NIKO-SEM

N- & P-Channel Enhancement Mode Field Effect Transistor

P2804ND5G

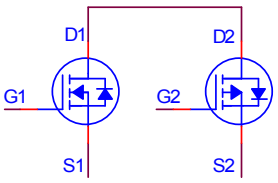
TO-252-5

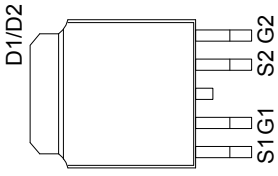
Halogen-Free & Lead-Free

RoHS Compliant

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	40V	28mΩ	21A
P-Channel	-40V	48mΩ	-16A





G : GATE
D : DRAIN
S : SOURCE

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_C = 25 °C	I_D	21	-16	A
	T_C = 100 °C		13	-10	
Pulsed Drain Current[1]		I_{DM}	50	-50	
Avalanche Current		I_{AS}	26	-26	
Avalanche Energy	L=0.1mH	E_{AS}	33	33	mJ
Power Dissipation	T_C = 25 °C	P_D	21		W
	T_C = 100 °C		8		
Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		6	°C / W
Junction-to-Ambient	$R_{\theta JA}$		40	°C / W

[1]Pulse width limited by maximum junction temperature.

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	2	3	
		V_{DS} = V_{GS}, I_D = -250μA	P-Ch	-1	-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	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	N-Ch	50			A
		V_{DS} =-5V, V_{GS} = -10V	P-Ch	-50			
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 5V, I_D = 6A	N-Ch		35	49	mΩ
		V_{GS} = -5V, I_D = -4.5A	P-Ch		65	85	
		V_{GS} = 10V, I_D = 7A	N-Ch		18	28	
		V_{GS} = -10V, I_D = -5.5A	P-Ch		33	48	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 7A	N-Ch		16		S
		V_{DS} = -10V, I_D = -5.5A	P-Ch		11		

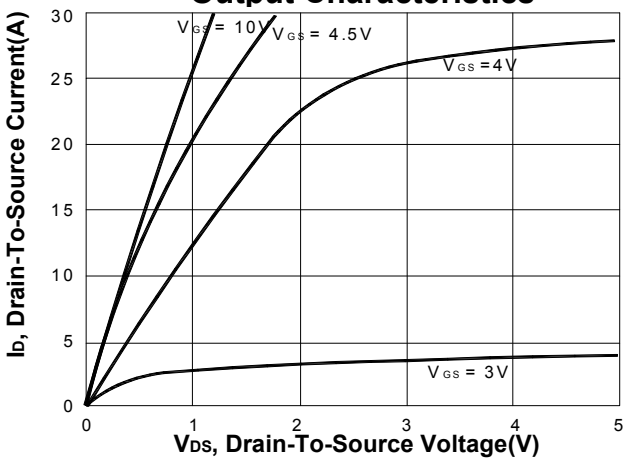
DYNAMIC							
Input Capacitance	C_{iss}	N-Channel V_{GS} = 0V, V_{DS} = 20V, f = 1MHz P-Channel V_{GS} = 0V, V_{DS} = -20V, f = 1MHz	N-Ch		797		pF
			P-Ch		856		
Output Capacitance	C_{oss}		N-Ch		180		
			P-Ch		191		
Reverse Transfer Capacitance	C_{rss}		N-Ch		132		
			P-Ch		128		
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = 10V, I_D = 7A P-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -10V, I_D = -5.5A	N-Ch		17		nC
			P-Ch		18		
Gate-Source Charge[2]	Q_{gs}		N-Ch		4		
			P-Ch		4		
Gate-Drain Charge[2]	Q_{gd}		N-Ch		5		
			P-Ch		6		

Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel	N-Ch		10		nS
			P-Ch		10		
Rise Time[2]	t_r	V_{DS} = 20V	N-Ch		15		
		$I_D \cong$ 1A, V_{GS} = 10V, R_{GEN} = 6Ω	P-Ch		10		
Turn-Off Delay Time[2]	$t_{d(off)}$	P-Channel	N-Ch		20		
			P-Ch		25		
Fall Time[2]	t_f	V_{DS} = -20V	N-Ch		10		
		$I_D \cong$ -1A, V_{GS} = -10V, R_{GEN} = 6Ω	P-Ch		5		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Forward Voltage[1]	V_{SD}	I_F = 7A, V_{GS} = 0V	N-Ch			1	V
		I_F = -5.5A, V_{GS} = 0V	P-Ch			-1	
Continuous Current	I_S		N-Ch			21	A
			P-Ch			-16	
Reverse Recovery Time	t_{rr}	I_F = 7A, dI_F/dt = 100A / μS	N-Ch		25		nS
		I_F = -5.5A, dI_F/dt = 100A / μS	P-Ch		35		
Reverse Recovery Charge	Q_{rr}		N-Ch		35		nC
			P-Ch		40		

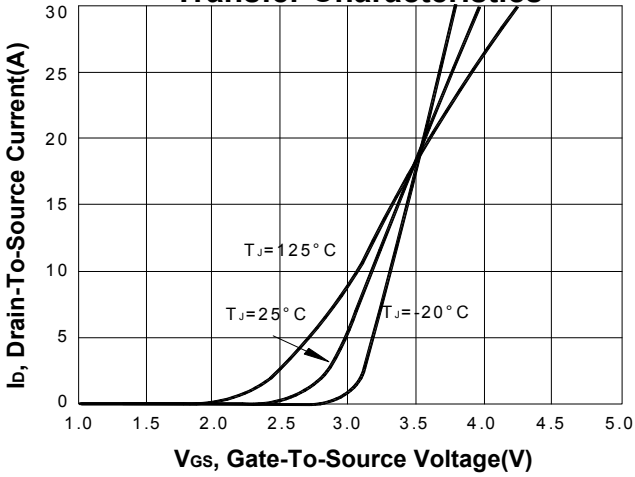
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.

TYPICAL PERFORMANCE CHARACTERISTICS
N-CHANNEL

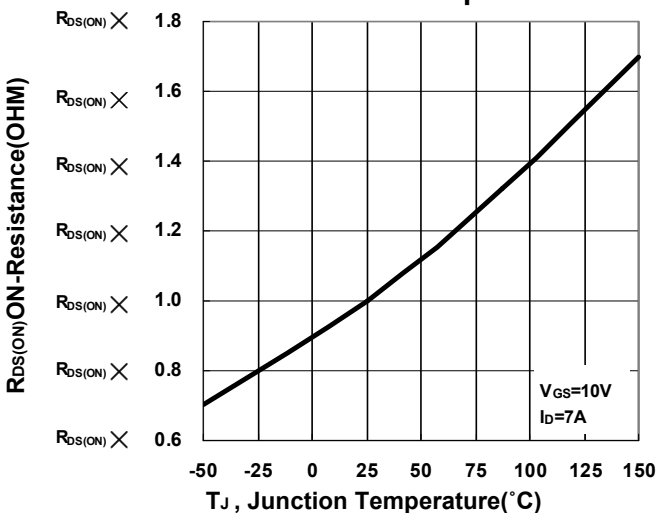
Output Characteristics



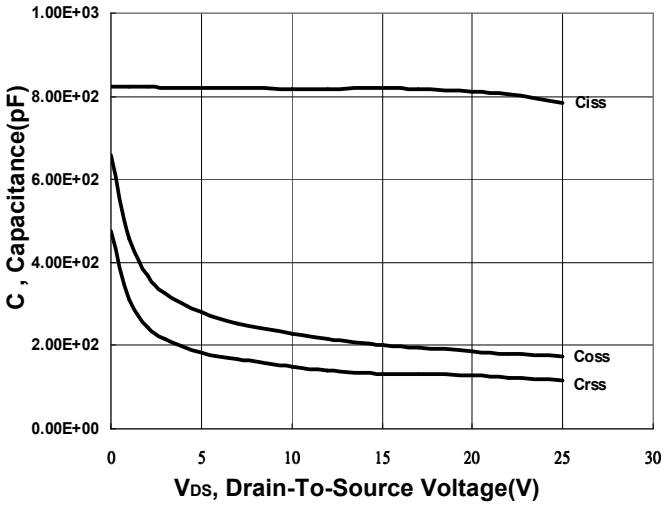
Transfer Characteristics



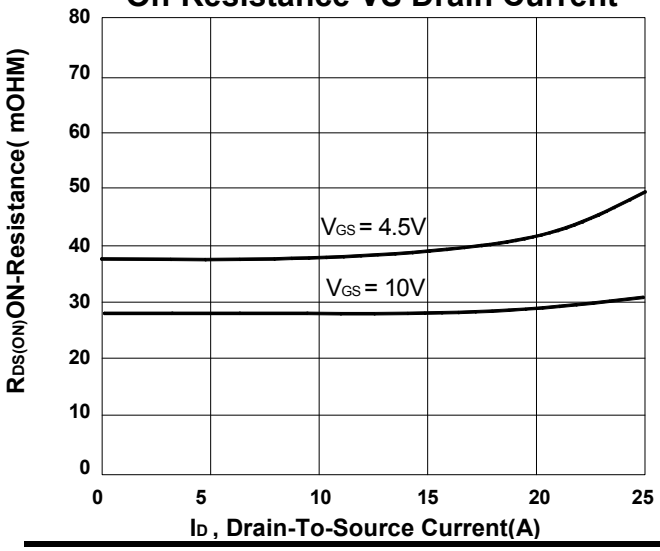
On-Resistance VS Temperature



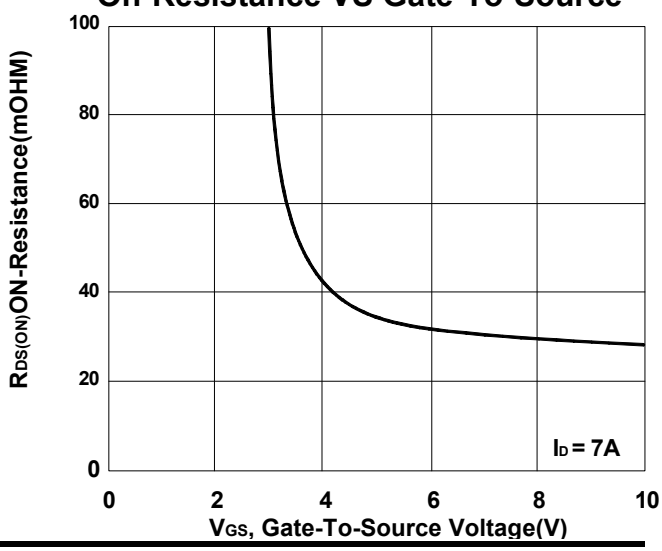
Capacitance Characteristic



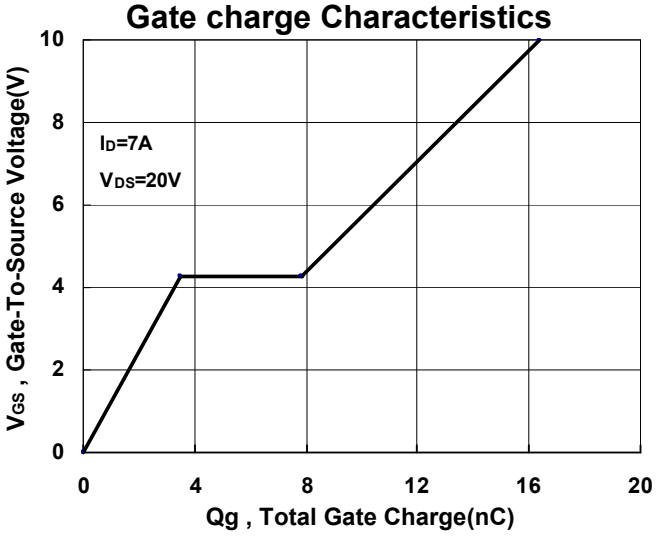
On-Resistance VS Drain Current



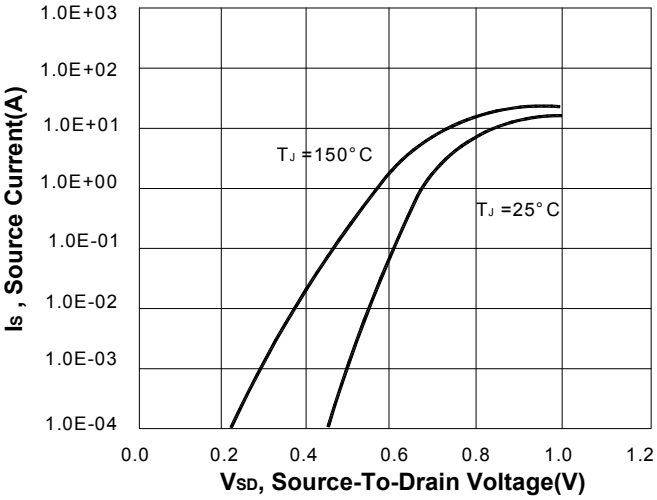
On-Resistance VS Gate-To-Source



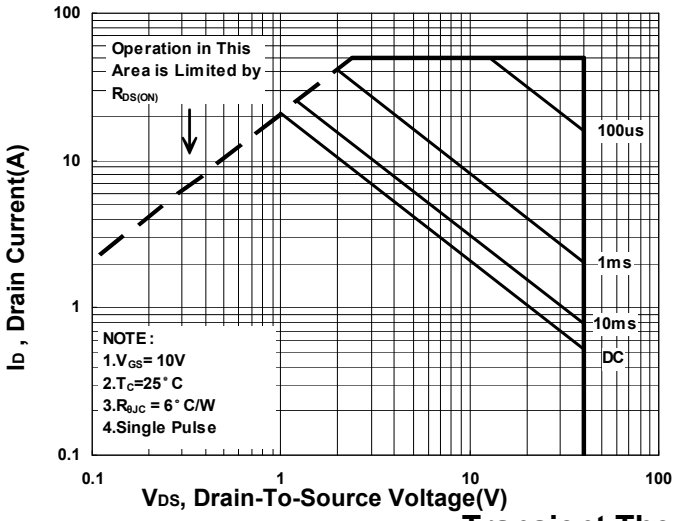
Gate charge Characteristics



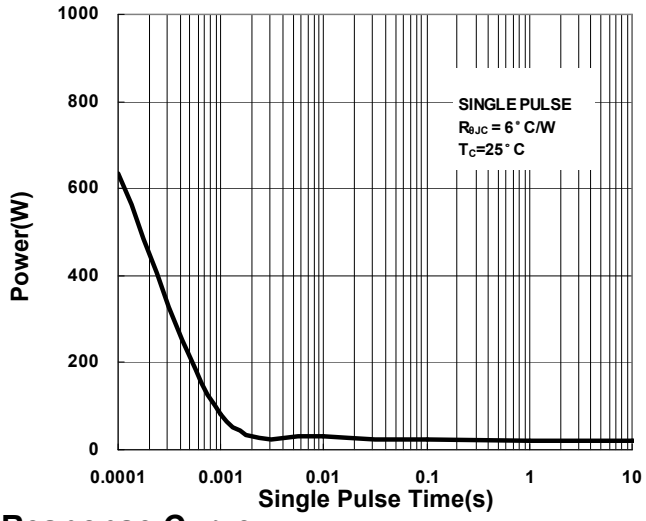
Source-Drain Diode Forward Voltage



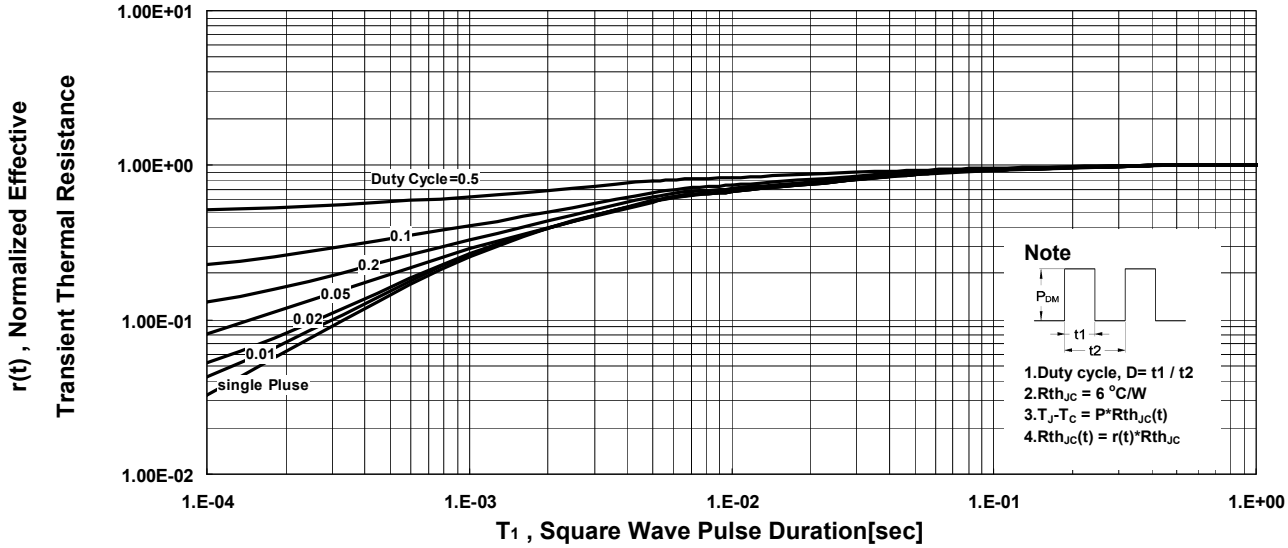
Safe Operating Area



Single Pulse Maximum Power Dissipation

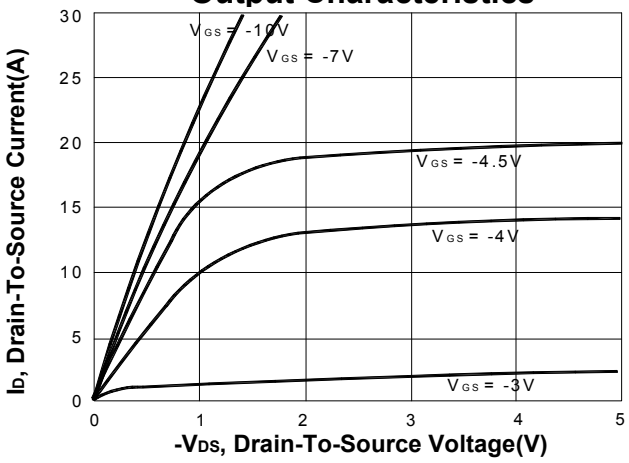


Transient Thermal Response Curve

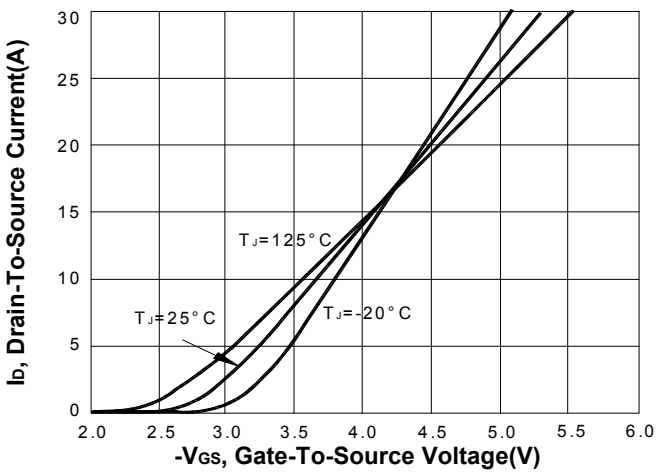


TYPICAL PERFORMANCE CHARACTERISTICS
P-CHANNEL

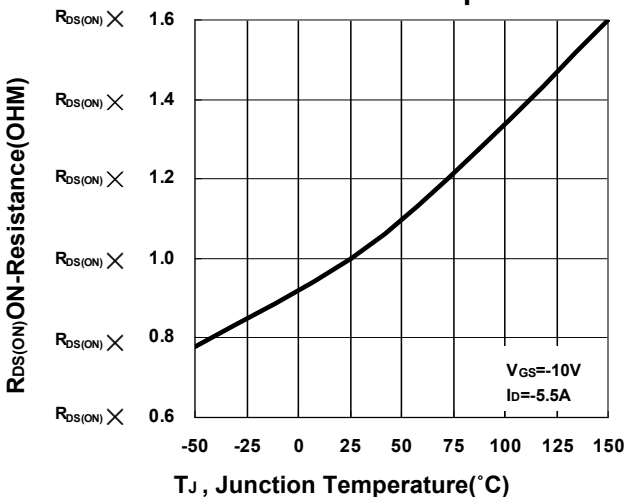
Output Characteristics



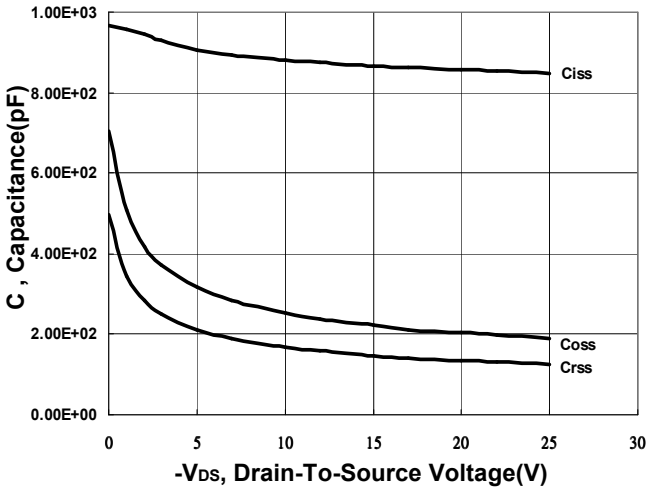
Transfer Characteristics



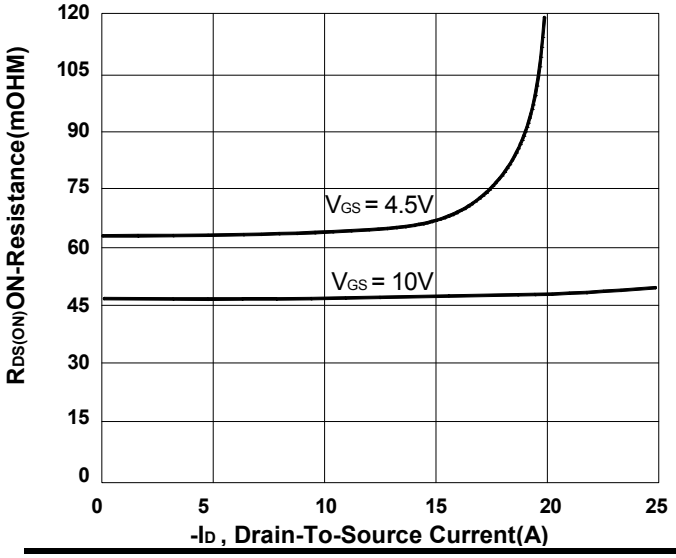
On-Resistance VS Temperature



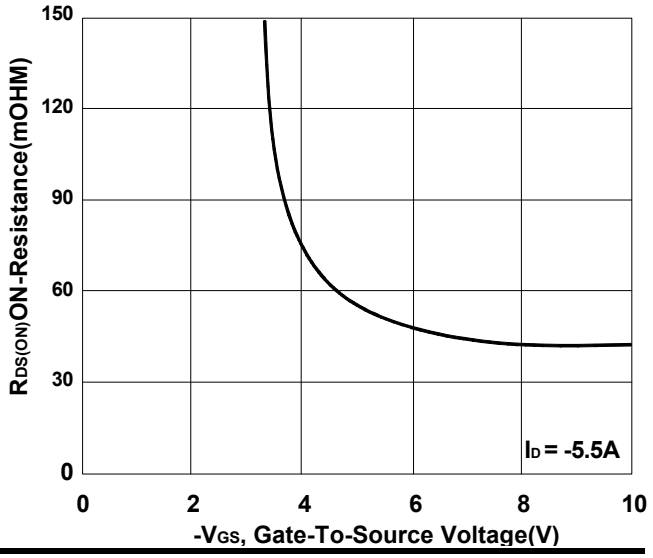
Capacitance Characteristic



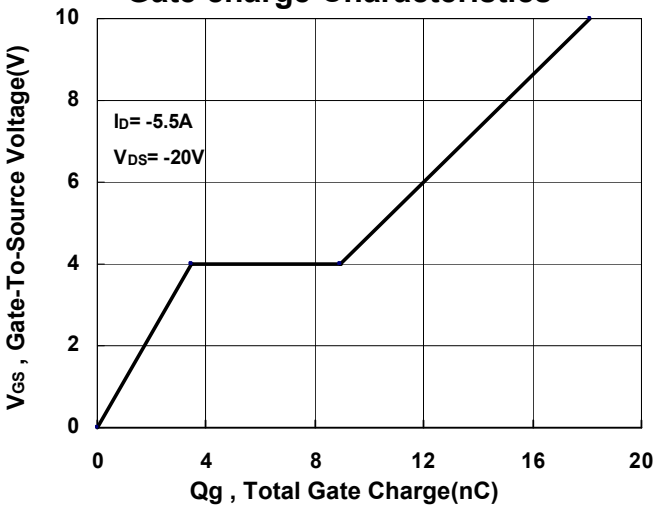
On-Resistance VS Drain Current



On-Resistance VS Gate-To-Source



Gate charge Characteristics



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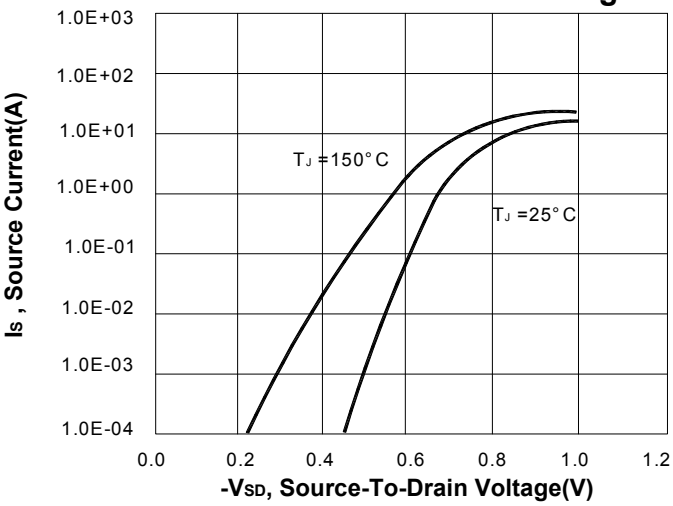
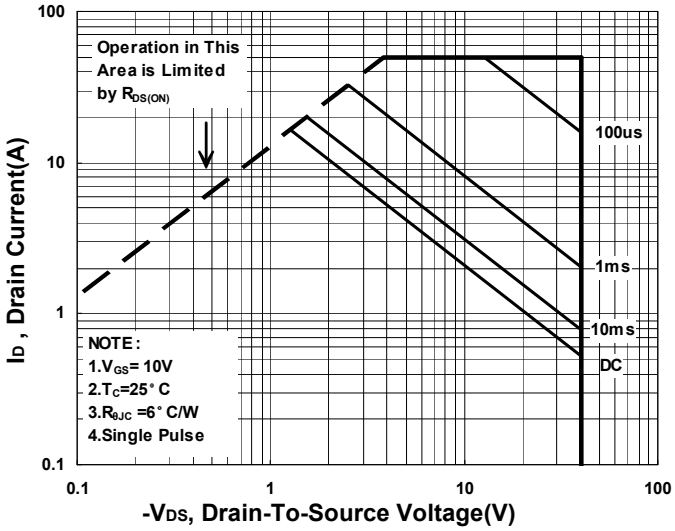


Safe Operating Area



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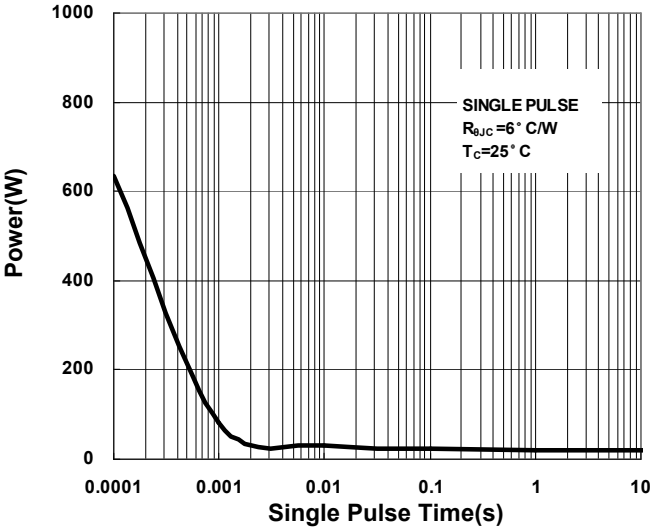

Transient Thermal Response Curve