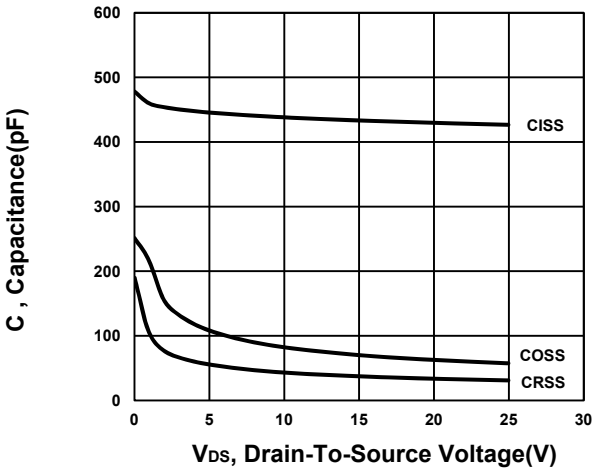
Transfer Characteristics



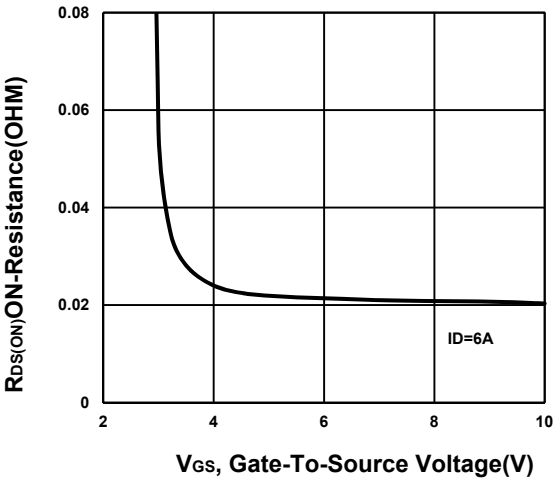
Gate charge Characteristics



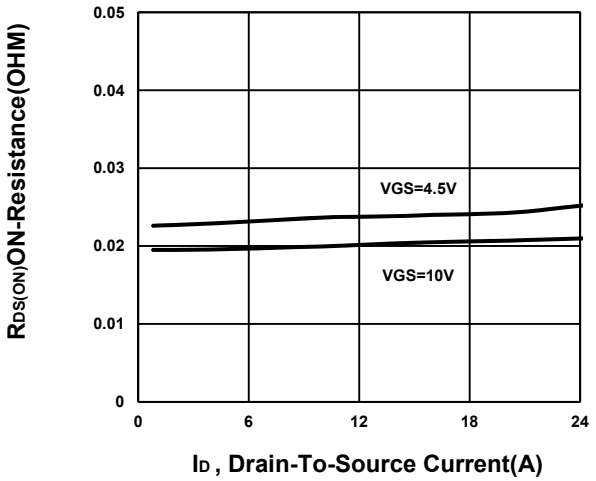
Capacitance Characteristic



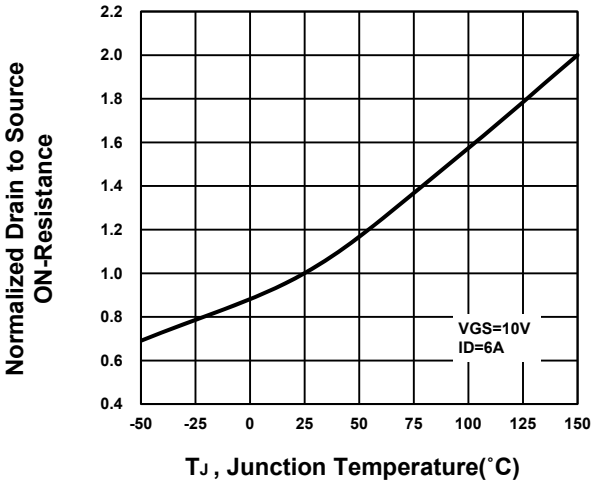
On-Resistance VS Gate-To-Source



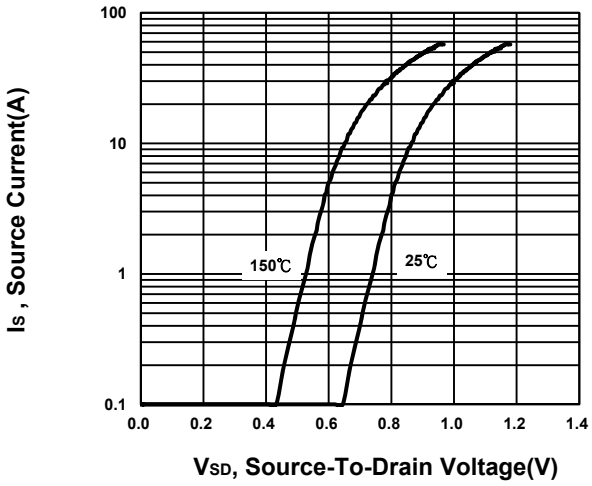
On-Resistance VS Drain Current



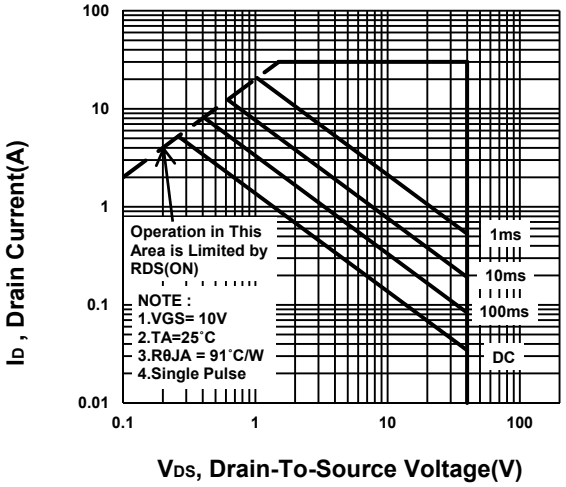
On-Resistance VS Temperature



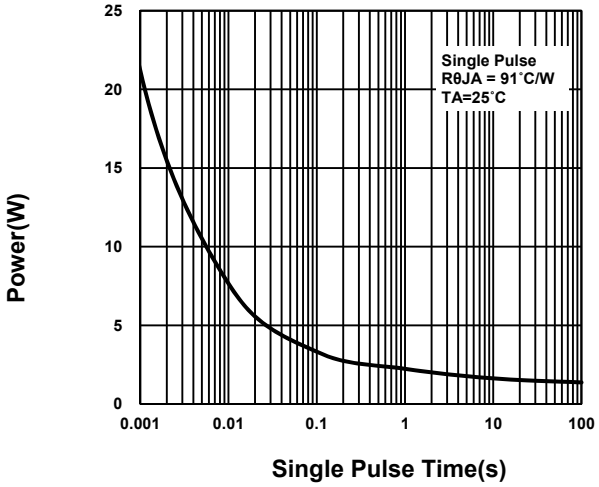
Source-Drain Diode Forward Voltage



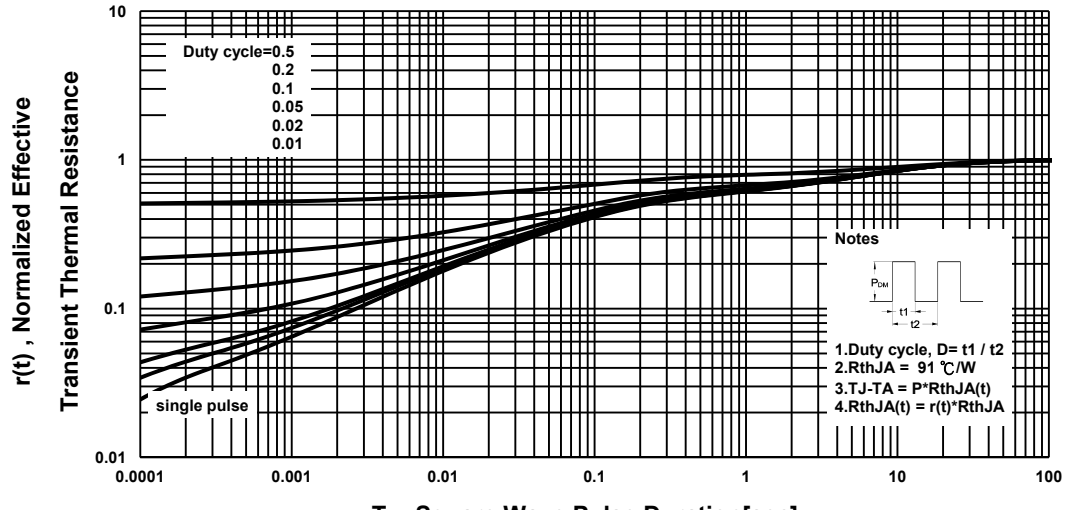
Safe Operating Area



Single Pulse Maximum Power Dissipation

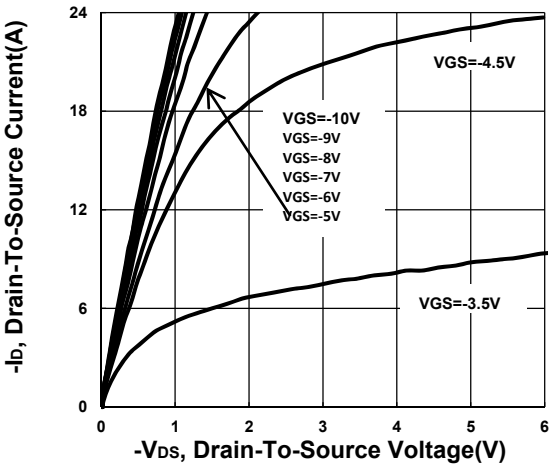


Transient Thermal Response Curve

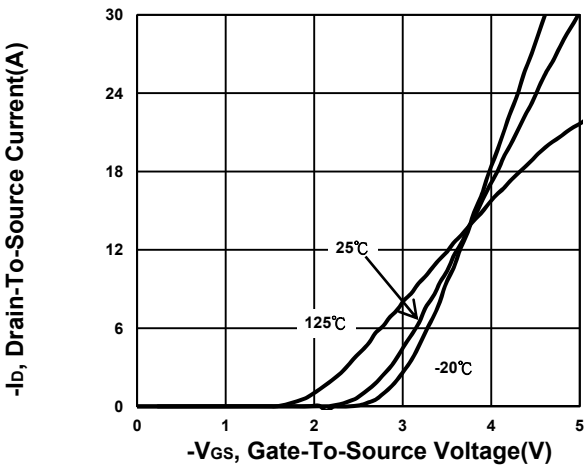


P-CHANNEL

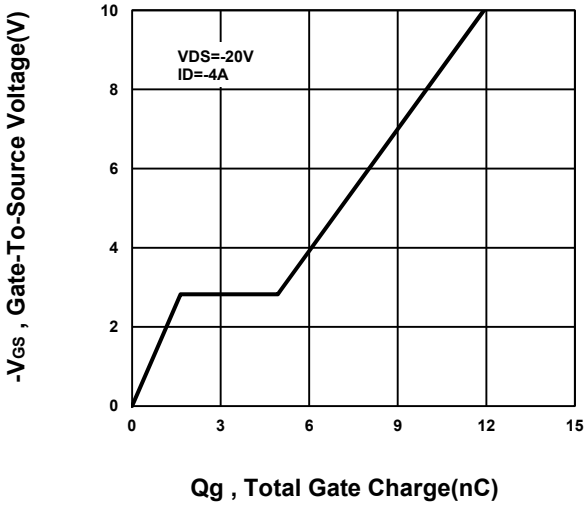
Output Characteristics



Transfer Characteristics



Gate charge Characteristics



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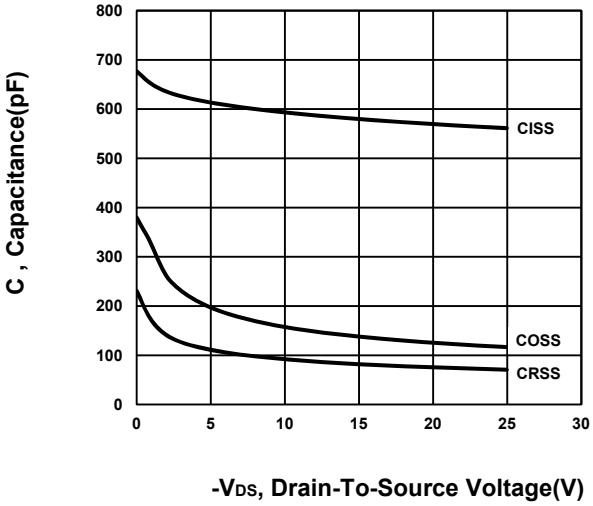
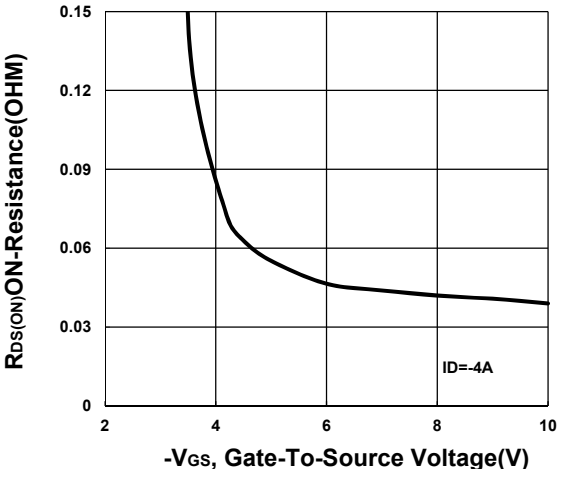
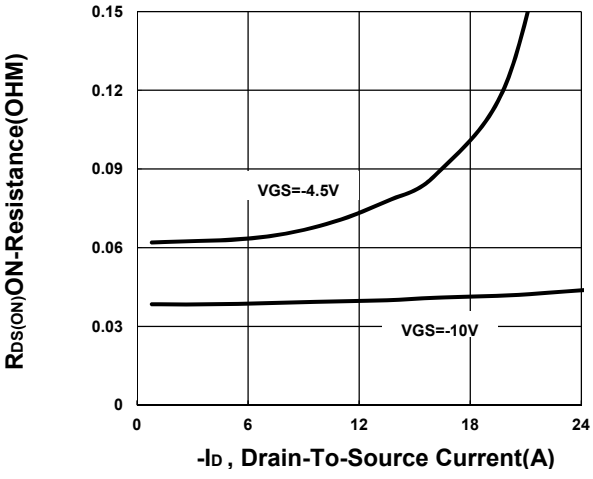


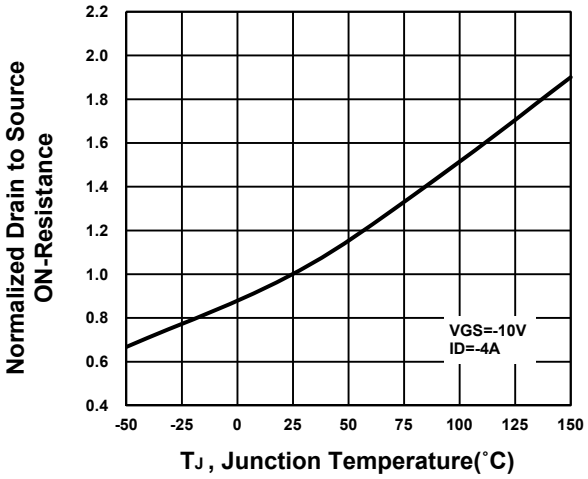
On-Resistance VS Gate-To-Source



On-Resistance VS Drain Current



On-Resistance VS Temperature



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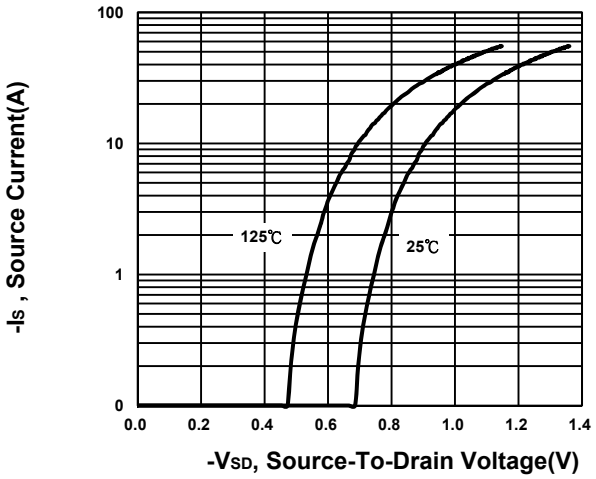

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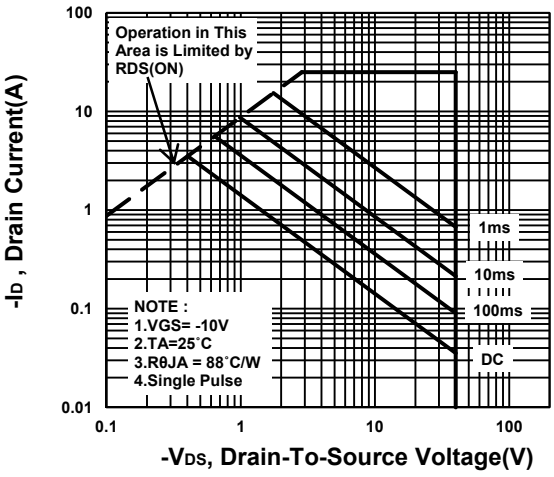

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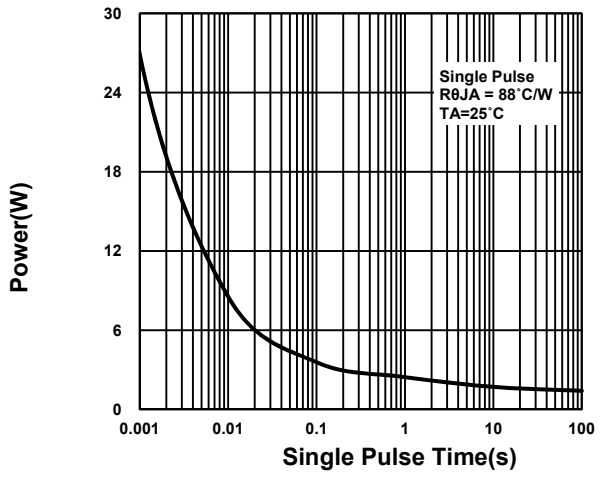

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