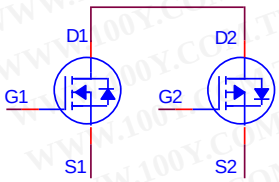
NIKO-SEM

N- & P-Channel Enhancement Mode Field Effect Transistor

PD609CX
TO-252-5
Halogen-Free & Lead-Free

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
Q2	-40V	60mΩ	-17A
Q1	40V	25mΩ	22.5A

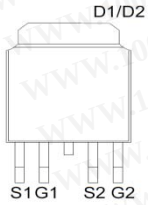


Features

- 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.



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	Q2	Q1	UNITS
Drain-Source Voltage		V_{DS}	-40	40	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	-17	22.5	A
	T_C = 100 °C		-11	14	
Pulsed Drain Current[1]		I_{DM}	-56	60	
Avalanche Current		I_{AS}	-21	14	
Avalanche Energy	L = 0.1mH	E_{AS}	22	9.8	mJ
Power Dissipation	T_C = 25 °C	P_D	34	26.5	W
	T_C = 100 °C		13.8	10.6	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL		TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	$R_{\theta JA}$	Q2		62.5	°C / W
		Q1		62.5	
Junction-to-Case	$R_{\theta JC}$	Q2		3.6	
		Q1		4.7	

[1]Pulse width limited by maximum junction temperature.
[2]Package limitation current :Q1=15A,Q2=-15A

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	Q2	-40			V
		V_{GS} = 0V, I_D = 250μA	Q1	40			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	Q2	-1.3	-1.85	-2.3	
		V_{DS} = V_{GS}, I_D = 250μA	Q1	1.3	1.6	2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	Q2			±100	nA
		V_{DS} = 0V, V_{GS} = ±20V	Q1			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -32V, V_{GS} = 0V	Q2			-1	μA
		V_{DS} = 32V, V_{GS} = 0V	Q1			1	
		V_{DS} = -30, V_{GS} = 0V, T_J = 55 °C	Q2			-10	
		V_{DS} = 30V, V_{GS} = 0V, T_J = 55 °C	Q1			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -4A	Q2		57	90	mΩ
		V_{GS} = 4.5V, I_D = 6A	Q1		21	35	
		V_{GS} = -10V, I_D = -4A	Q2		36	60	
		V_{GS} = 10V, I_D = 6A	Q1		18	25	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -4A	Q2		10		S
		V_{DS} = 5V, I_D = 6A	Q1		27		
DYNAMIC							
Input Capacitance	C_{iss}	Q2 V_{GS} = 0V, V_{DS} = -20V, f = 1MHz Q1 V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	Q2		538		pF
			Q1		460		
Output Capacitance	C_{oss}		Q2		127		
			Q1		66		
Reverse Transfer Capacitance	C_{rss}		Q2		73		
			Q1		39		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	Q2		14		Ω
			Q1		4.6		

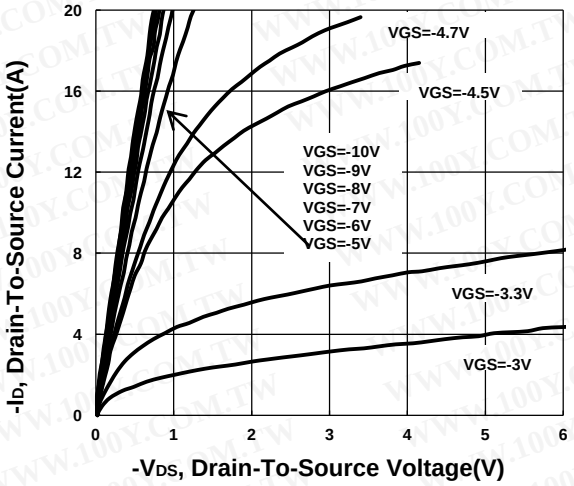
Total Gate Charge[2]	Q_g	VGS = 10V	Q2 V_{DS} = -20V , V_{GS} = -10V, I_D = -4A Q1 V_{DS} = 20V , V_{GS} = 10V, I_D =6A	Q2		11.6		nC
				Q1		9.9		
		VGS = 4.5V		Q2		6.5		
				Q1		5.6		
Gate-Source Charge[2]	Q_{gs}			Q2		1.5		
				Q1		1.3		
Gate-Drain Charge[2]	Q_{gd}			Q2		3.3		
				Q1		2.6		
Turn-On Delay Time[2]	$t_{d(on)}$		Q2 , V_{DS} = -20V , $I_D \cong$ -4A, V_{GS} = -10V, R_{GEN} =6Ω Q1 , V_{DS} = 20V , $I_D \cong$ 6A, V_{GS} = 10V, R_{GEN} =6Ω	Q2		11		nS
				Q1		9.5		
Rise Time[2]	t_r			Q2		26		
				Q1		37		
Turn-Off Delay Time[2]	$t_{d(off)}$			Q2		54		
				Q1		24		
Fall Time[2]	t_f			Q2		47		
				Q1		63		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)								
Continuous Current[3]	I_S			Q2			-17	A
				Q1			22	
Forward Voltage[1]	V_{SD}		I_F = -4A, V_{GS} = 0V	Q2			-1.2	V
			I_F = 6A, V_{GS} = 0V	Q1			1.2	
Reverse Recovery Time	t_{rr}		Q2 I_F = -4A, dI_F/dt = 100A / μS Q1 I_F = 6A, dI_F/dt = 100A / μS	Q2		12		nS
				Q1		10		
Reverse Recovery Charge	Q_{rr}			Q2		6		nC
				Q1		5		

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current :Q1=15A,Q2=-15A

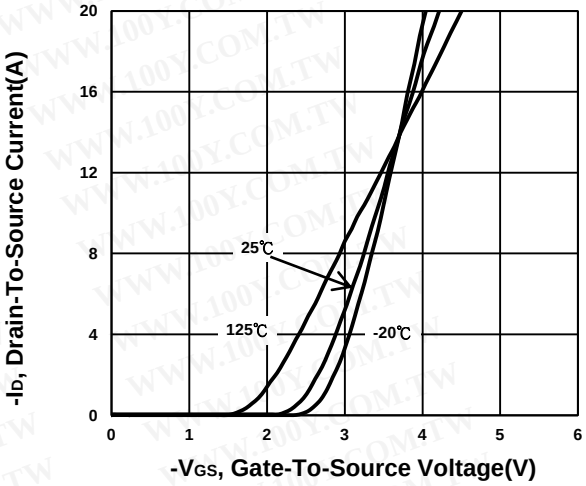
Typical performance characteristics

Q2 P-Channel

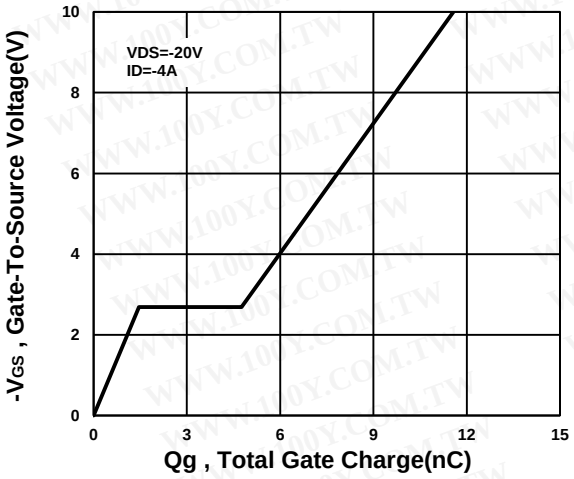
Output Characteristics



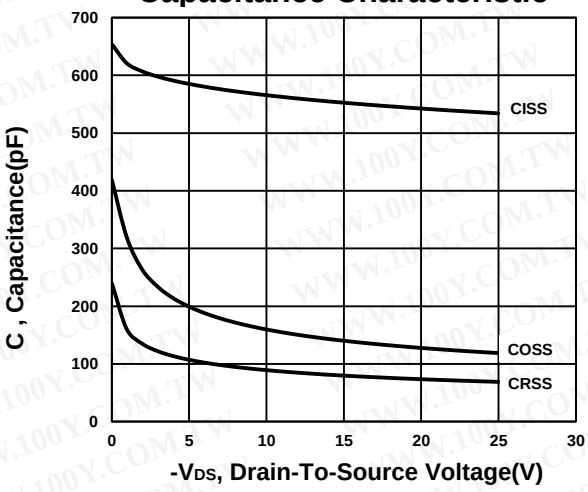
Transfer Characteristics



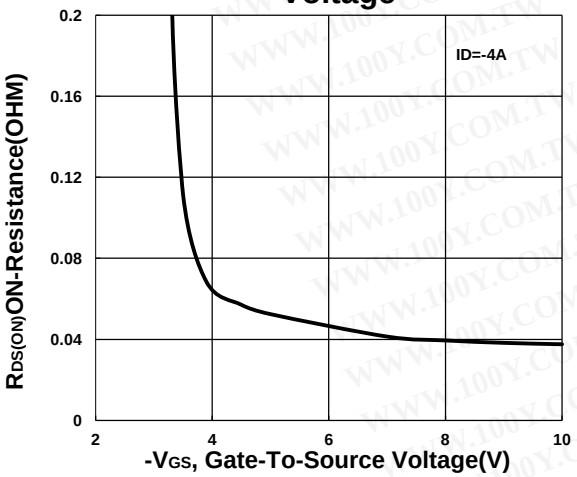
Gate charge Characteristics



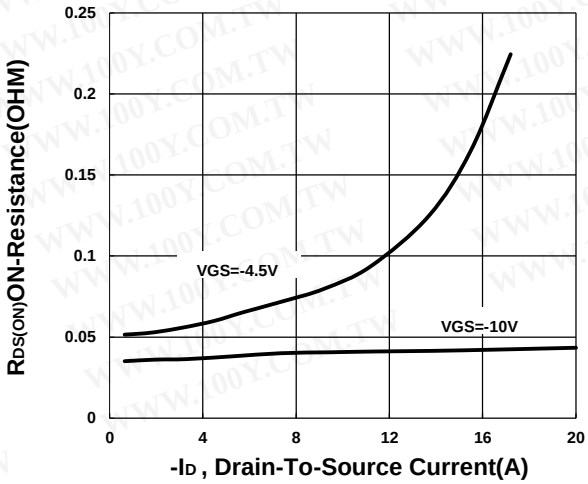
Capacitance Characteristic



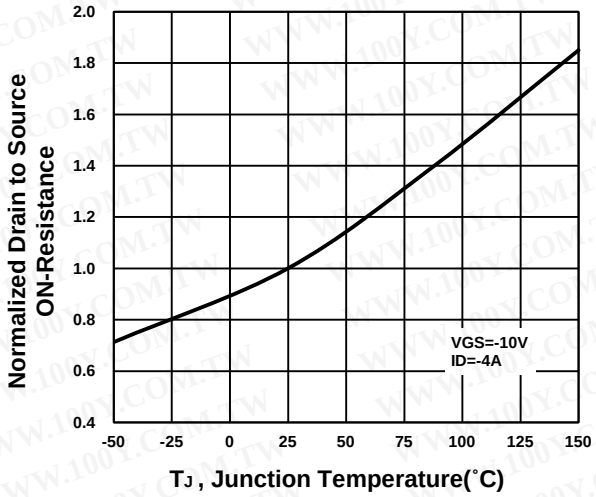
On-Resistance VS Gate-To-Source Voltage



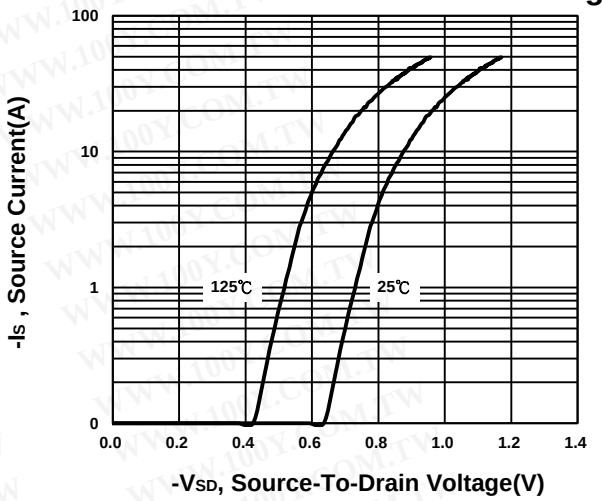
On-Resistance VS Drain Current



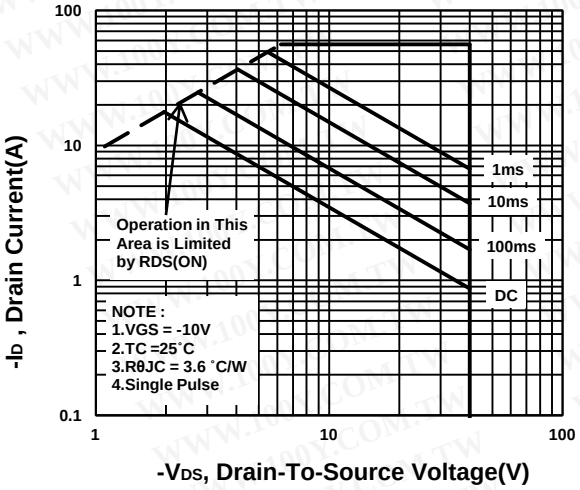
On-Resistance VS Temperature



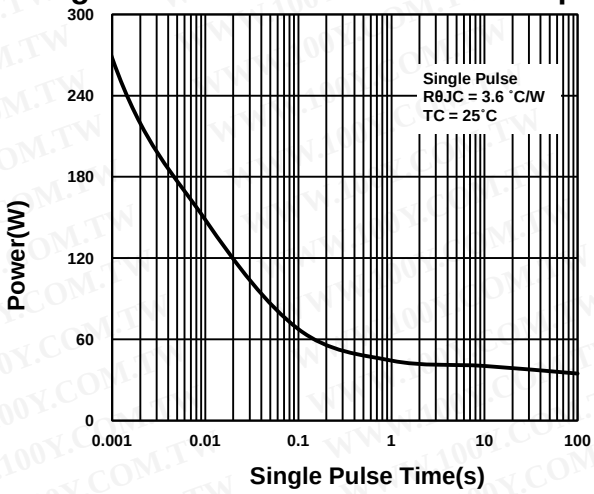
Source-Drain Diode Forward Voltage



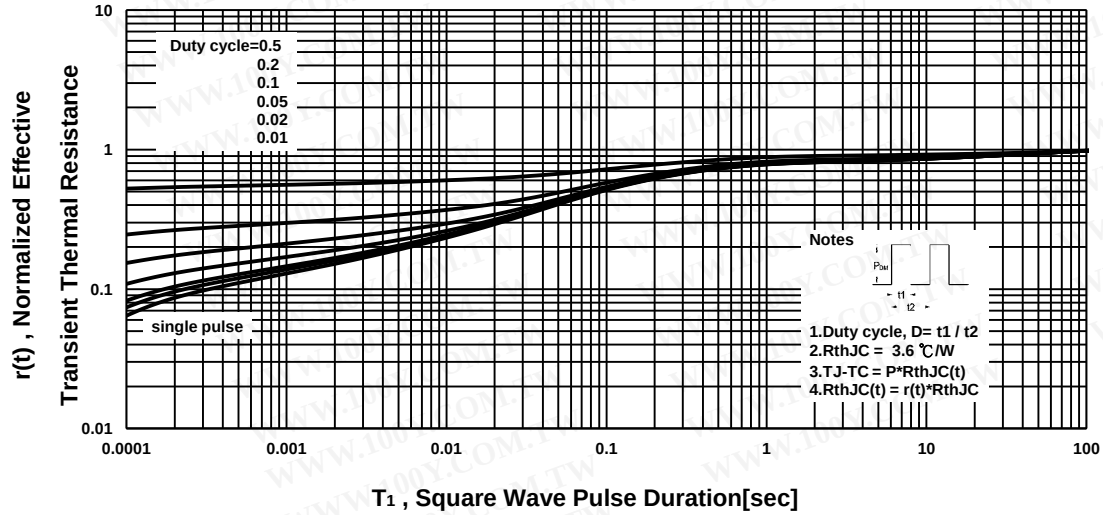
Safe Operating Area



Single Pulse Maximum Power Dissipation

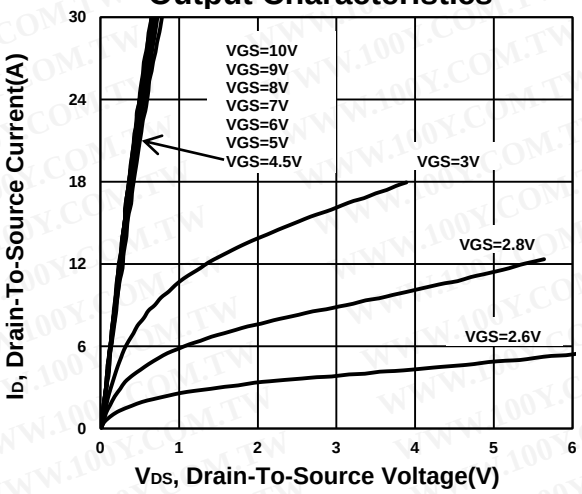


Transient Thermal Response Curve

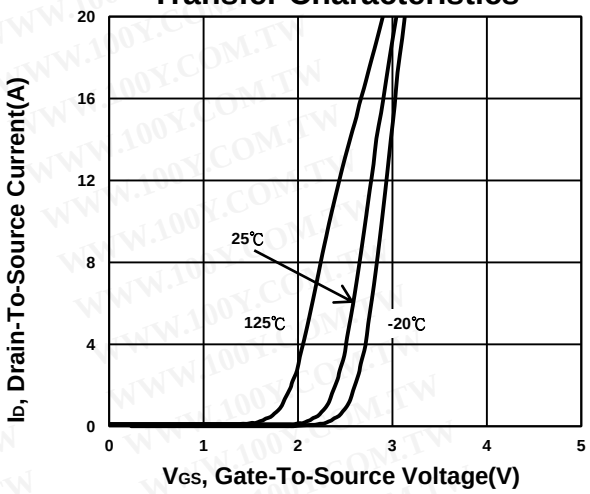


Q1 N- Channel

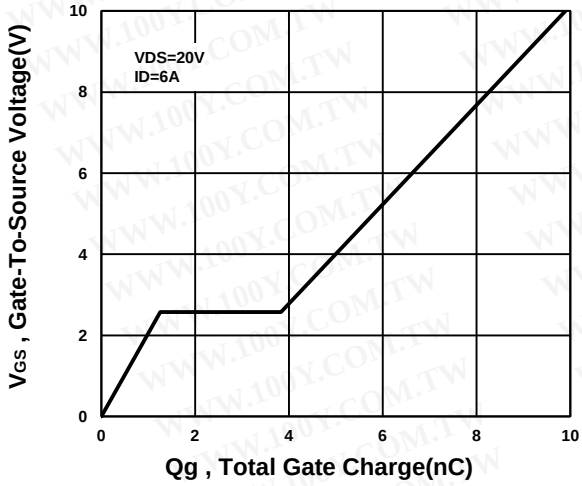
Output Characteristics



Transfer Characteristics



Gate charge Characteristics



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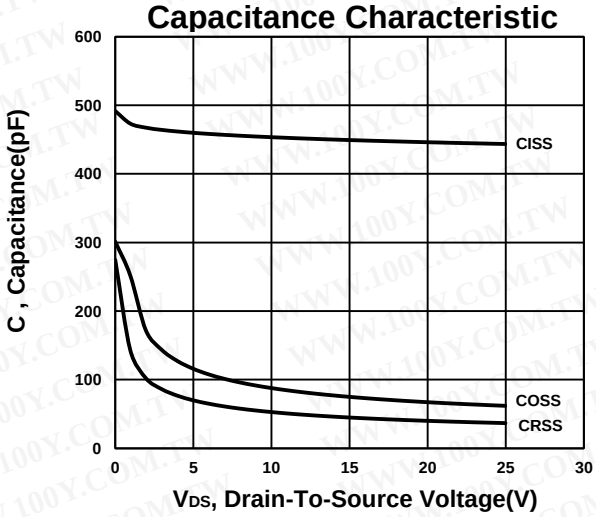
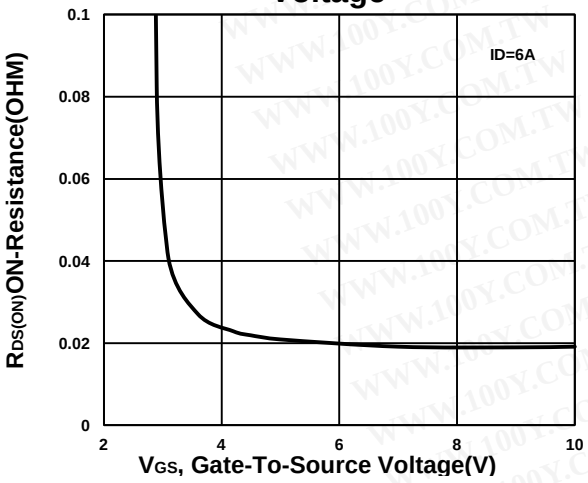
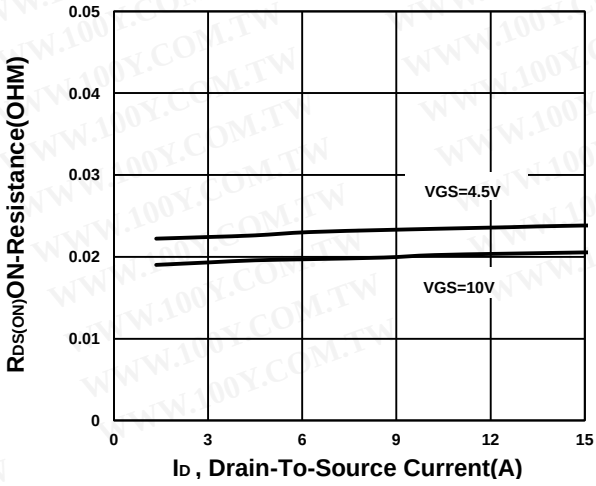


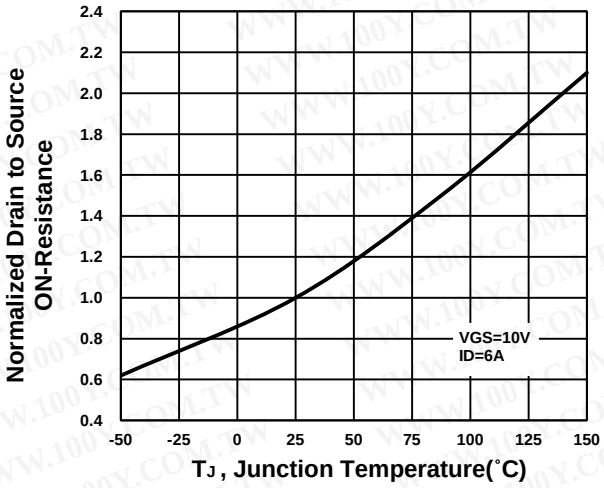
On-Resistance VS Gate-To-Source Voltage



On-Resistance VS Drain Current



On-Resistance VS Temperature



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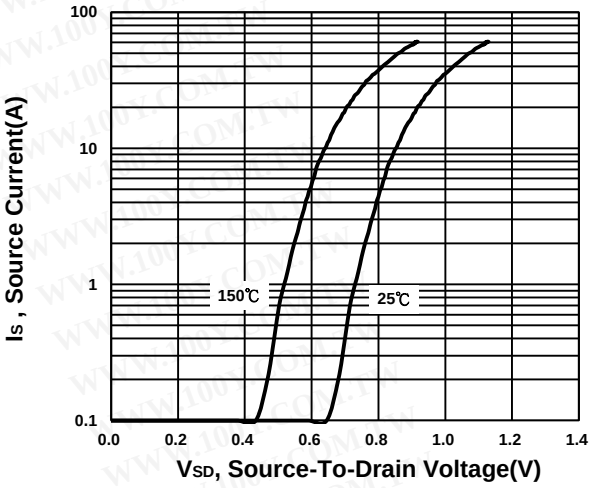

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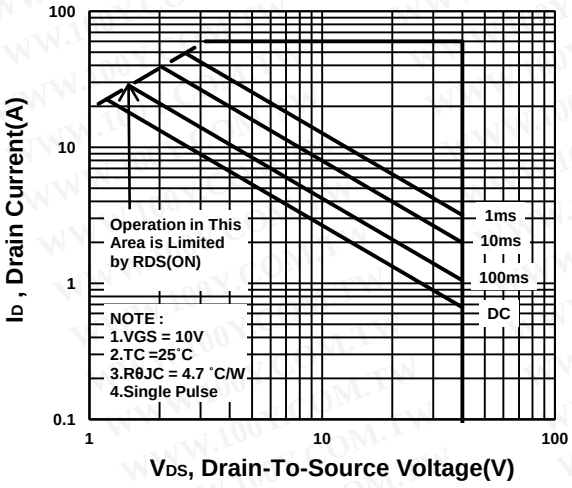

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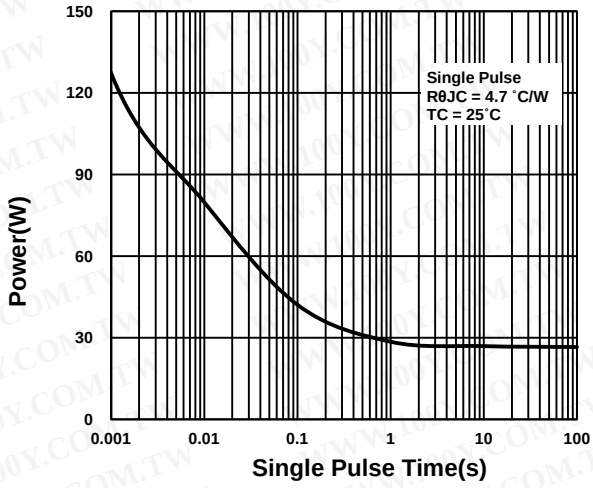

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