NIKO-SEM

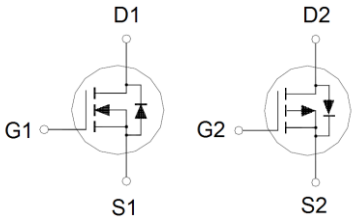
N- & P-Channel Enhancement Mode Field Effect Transistor

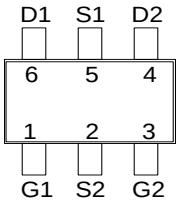
PA500CA
SOT-23-6
Halogen-Free & Lead-Free

RoHS Compliant

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	30V	60mΩ	3.4A
P-Channel	-30V	120mΩ	-2.3A





G : GATE
D : DRAIN
S : SOURCE

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 Minim ize Switching Losses.

Applications

- Protection Circuits Applications.
- Logic/Load Switch Circuits 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	T_A = 25 °C	I_D	3.4	-2.3	A
	T_A = 70 °C		2.7	-1.8	
Pulsed Drain Current[1]		I_{DM}	10	-8	
Power Dissipation[3]	T_A = 25 °C	P_D	1.3	1	W
	T_A = 70 °C		0.8	0.7	
Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE		SYMBOL	N-Channel	P-Channel	UNITS
Junction-to-Ambient[2]	t ≦10s	$R_{\theta JA}$	93	114	°C / W
	Steady-State		163	188	

[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)

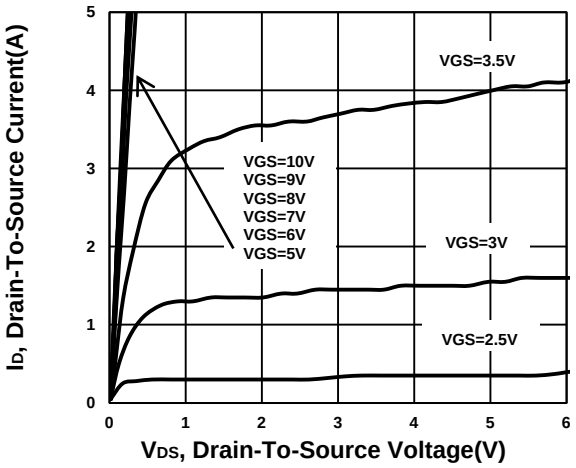
PARAMETER	SYMBOL	TEST CONDITIONS		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	N-Ch	30			V
		V_{GS} = 0V, I_D = -250μA	P-Ch	-30			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	N-Ch	1	1.5	2.5	
		V_{DS} = V_{GS}, I_D = -250μA	P-Ch	-1	-1.45	-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}=10V, V_{GS}=0V, T_J=125 °C	N-Ch			10	
		V_{DS}=-10V, V_{GS}=0V, T_J=125 °C	P-Ch			-10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 2A	N-Ch		66	100	mΩ
		V_{GS} = -4.5V, I_D = -1.5A	P-Ch		124	180	
		V_{GS} = 10V, I_D = 3.4A	N-Ch		43	60	
		V_{GS} = -10V, I_D = -2.3A	P-Ch		86	120	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 3.4A	N-Ch		6		S
		V_{DS} = -5V, I_D = -2.3A	P-Ch		4.3		
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		211		pF
			P-Ch		193		
Output Capacitance	C_{oss}		N-Ch		40		
			P-Ch		52		
Reverse Transfer Capacitance	C_{rss}		N-Ch		27		
			P-Ch		34		
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 10V, V_{GS} = 10V, I_D = 3.4A P-Channel V_{DS} =-10V, V_{GS} = -10V, I_D = -2.3A	N-Ch		5.3		nC
			P-Ch		5		
Gate-Source Charge[2]	Q_{gs}		N-Ch		0.8		
			P-Ch		0.5		
Gate-Drain Charge[2]	Q_{gd}		N-Ch		1.5		
			P-Ch		1.3		

Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DS} = 15V $I_D \cong$ 3.4A, V_{GS} = 10V, R_{GEN} = 6Ω P-Channel V_{DS} = -15V, $I_D \cong$ -2.3A,V_{GS} = -10V,R_{GEN} = 6Ω	N-Ch P-Ch		4.2 3.8		nS
Rise Time[2]	t_r		N-Ch P-Ch		37 36		
Turn-Off Delay Time[2]	$t_{d(off)}$		N-Ch P-Ch		14 19		
Fall Time[2]	t_f		N-Ch P-Ch		10 20		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current	I_S		N-Ch P-Ch			1 -0.8	A
Forward Voltage[1]	V_{SD}	I_F = 3.4A, V_{GS} = 0V I_F = -2.3A, V_{GS} = 0V	N-Ch P-Ch			1.3 -1.3	V
Reverse Recovery Time	t_{rr}	N- Channel I_F = 3.4A, dI_F/dt = 100A / μS	N-Ch P-Ch		11 7.2		nS
Reverse Recovery Charge	Q_{rr}	P-Channel I_F = -2.3A, dI_F/dt = 100A / μS	N-Ch P-Ch		3.5 2.5		nC

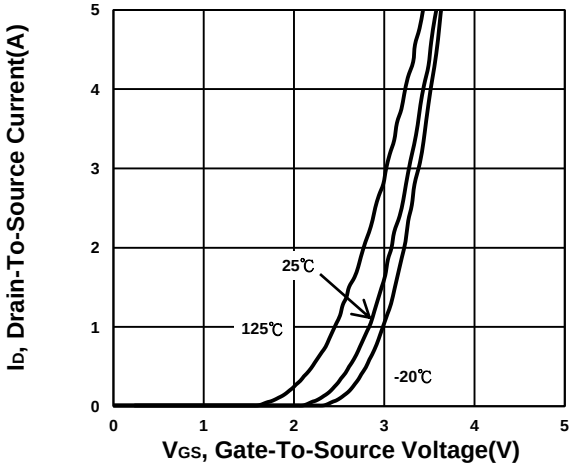
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.

N-CHANNEL

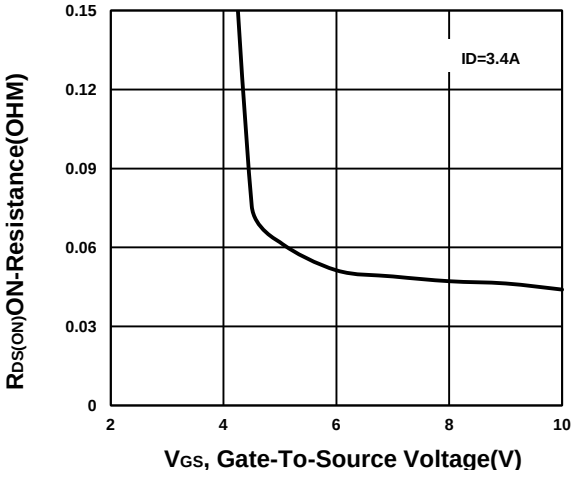
Output Characteristics



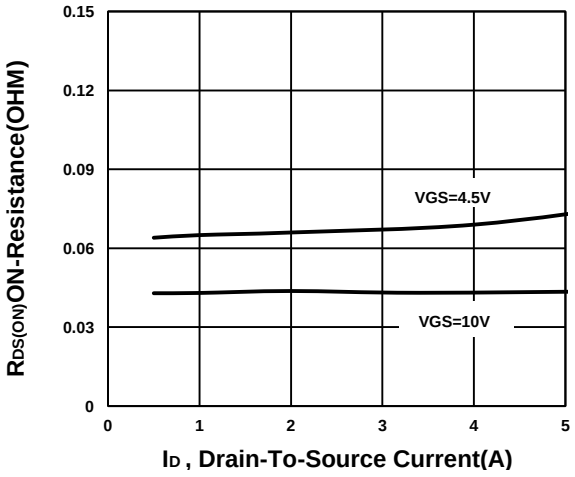
Transfer Characteristics



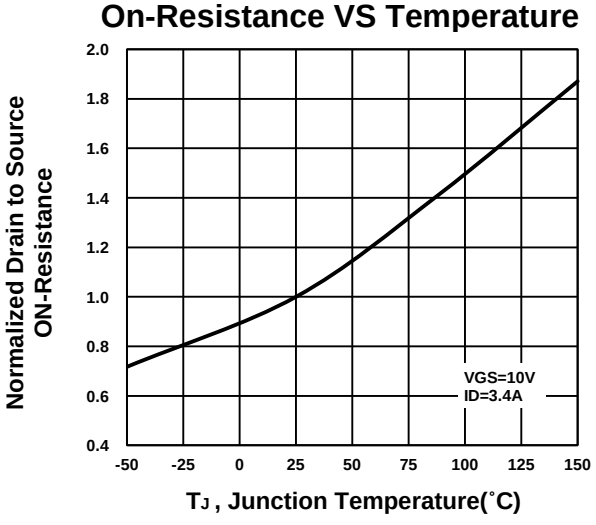
On-Resistance VS Gate-To-Source



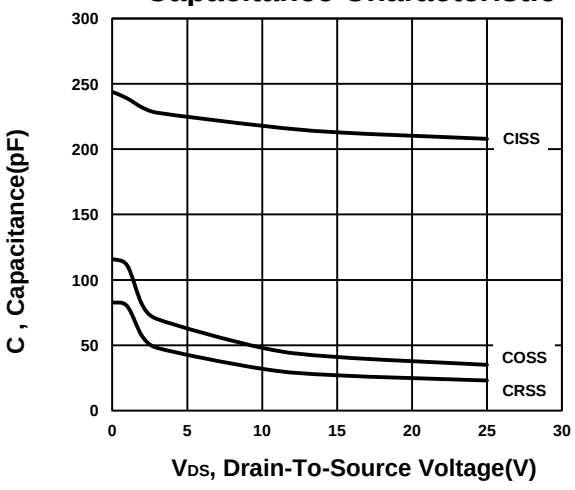
On-Resistance VS Drain Current



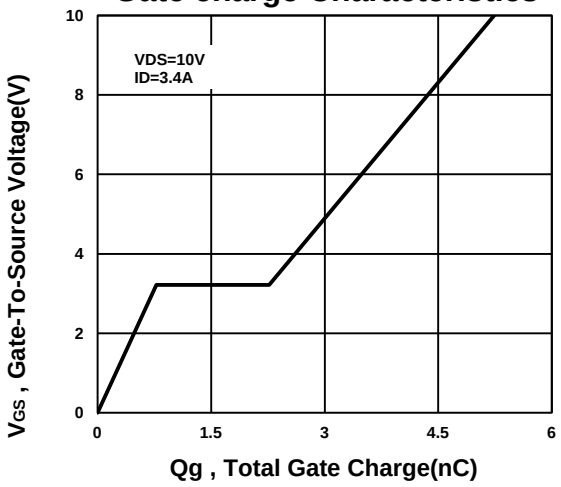
On-Resistance VS Temperature



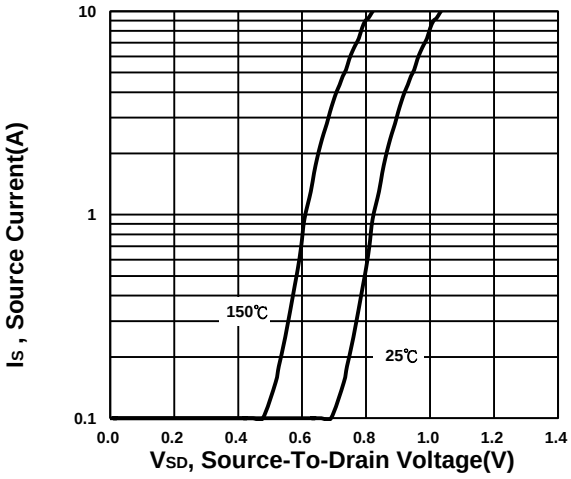
Capacitance Characteristic



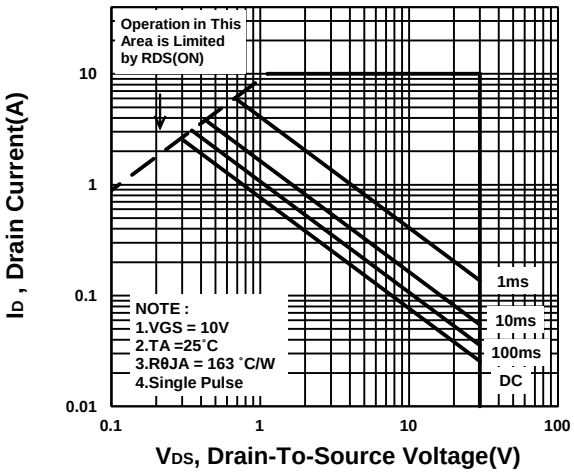
Gate charge Characteristics



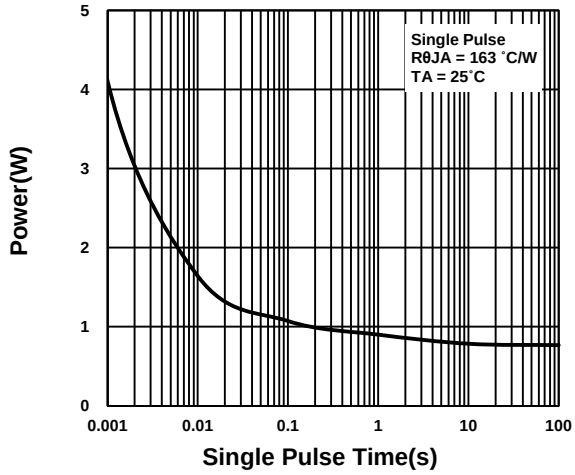
Source-Drain Diode Forward Voltage



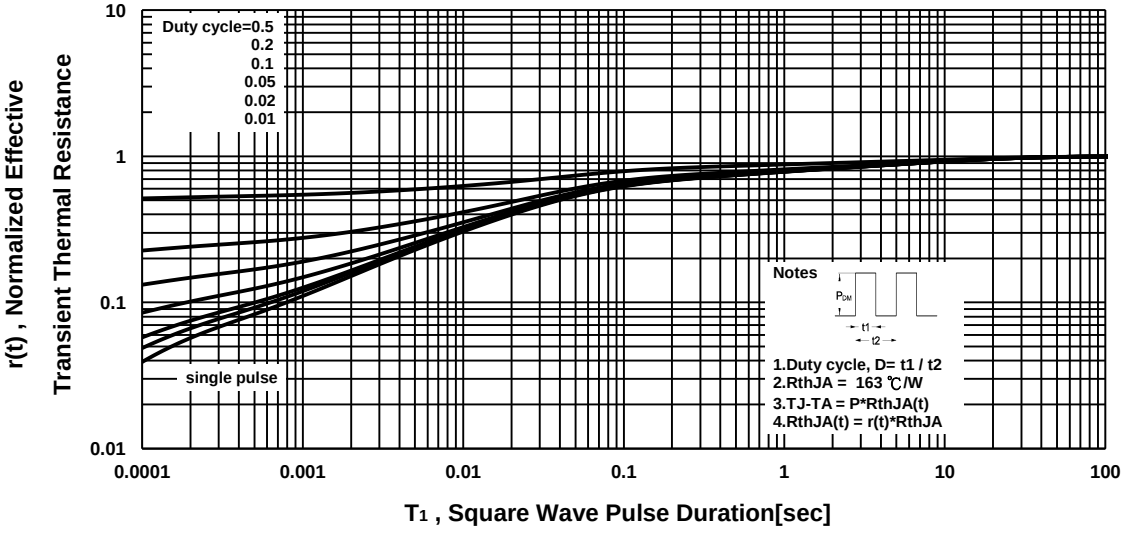
Safe Operating Area



Single Pulse Maximum Power Dissipation

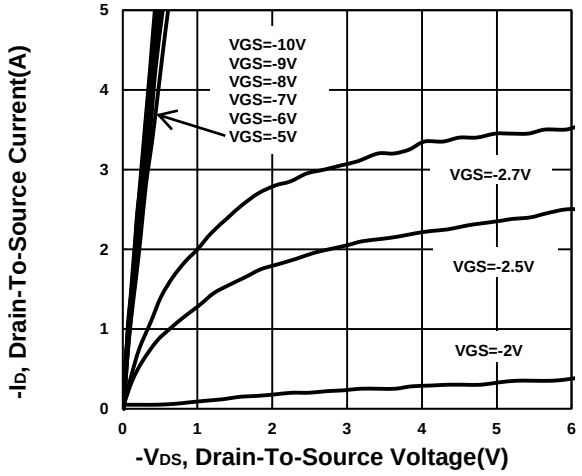


Transient Thermal Response Curve

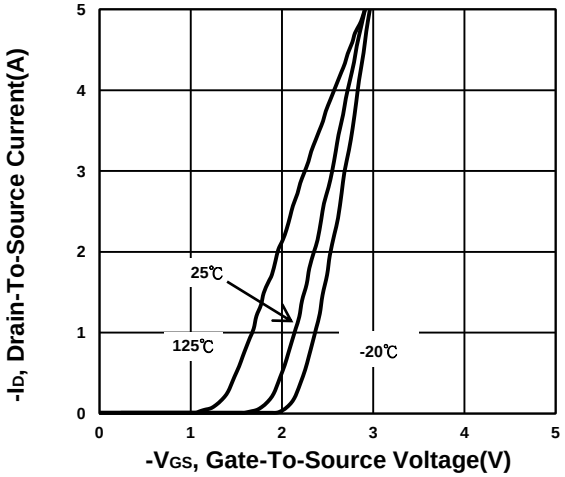


P-CHANNEL

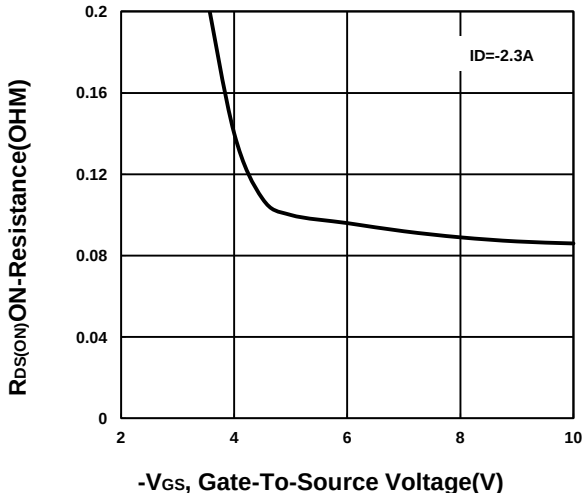
Output Characteristics



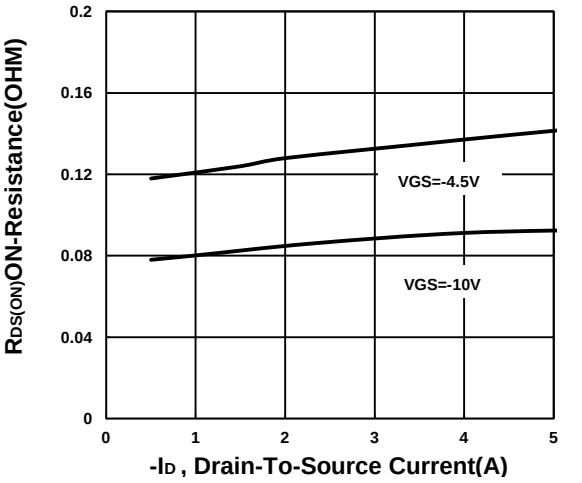
Transfer Characteristics



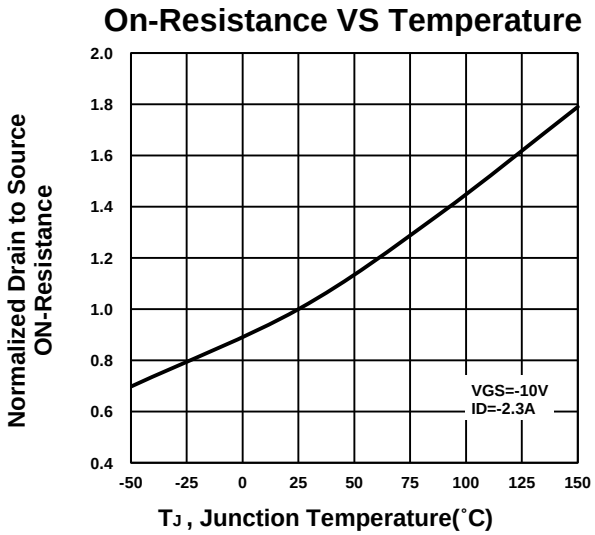
On-Resistance VS Gate-To-Source



On-Resistance VS Drain Current



On-Resistance VS Temperature



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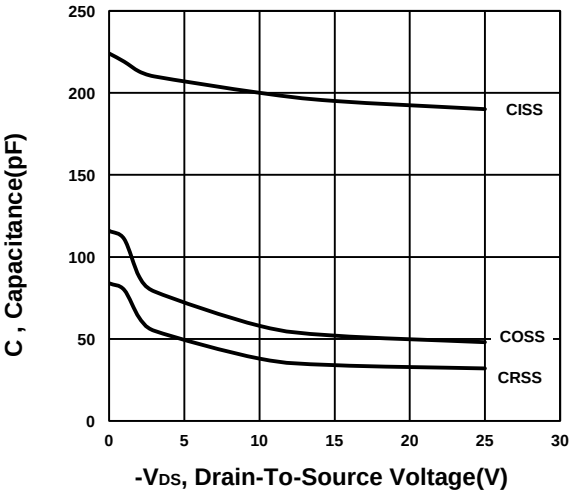

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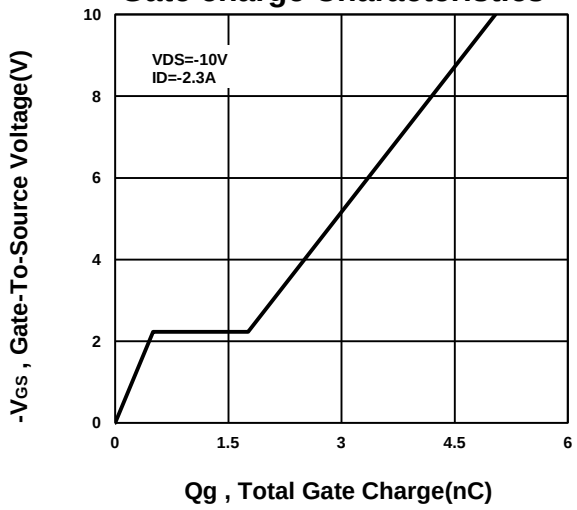

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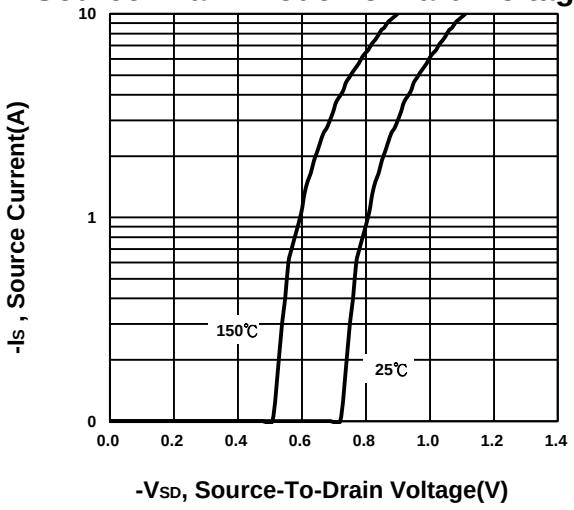

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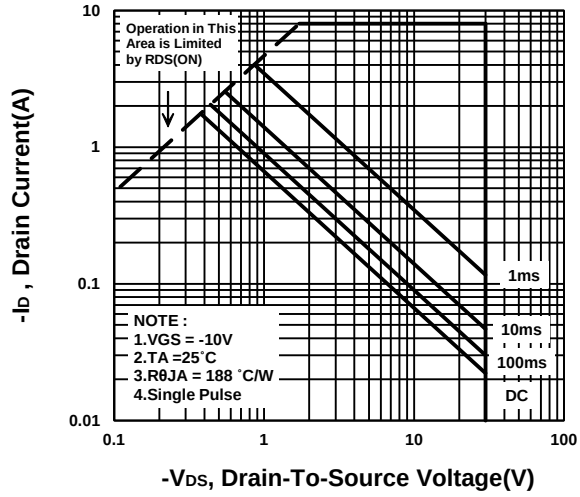

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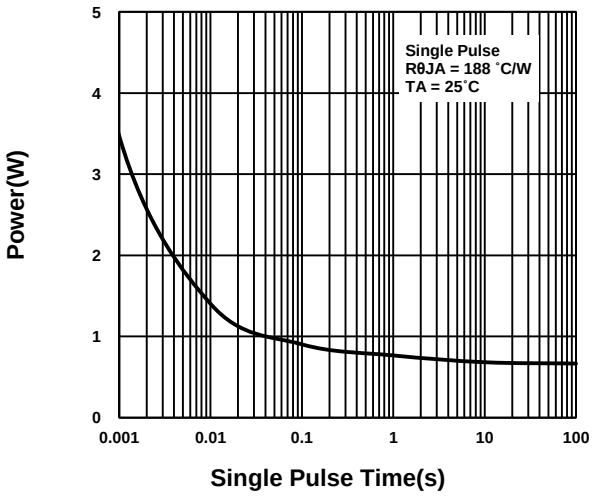

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