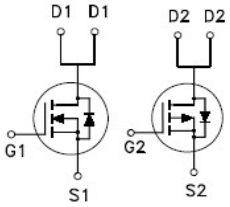
NIKO-SEM

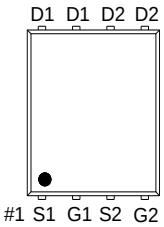
N- & P-Channel Enhancement Mode Field Effect Transistor

PA110NK
PDFN 5x6P
Halogen-Free & Lead-Free

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
Q2	-100V	180mΩ	-10A
Q1	100V	110mΩ	9A





G. GATE
D. DRAIN
S. SOURCE

RoHS Compliant

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

PARAMETERS/TEST CONDITIONS		SYMBOL	Q2	Q1	UNITS
Drain-Source Voltage		V_{DS}	-100	100	V
Gate-Source Voltage		V_{GS}	±25	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	-10	9	A
	T_C = 100 °C		-6.5	5.7	
Pulsed Drain Current[1]		I_{DM}	-40	25	
Continuous Drain Current[3]	T_A = 25 °C	I_D	-2.7	3	
	T_A = 70 °C		-2.2	2.5	
Avalanche Current		I_{AS}	-11	6	
Avalanche Energy	L = 1mH	E_{AS}	61	18	mJ
Power Dissipation	T_C = 25 °C	P_D	42	21	W
	T_C = 100 °C		17	8	
Power Dissipation[3]	T_A = 25 °C	P_D	3	2.5	W
	T_A = 70 °C		1.9	1.6	
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[2]	t ≦10s	$R_{\theta JA}$	Q2		42	°C / W
			Q1		50	
Junction-to-Ambient[2]	Steady-State	$R_{\theta JA}$	Q2		63	
			Q1		73	
Junction-to-Case		$R_{\theta JC}$	Q2		3	
			Q1		6	

[1]Pulse width limited by maximum junction temperature $T_{J(MAX)}$=150°C.
[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. The value in any given application depends on the user's specific board design.
[3]The Power dissipation is based on $R_{\theta JA}$ t ≦10s value.

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

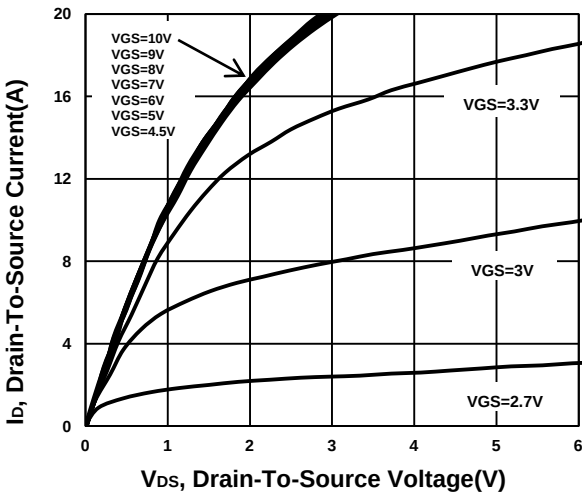
PARAMETER	SYMBOL	TEST CONDITIONS		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	Q2	-100			V
		V_{GS} = 0V, I_D = 250μA	Q1	100			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	Q2	-1.3	-1.8	-2.3	
		V_{DS} = V_{GS}, I_D = 250μA	Q1	1.3	1.8	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} = -80V, V_{GS} = 0V	Q2			-1	μA
		V_{DS} = 80V, V_{GS} = 0V	Q1			1	
		V_{DS} = -80V, V_{GS} = 0V, T_J = 55 °C	Q2			-10	
		V_{DS} = 80V, V_{GS} = 0V, T_J = 55 °C	Q1			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -5A	Q2		173	190	mΩ
		V_{GS} = 4.5V, I_D = 6A	Q1		86	120	
		V_{GS} = -10V, I_D = -5A	Q2		159	180	
		V_{GS} = 10V, I_D = 6A	Q1		80	110	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -5A	Q2		19		S
		V_{DS} = 5V, I_D = 6A	Q1		30		
DYNAMIC							
Input Capacitance	C_{iss}	Q2 V_{GS} = 0V, V_{DS} = -25V f = 1MHz Q1 V_{GS} = 0V, V_{DS} = 25V f = 1MHz	Q2	1232	1540	1840	pF
			Q1	492	616	739	
Output Capacitance	C_{oss}		Q2	90	113	135	
			Q1	44	55	66	
Reverse Transfer Capacitance	C_{rss}		Q2	46	77	108	
			Q1	18	31	43	
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	Q2	1.9	3.8	5.7	Ω
			Q1	0.8	1.5	2.3	
Total Gate Charge[2]	Q_g VGS = 10V	Q2 V_{DS} = -50V V_{GS} = -10V, I_D = -5A Q1 V_{DS} = 50V V_{GS} = 10V, I_D = 6A	Q2	23	29	34.8	nC
			Q1	11	14	16.8	
	Q_g VGS = 4.5V		Q2	12	15	18	
			Q1	6.4	8	9.6	
Gate-Source Charge[2]	Q_{gs}		Q2	3.3	4.1	4.9	
			Q1	1.4	1.8	2.2	
Gate-Drain Charge[2]	Q_{gd}		Q2	4.3	7.1	9.9	
			Q1	2.6	4.3	6	

Turn-On Delay Time[2]	$t_{d(on)}$	Q2 , V_{DS} = -50V $I_D \cong$ -5A V_{GS} = -10V, R_{GEN} =6Ω	Q2		17		nS
			Q1		11		
Rise Time[2]	t_r		Q2		20		
			Q1		21		
Turn-Off Delay Time[2]	$t_{d(off)}$	Q1 , V_{DS} = 50V $I_D \cong$ 6A, V_{GS} = 10V, R_{GEN} =6Ω	Q2		59		
			Q1		27		
Fall Time[2]	t_f		Q2		41		
			Q1		41		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current	I_S		Q2			-10	A
			Q1			9	
Forward Voltage[1]	V_{SD}	I_F = -5A V_{GS} = 0V	Q2			-1.2	V
		I_F = 6A, V_{GS} = 0V	Q1			1.4	
Reverse Recovery Time	t_{rr}	Q2 I_F = -5A dI_F/dt = 100A / μS	Q2	21	43	64	nS
			Q1	11	23	34	
Reverse Recovery Charge	Q_{rr}	Q1 I_F = 6A, dI_F/dt = 100A / μS	Q2	43	87	130	nC
			Q1	12	25	37	

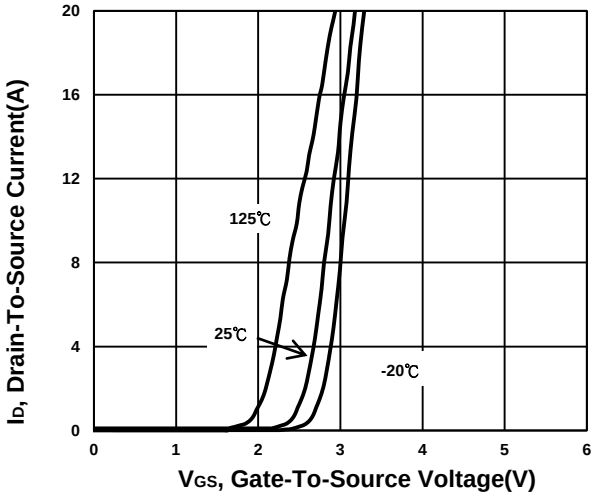
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.

TYPICAL PERFORMANCE CHARACTERISTICS
N-CHANNEL

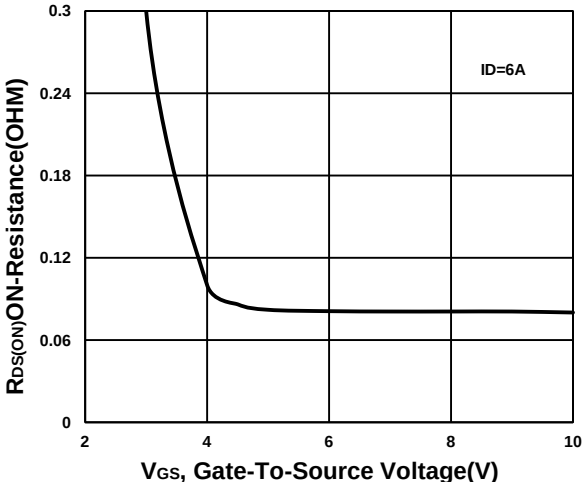
Output Characteristics



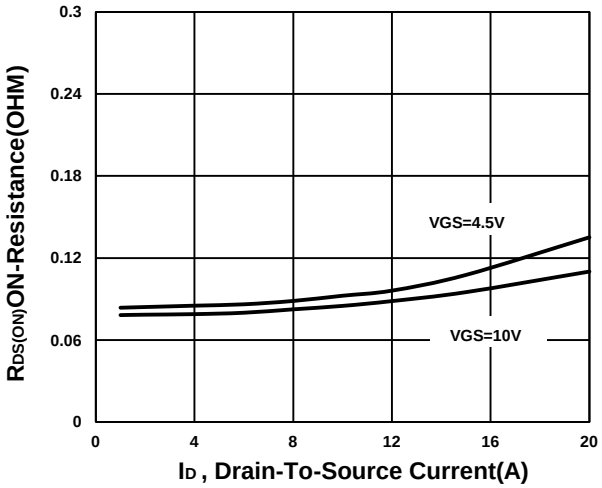
Transfer Characteristics



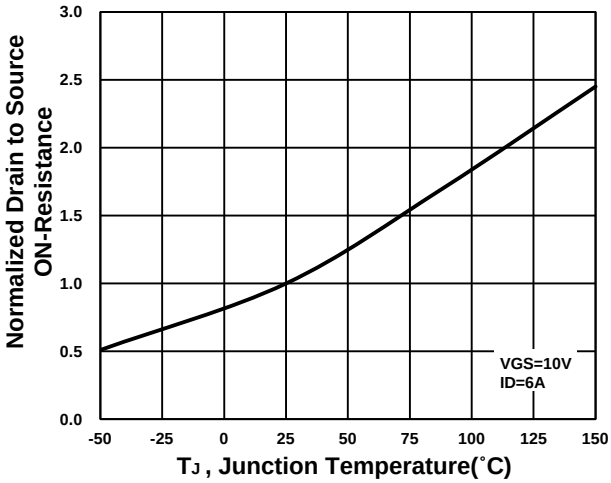
On-Resistance VS Gate-To-Source Voltage



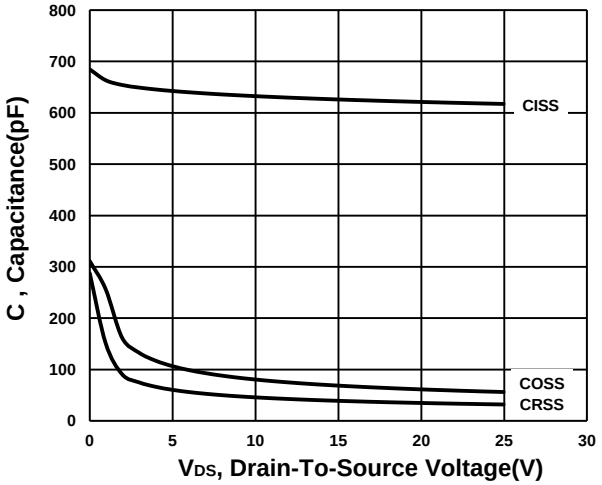
On-Resistance VS Drain Current



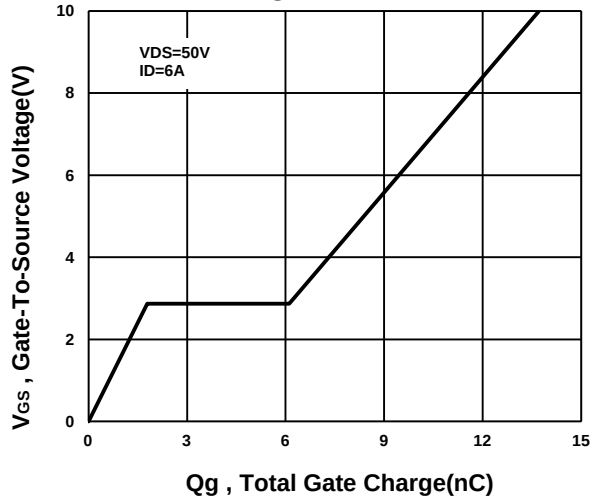
On-Resistance VS Temperature



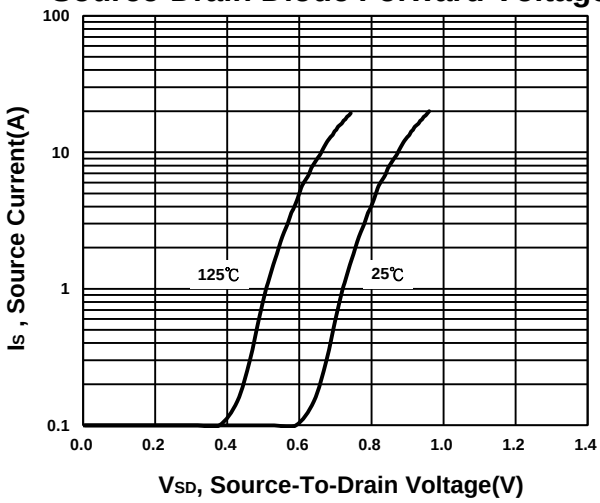
Capacitance Characteristic



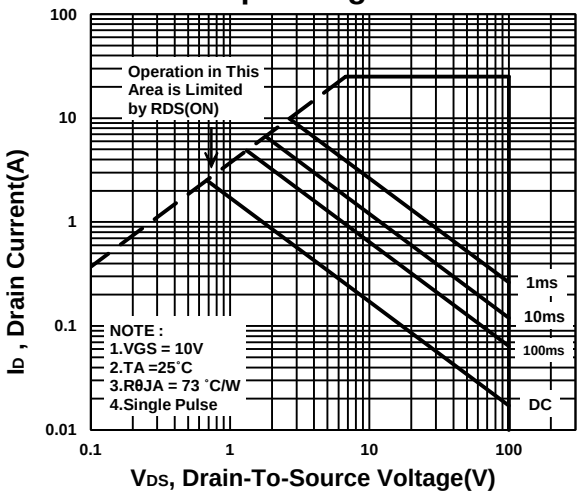
Gate charge Characteristics



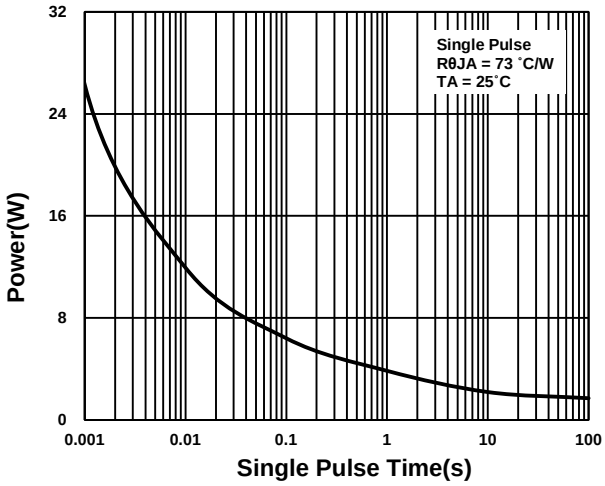
Source-Drain Diode Forward Voltage



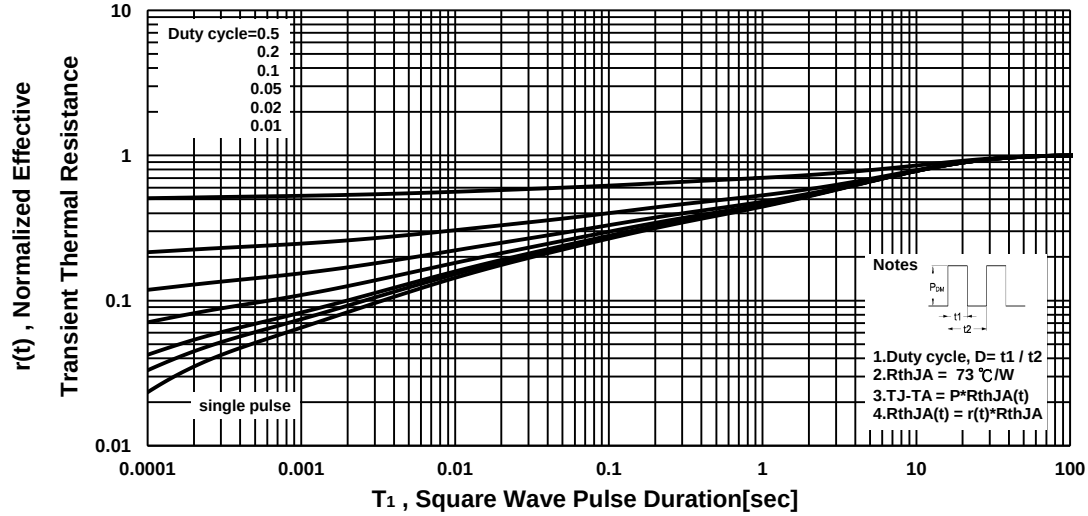
Safe Operating Area



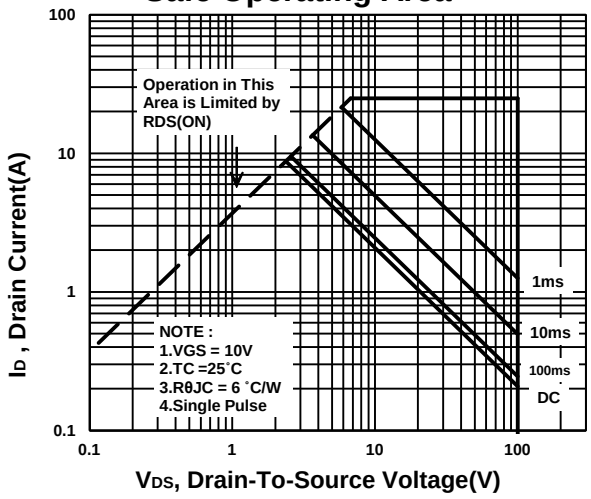
Single Pulse Maximum Power Dissipation



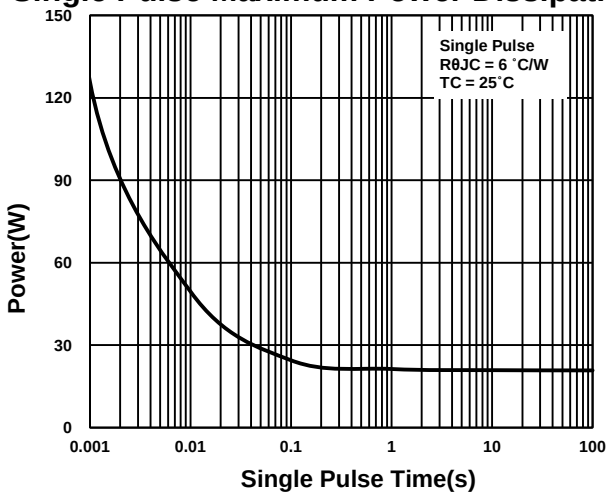
Transient Thermal Response Curve



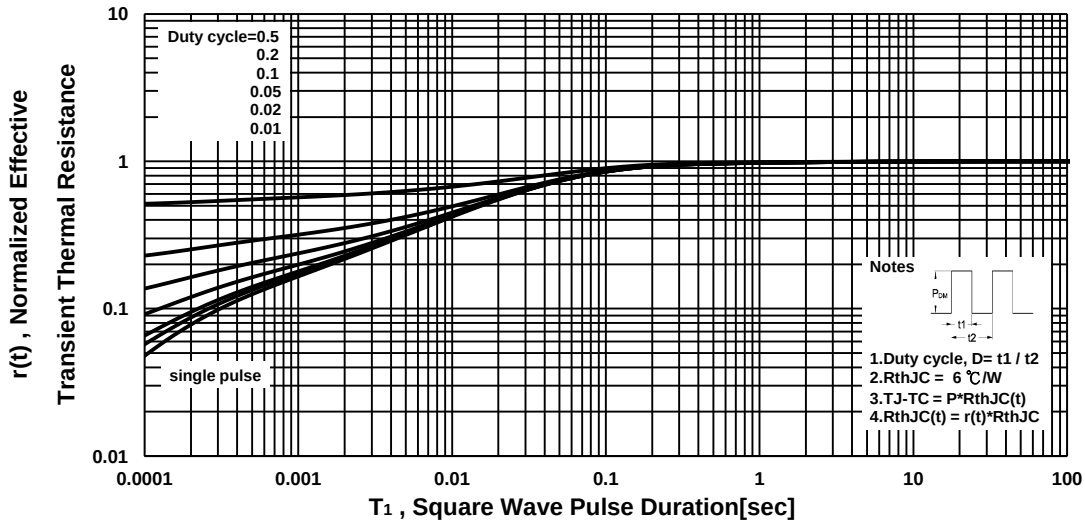
Safe Operating Area



Single Pulse Maximum Power Dissipation

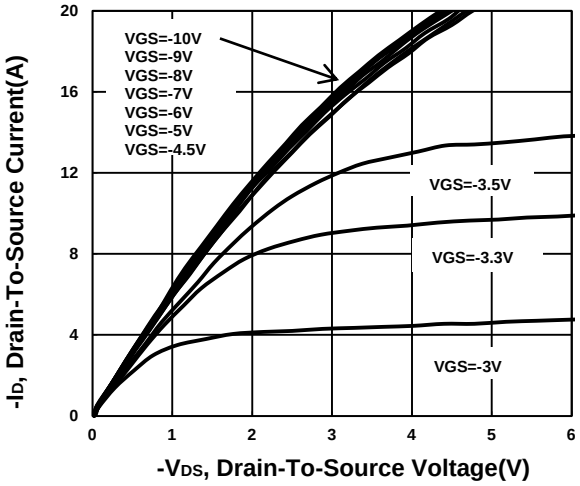


Transient Thermal Response Curve

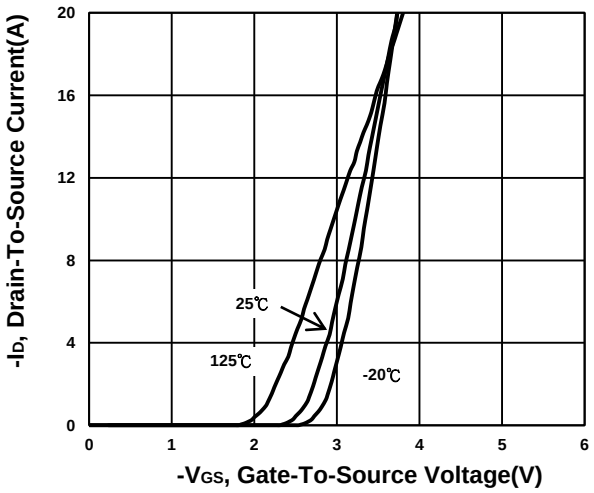


P-CHANNEL

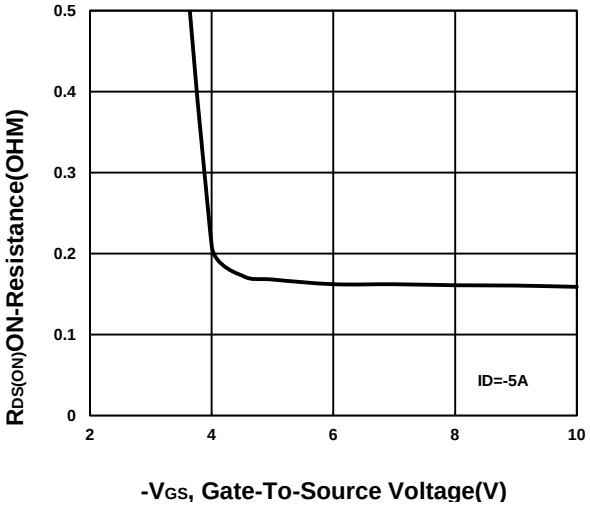
Output Characteristics



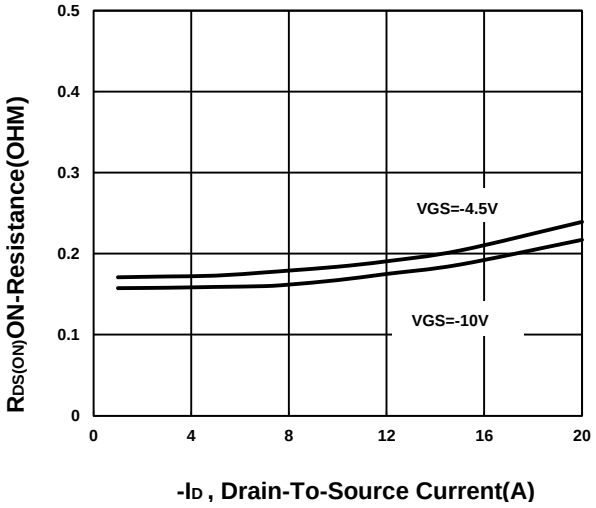
Transfer Characteristics



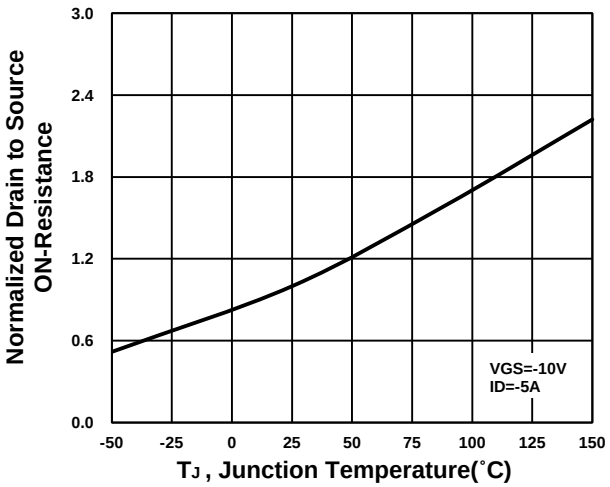
On-Resistance VS Gate-To-Source Voltage



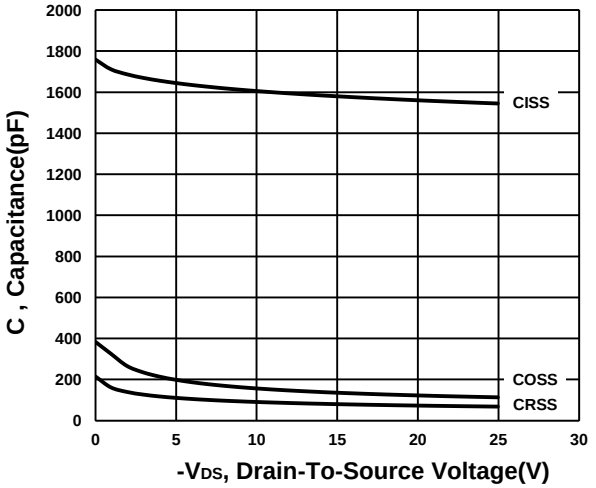
On-Resistance VS Drain Current



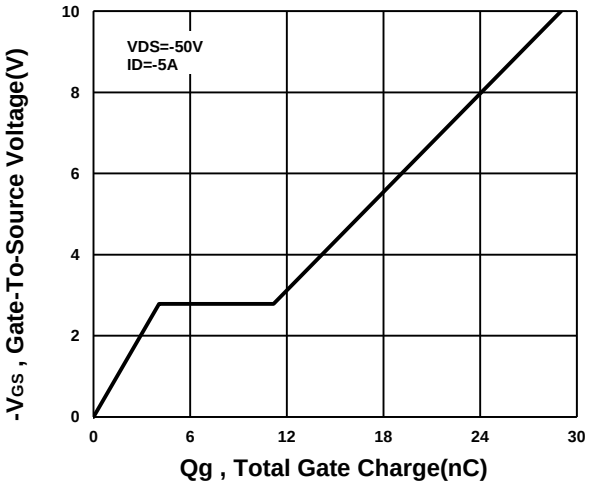
On-Resistance VS Temperature



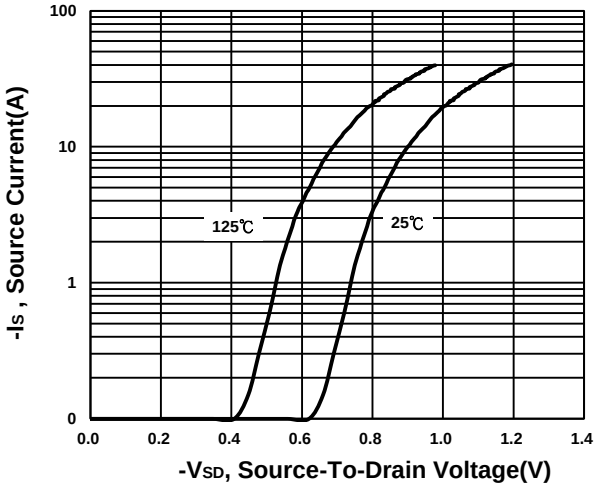
Capacitance Characteristic



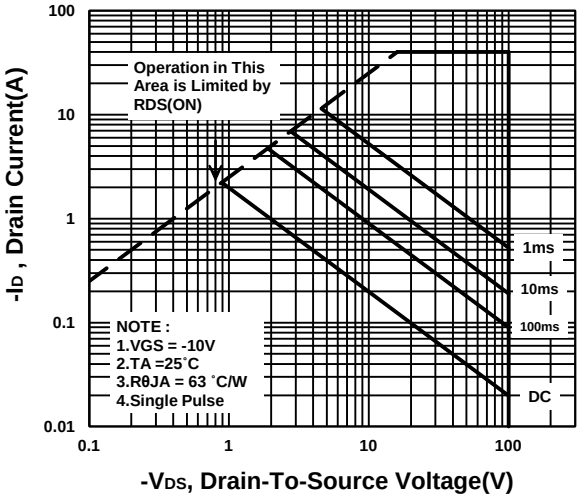
Gate charge Characteristics



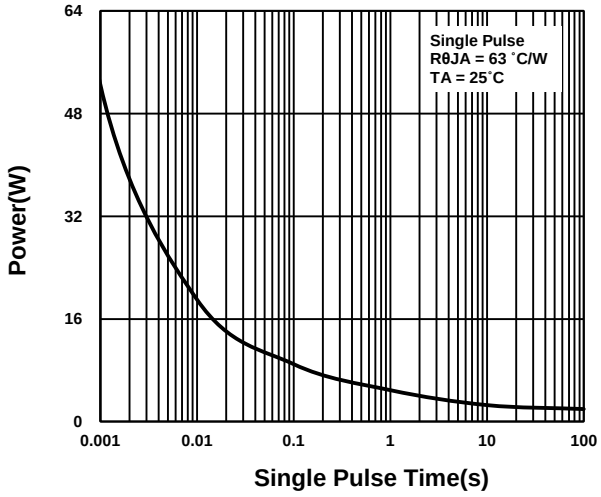
Source-Drain Diode Forward Voltage



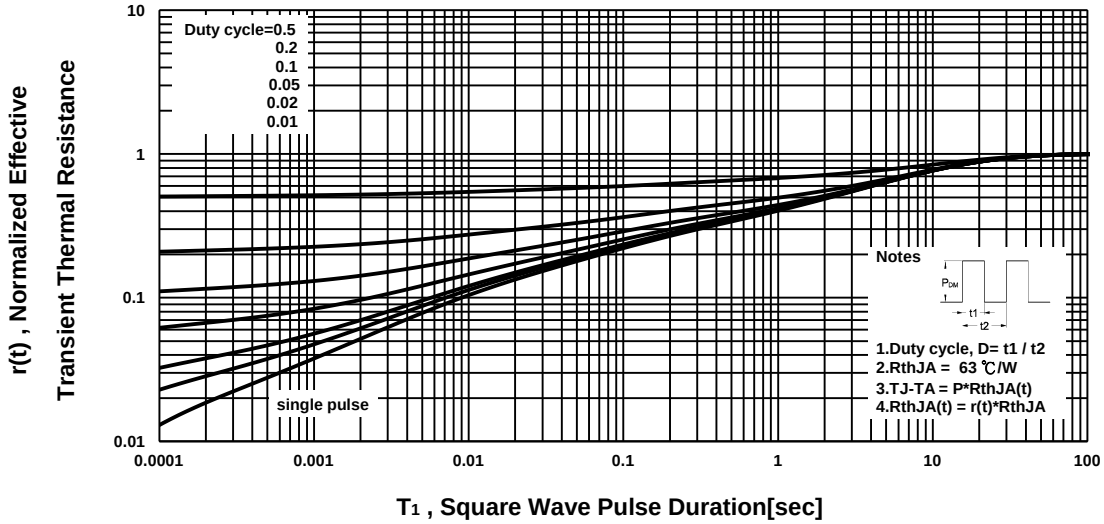
Safe Operating Area



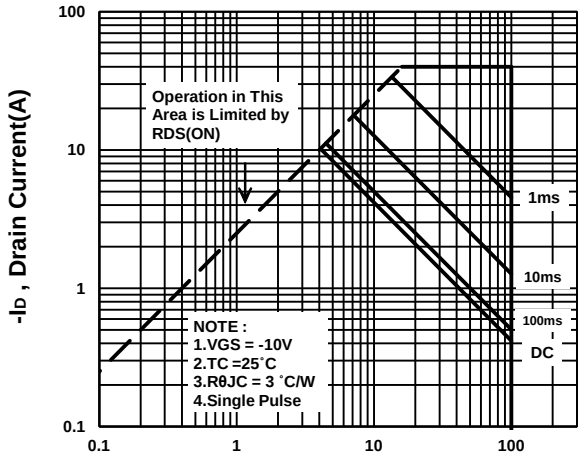
Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

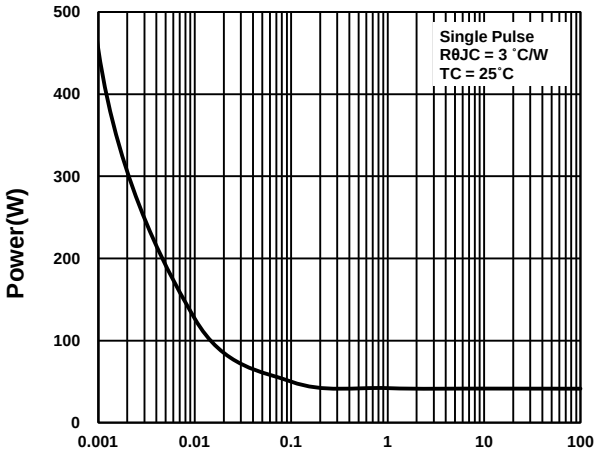


Safe Operating Area



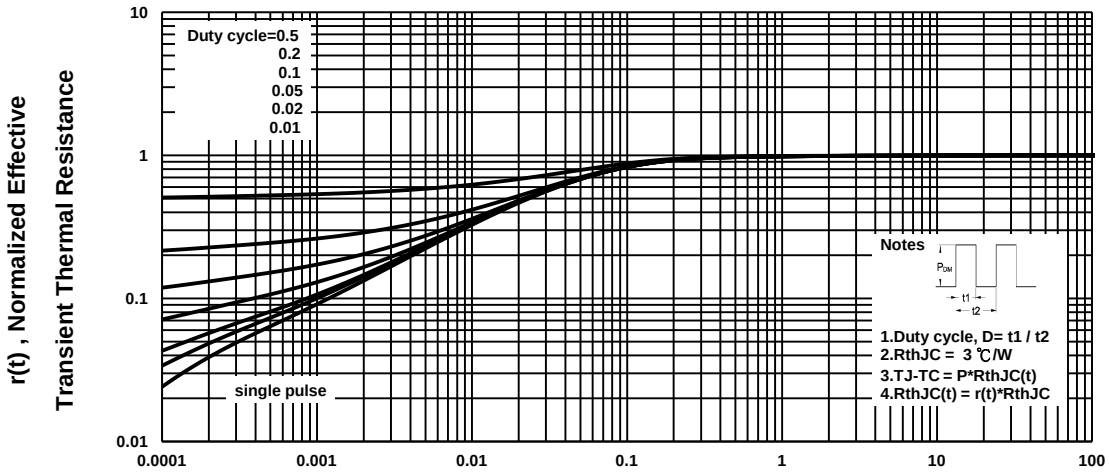
-VDS, Drain-To-Source Voltage(V)

Single Pulse Maximum Power Dissipation



Single Pulse Time(s)

Transient Thermal Response Curve



T1 , Square Wave Pulse Duration[sec]