NIKO-SEM

N- & P-Channel Enhancement Mode Field Effect Transistor

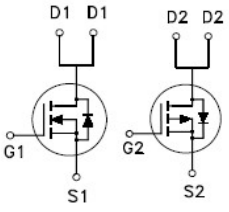
P3606NEA

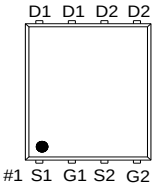
PDFN 3x3P

Halogen-Free & Lead-Free

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
Q2	-60V	108mΩ	-9.7A
Q1	60V	38mΩ	16A





G. GATE
D. DRAIN
S. SOURCE

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

PARAMETERS/TEST CONDITIONS		SYMBOL	Q2	Q1	UNITS
Drain-Source Voltage		V_{DS}	-60	60	V
Gate-Source Voltage		V_{GS}	±25	±20	V
Continuous Drain Current[4]	T_C = 25 °C	I_D	-9.7	16	A
	T_C = 100 °C		-6.1	10	
Pulsed Drain Current[1]		I_{DM}	-25	30	
Continuous Drain Current	T_A = 25 °C	I_D	-2.8	5	
	T_A = 70 °C		-2.3	4	
Avalanche Current		I_{AS}	-16	20	
Avalanche Energy	L = 0.1mH	E_{AS}	12.8	20	mJ
Power Dissipation[3]	T_C = 25 °C	P_D	20	23	W
	T_C = 100 °C		8.1	9	
Power Dissipation[3]	T_A = 25 °C	P_D	1.8	2	W
	T_A = 70 °C		1.1	1.3	
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[2]	t ≦10s	$R_{\theta JA}$	Q2		70	°C / W
	Steady-State				100	
Junction-to-Ambient[2]	t ≦10s	$R_{\theta JA}$	Q1		60	
	Steady-State				90	
Junction-to-Case		$R_{\theta JC}$	Q2		6.1	
			Q1		5.5	

[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 :Q1=12A,Q2=-10A

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	-60			V
		V_{GS} = 0V, I_D = 250μA	Q1	60			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	Q2	-1.3	-1.8	-2.3	
		V_{DS} = V_{GS}, I_D = 250μA	Q1	1.3	1.8	2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±25V	Q2			±100	nA
		V_{DS} = 0V, V_{GS} = ±20V	Q1			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -60V, V_{GS} = 0V	Q2			-1	μA
		V_{DS} = 60V, V_{GS} = 0V	Q1			1	
		V_{DS} = -60V, V_{GS} = 0V, T_J = 55 °C	Q2			-10	
		V_{DS} = 60V, V_{GS} = 0V, T_J = 55 °C	Q1			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -3.6A	Q2		123	150	mΩ
		V_{GS} = 4.5V, I_D = 6A	Q1		35	50	
		V_{GS} = -10V, I_D = -3.6A	Q2		90	108	
		V_{GS} = 10V, I_D = 6A	Q1		30	38	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -3.6A	Q2		8.2		S
		V_{DS} = 5V, I_D = 6A	Q1		23		

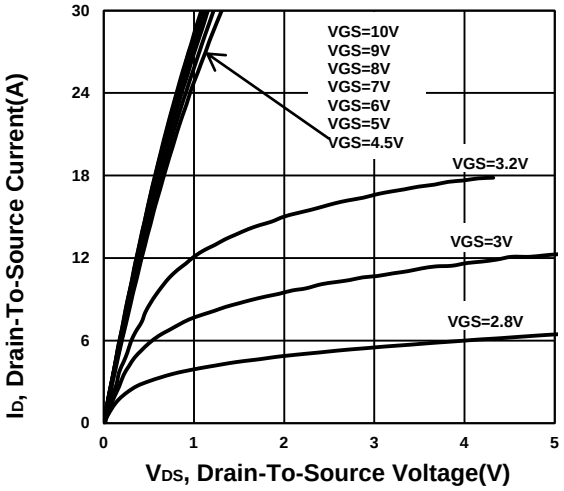
DYNAMIC							
Input Capacitance	C_{iss}	Q2 V_{GS} = 0V, V_{DS} = -30V, f = 1MHz Q1 V_{GS} = 0V, V_{DS} = 30V, f = 1MHz	Q2	429	537	644	pF
			Q1	480	600	720	
Output Capacitance	C_{oss}		Q2	56	71	85	
			Q1	57	72	86	
Reverse Transfer Capacitance	C_{rss}		Q2	26	44	62	
			Q1	32	54	76	
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	Q2	4.5	9	13.5	Ω
			Q1	0.8	1.6	2.4	
Total Gate Charge[2]	Q_g VGS = 10V	Q2 V_{DS} = -30V , V_{GS} = -10V, I_D = -3.6A Q1 V_{DS} = 30V , V_{GS} = 10V, I_D = 6A	Q2	8.8	11	13	nC
			Q1	12	15.7	19	
	Q_g VGS = 4.5V		Q2	5	6.4	7.7	
			Q1	7	9	11	
Gate-Source Charge[2]	Q_{gs}		Q2	1.3	1.6	1.9	
			Q1	1.4	1.8	2.2	
Gate-Drain Charge[2]	Q_{gd}		Q2	1.9	3.2	4.5	
			Q1	3.1	5.1	7.1	
Turn-On Delay Time[2]	$t_{d(on)}$	Q2 , V_{DS} = -30V , $I_D \cong$ -3.6A, V_{GS} = -10V, R_{GEN} =6Ω Q1 , V_{DS} = 30V , $I_D \cong$ 6A, V_{GS} = 10V, R_{GEN} =6Ω	Q2		6.5		nS
			Q1		7.5		
Rise Time[2]	t_r		Q2		11		
			Q1		18		
Turn-Off Delay Time[2]	$t_{d(off)}$		Q2		25		
			Q1		23		
Fall Time[2]	t_f		Q2		24		
			Q1		35		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current[3]	I_S		Q2			-14	A
			Q1			16	
Forward Voltage[1]	V_{SD}	I_F = -3.6A, V_{GS} = 0V	Q2			-1	V
		I_F = 6A, V_{GS} = 0V	Q1			1.3	
Reverse Recovery Time	t_{rr}	Q2 I_F = -3.6A, dI_F/dt = 100A / μS Q1 I_F = 6A, dI_F/dt = 100A / μS	Q2	6	13	20	nS
			Q1	7	14	21	
Reverse Recovery Charge	Q_{rr}		Q2	4	8.3	13	nC
			Q1	5	10	15	

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current :Q1=12A,Q2=-10A

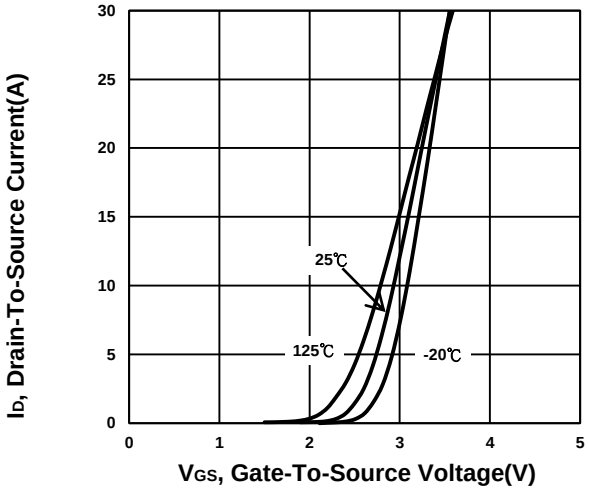
TYPICAL PERFORMANCE CHARACTERISTICS

N-CHANNEL

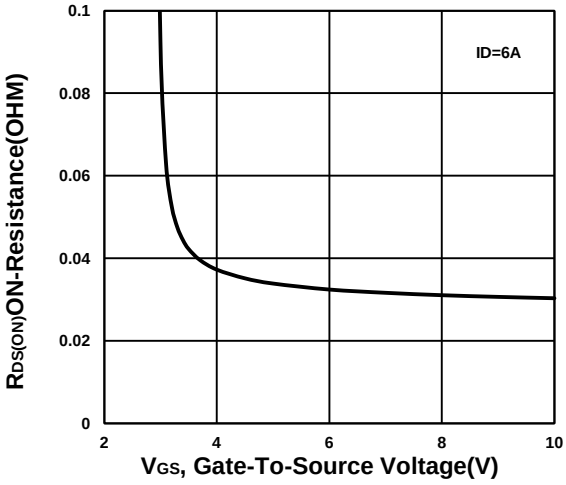
Output Characteristics



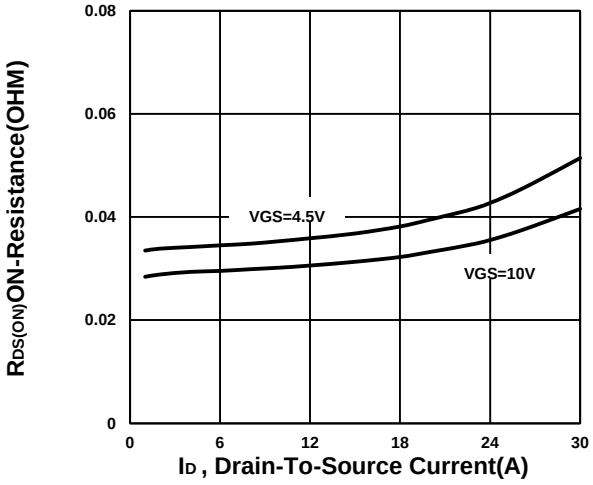
Transfer Characteristics



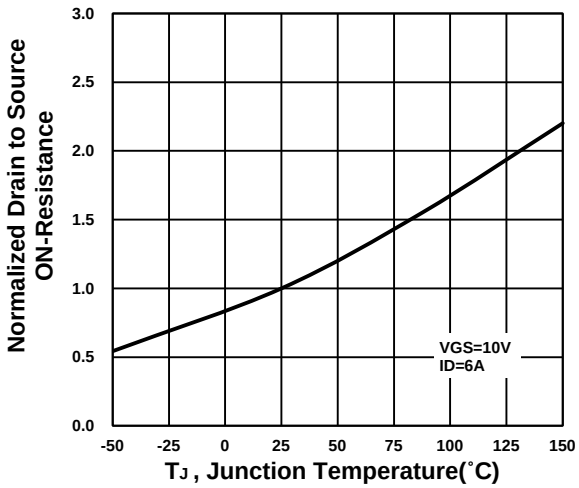
On-Resistance VS Gate-To-Source Voltage



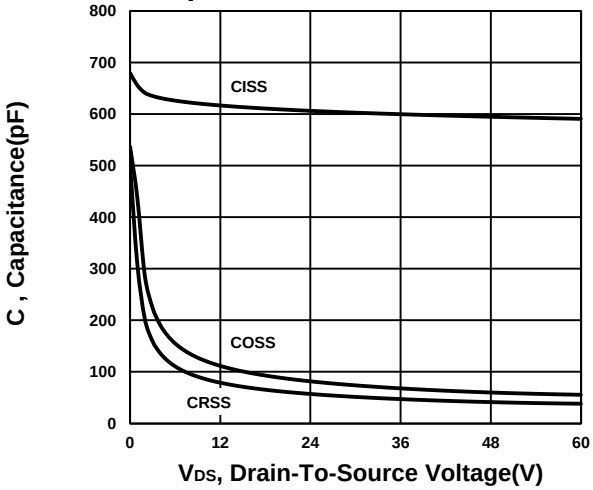
On-Resistance VS Drain Current



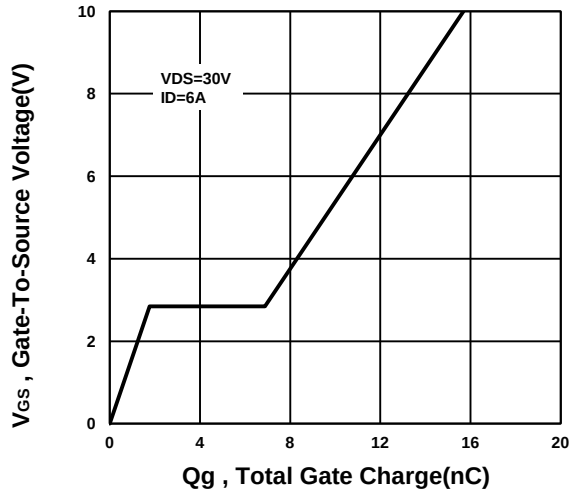
On-Resistance VS Temperature



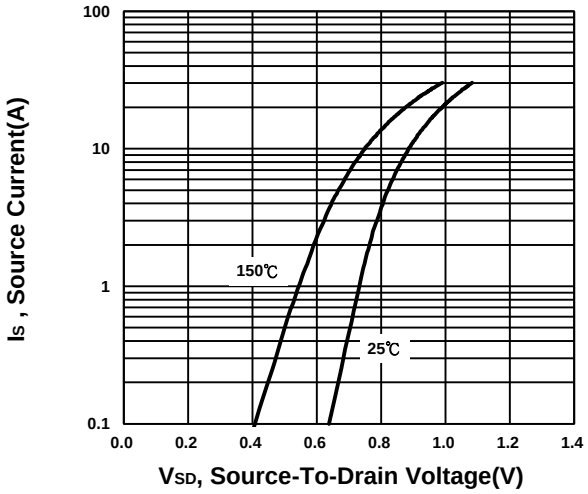
Capacitance Characteristic



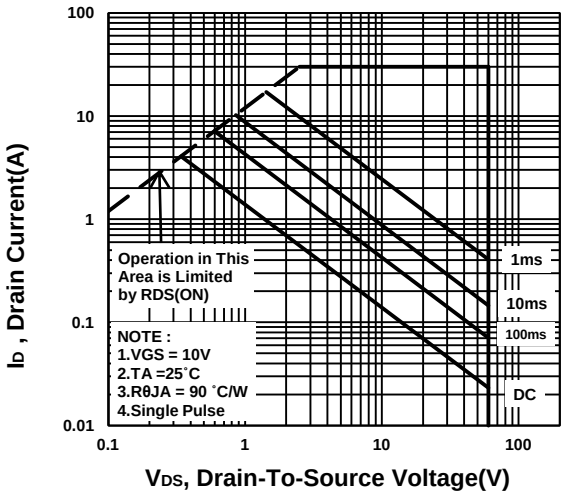
Gate charge Characteristics



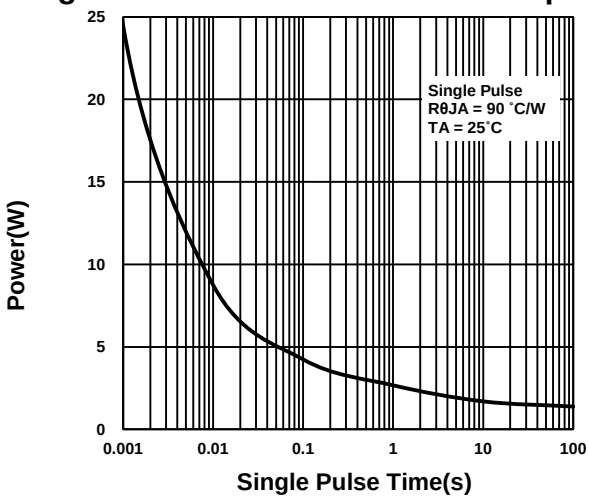
Source-Drain Diode Forward Voltage



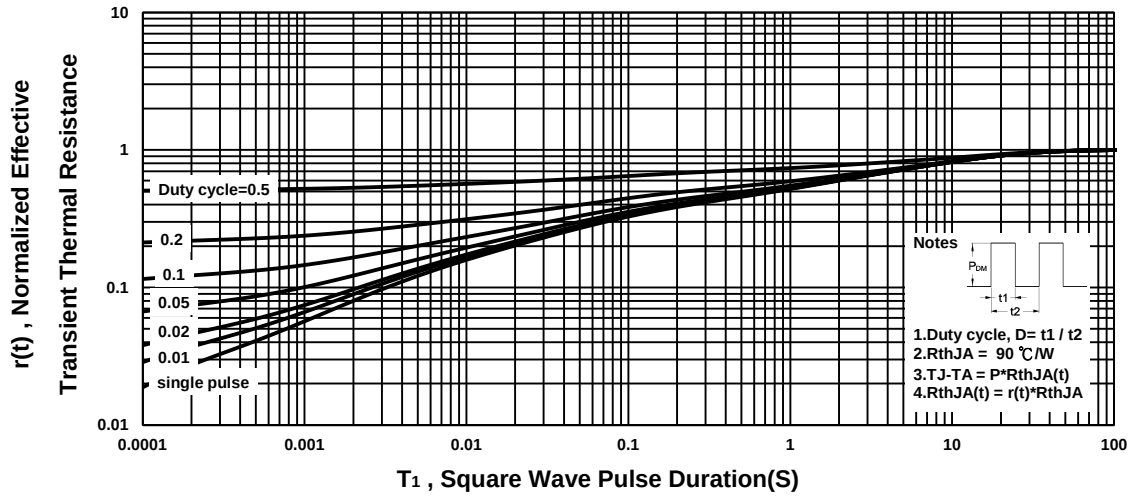
Safe Operating Area



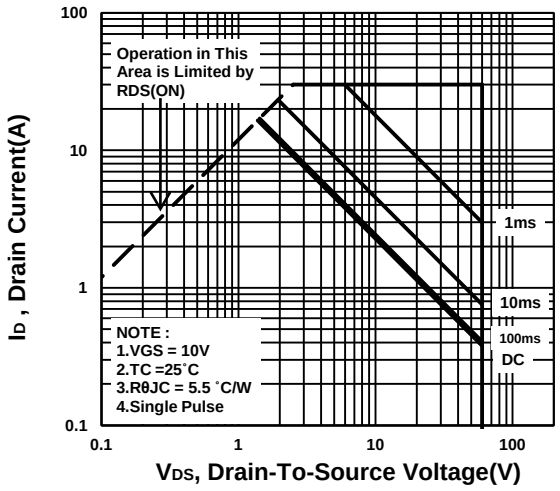
Single Pulse Maximum Power Dissipation



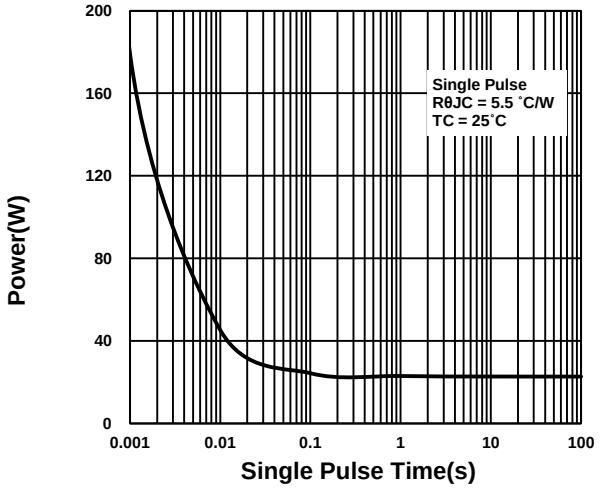
Transient Thermal Response Curve



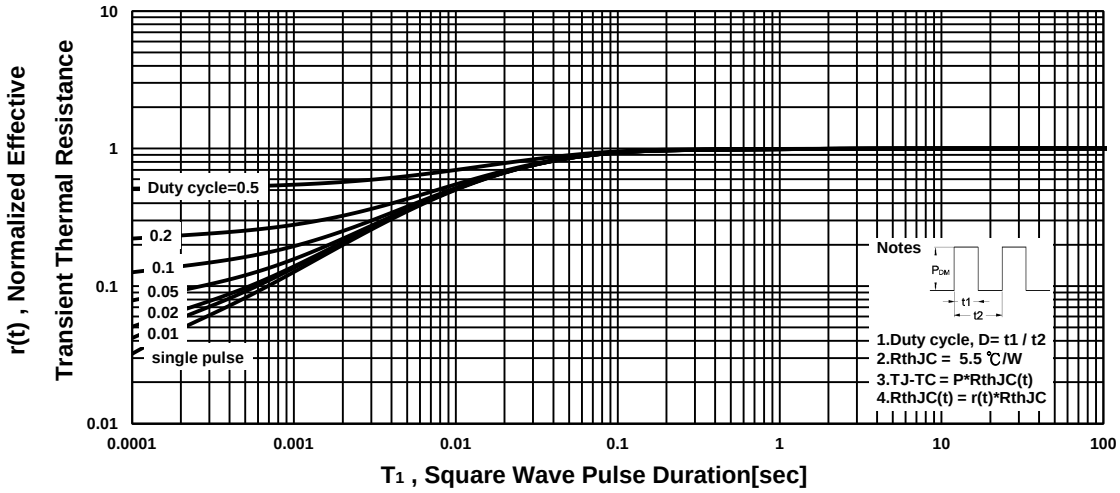
Safe Operating Area



Single Pulse Maximum Power Dissipation

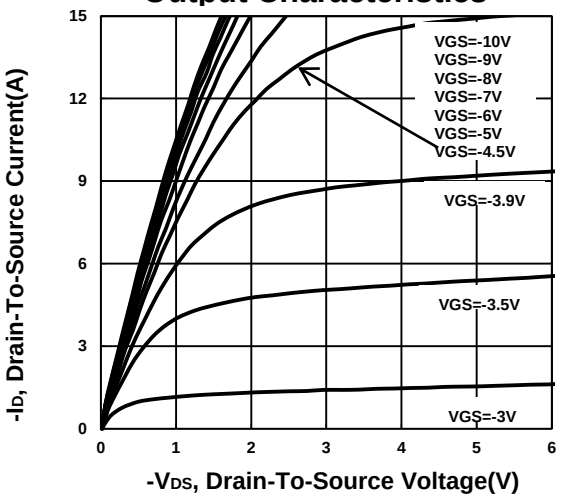


Transient Thermal Response Curve

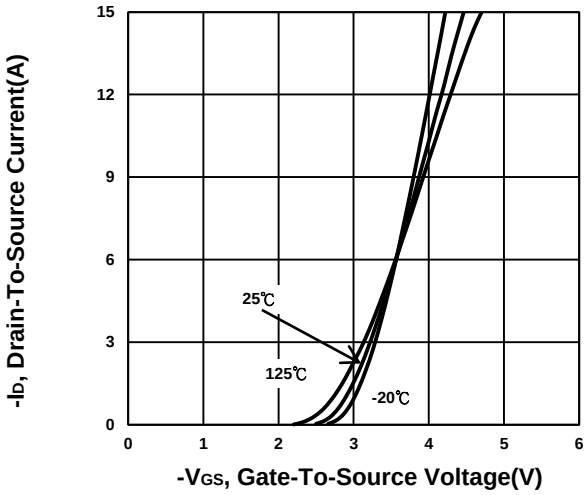


P-CHANNEL

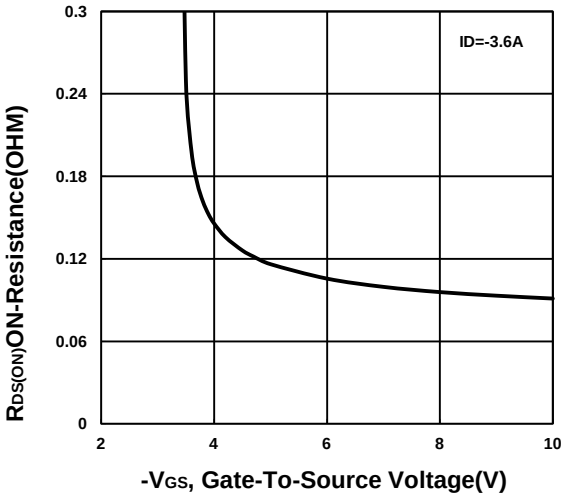
Output Characteristics



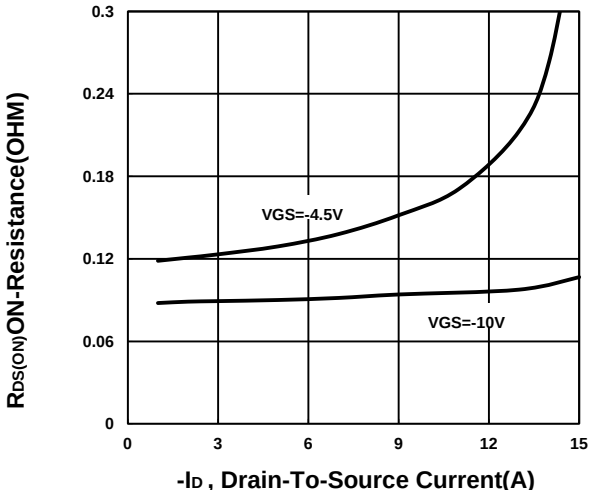
Transfer Characteristics



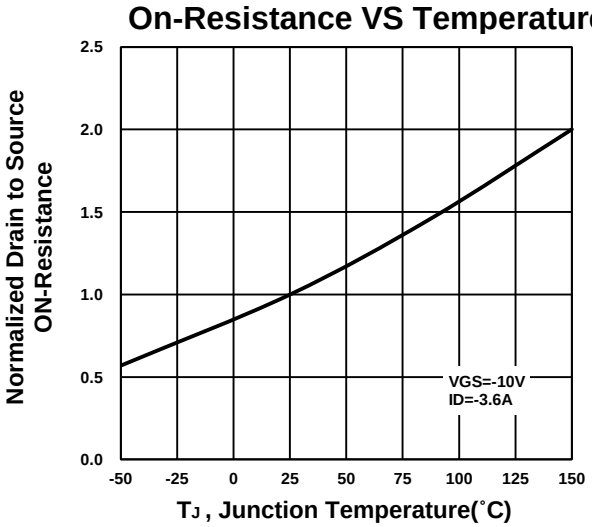
On-Resistance VS Gate-To-Source Voltage



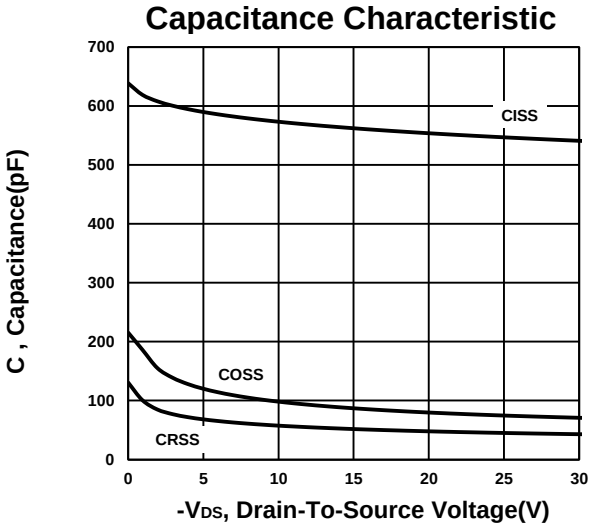
On-Resistance VS Drain Current



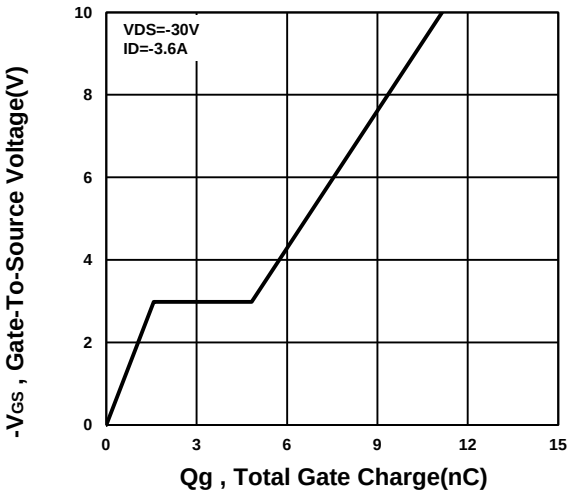
On-Resistance VS Temperature



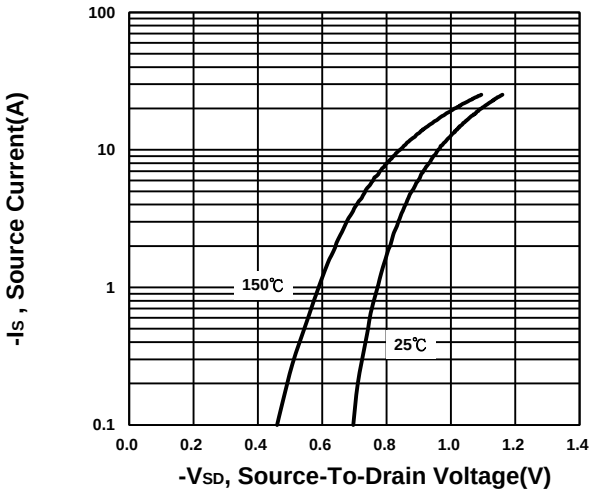
Capacitance Characteristic



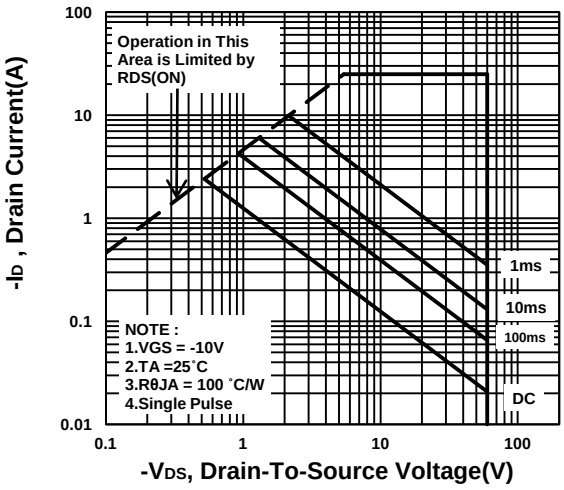
Gate charge Characteristics



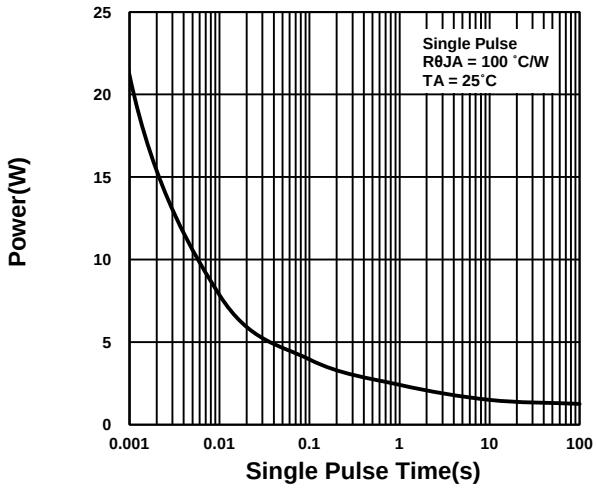
Source-Drain Diode Forward Voltage



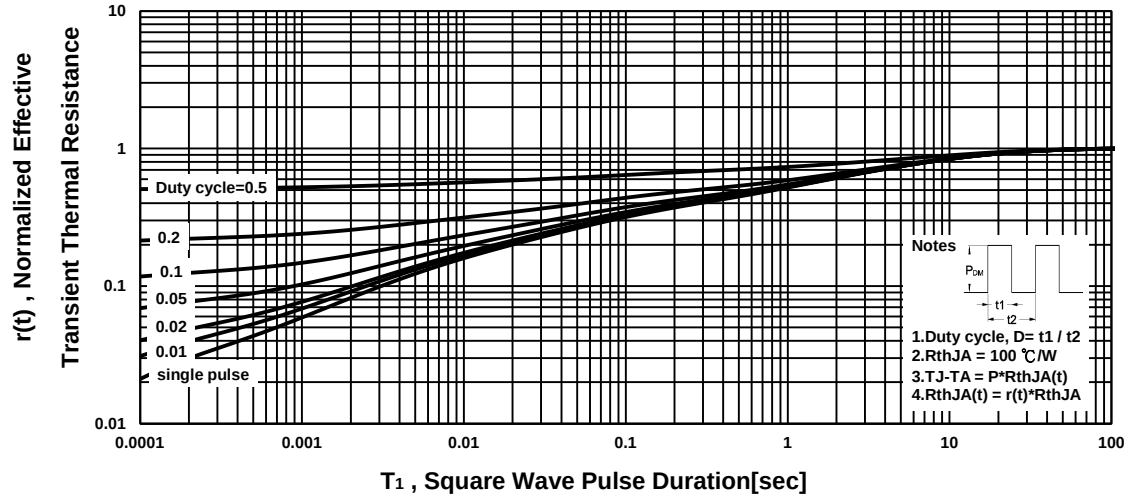
Safe Operating Area



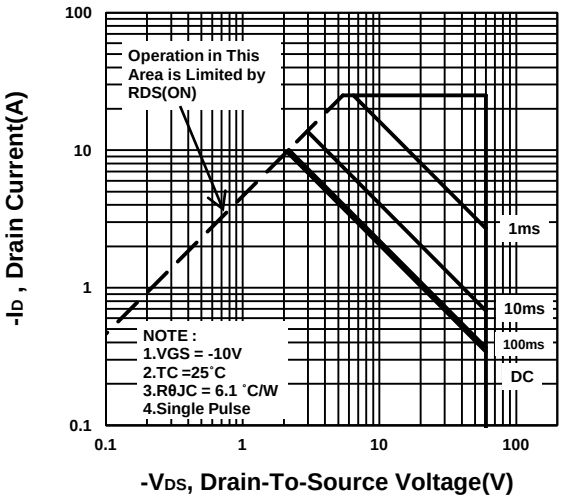
Single Pulse Maximum Power Dissipation



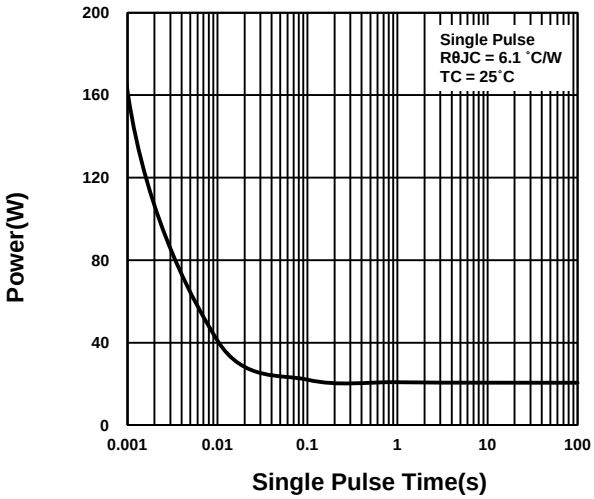
Transient Thermal Response Curve



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve