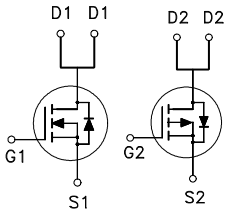
NIKO-SEM

N- & P-Channel Enhancement Mode Field Effect Transistor

P5003QVG
SOP-8
Halogen-Free & Lead-Free

PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	30	27.5mΩ	10A
P-Channel	-30	45mΩ	-7A



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}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_A = 25 °C	I_D	10	-7	A
	T_A = 70 °C		7	-5	
Pulsed Drain Current[1]		I_{DM}	20	-20	
Power Dissipation	T_A = 25 °C	P_D	2.5		W
	T_A = 70 °C		1.6		
Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	$R_{\theta JA}$		50	°C / W
Junction-to-Case	$R_{\theta JC}$		30	°C / W

[1]Pulse width limited by maximum junction temperature.
[2]Duty cycle ≤ 1%

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	-1.5	-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} = 20V, V_{GS} = 0V, T_J = 55 °C	N-Ch			10	
		V_{DS} = -20V, 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	20			A
		V_{DS} =-5V, V_{GS} = -10V	P-Ch	-20			
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 6A	N-Ch		30	40	mΩ
		V_{GS} = -4.5V, I_D = -4A	P-Ch		62	80	
		V_{GS} = 10V, I_D = 7A	N-Ch		20.5	27.5	
		V_{GS} = -10V, I_D = -5A	P-Ch		37.5	45	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 7A	N-Ch		16		S
		V_{DS} = -5V, I_D = -5A	P-Ch		13		

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		680		pF
			P-Ch		780		
Output Capacitance	C_{oss}		N-Ch		105		
			P-Ch		145		
Reverse Transfer Capacitance	C_{rss}		N-Ch		75		
			P-Ch		79		
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 = -5A	N-Ch		14		nC
			P-Ch		15.1		
Gate-Source Charge[2]	Q_{gs}		N-Ch		1.9		
			P-Ch		2.1		
Gate-Drain Charge[2]	Q_{gd}		N-Ch		3.3		
			P-Ch		4.0		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz	N-Ch		1.7	2.5	Ω
			P-Ch		3.5	6	

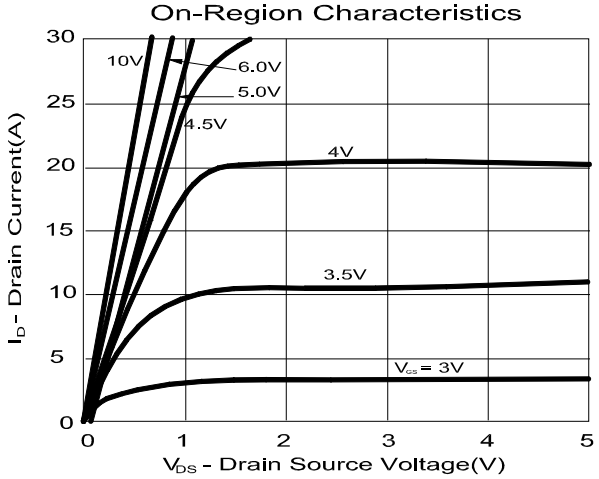
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DD} = 10V $I_D \cong$ 1A, V_{GS} = 10V, R_{GEN} = 3Ω	N-Ch P-Ch		4.6 7.7	7 11.5	nS
Rise Time[2]	t_r		N-Ch P-Ch		4 5.7	6 8.5	
Turn-Off Delay Time[2]	$t_{d(off)}$	P-Channel V_{DD} = -10V $I_D \cong$ -1A, V_{GS} = -10V, R_{GEN} = 3Ω	N-Ch P-Ch		20 20	30 30	
Fall Time[2]	t_f		N-Ch P-Ch		5 9.5	8 14	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current	I_S		N-Ch P-Ch			1.3 -1.3	A
Forward Voltage[1]	V_{SD}	I_F = 1A, V_{GS} = 0V I_F = -1A, V_{GS} = 0V	N-Ch P-Ch			1 -1	V

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Pulse width limited by maximum junction temperature.

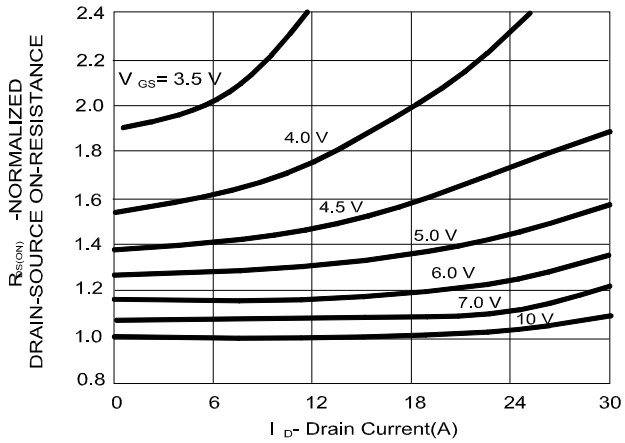
REMARK: THE PRODUCT MARKED WITH "P5003QVG", DATE CODE or LOT #

N-CHANNEL

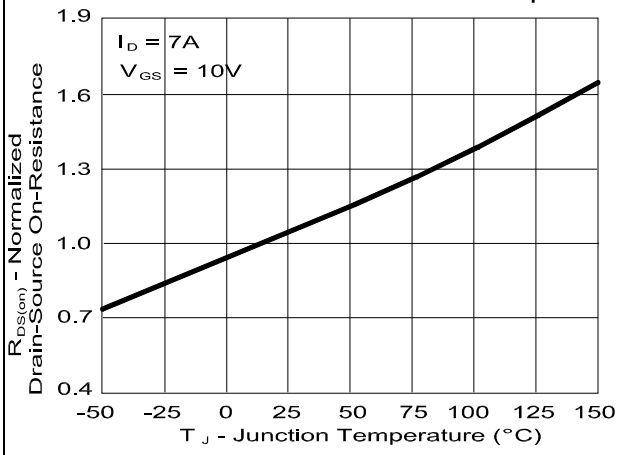
On-Region Characteristics



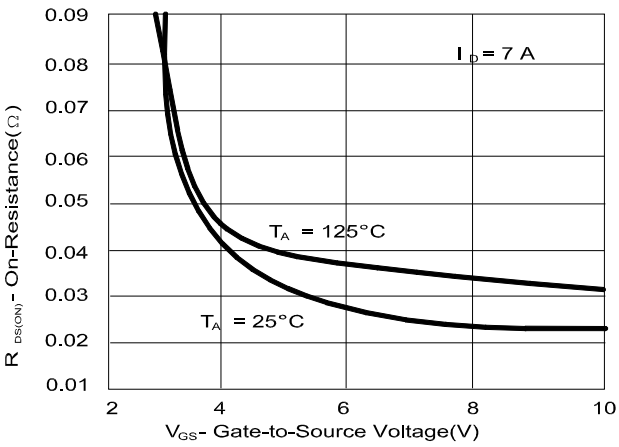
On-Resistance Variation with Drain Current and Gate Voltage



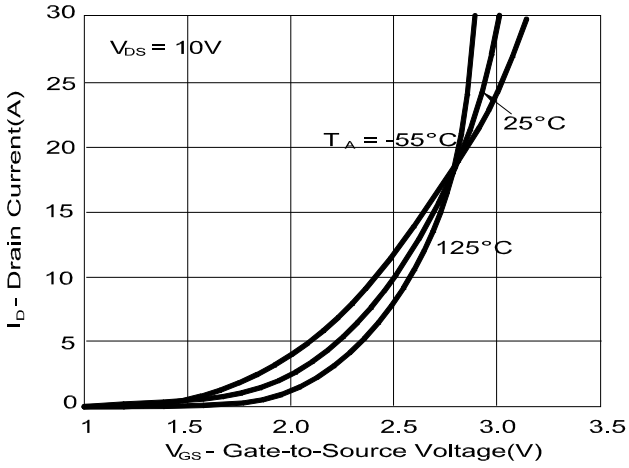
On-Resistance Variation with Temperature



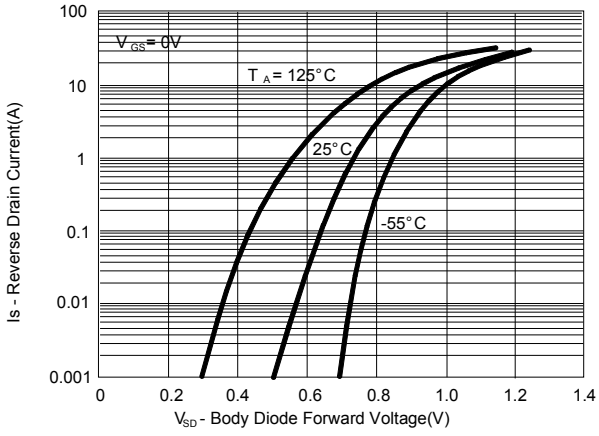
On-Resistance Variation with Gate-to-Source Voltage



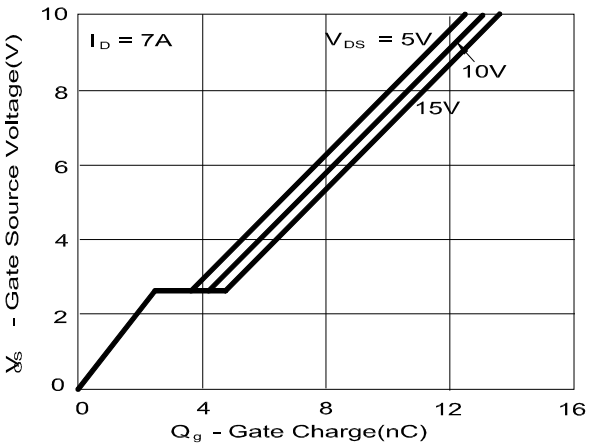
Transfer Characteristics



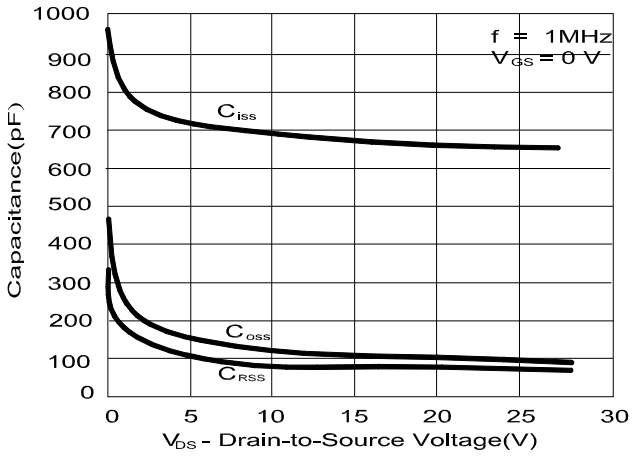
Body Diode Forward Voltage Variation with Source Current and Temperature



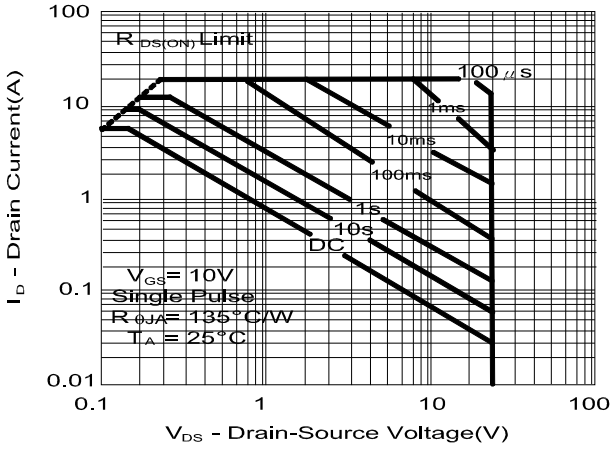
Gate Charge Characteristics



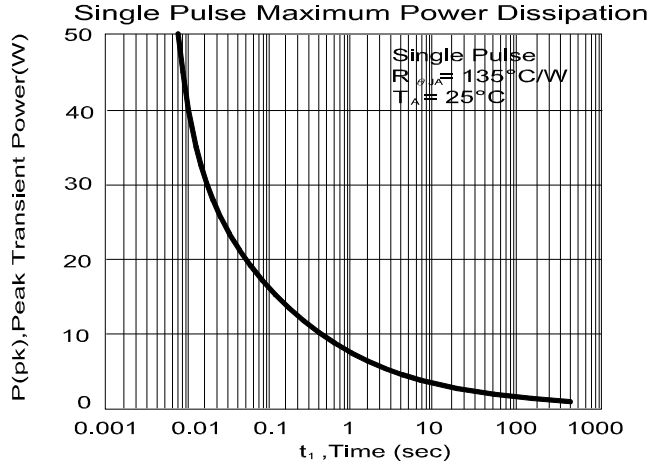
Capacitance Characteristics



Maximum Safe Operating Area

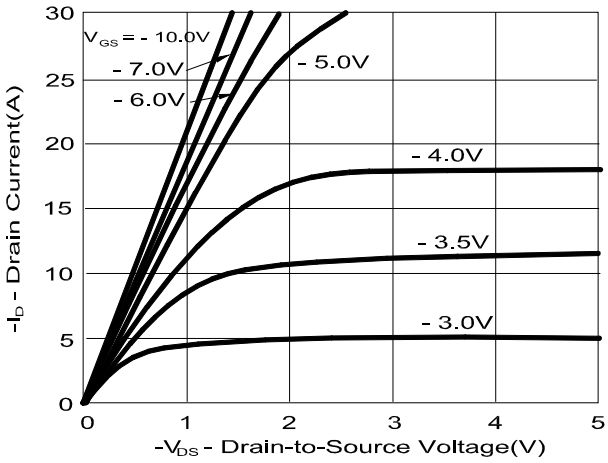


Single Pulse Maximum Power Dissipation

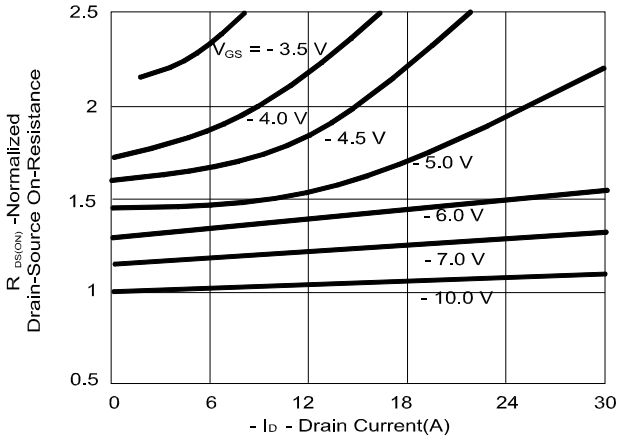


P-CHANNEL

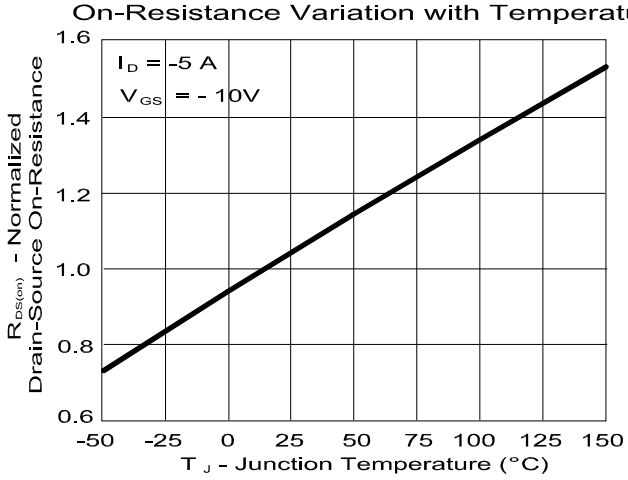
On-Region Characteristics



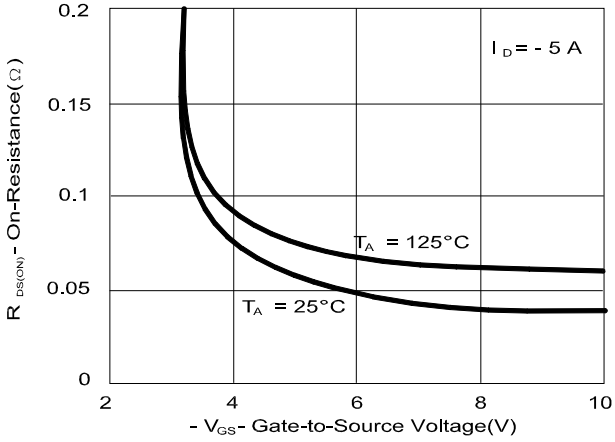
On-Resistance Variation with Drain Current and Gate Voltage



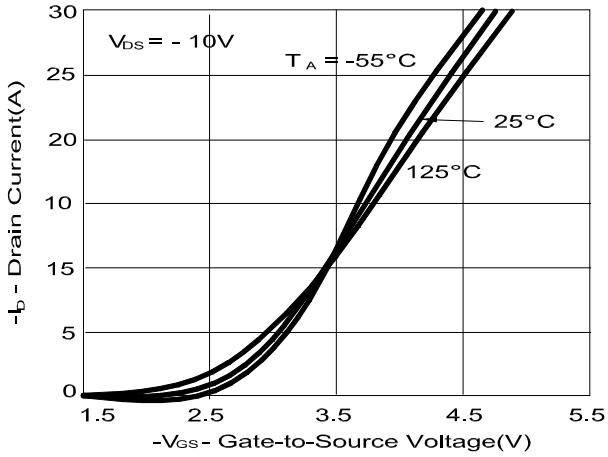
On-Resistance Variation with Temperature



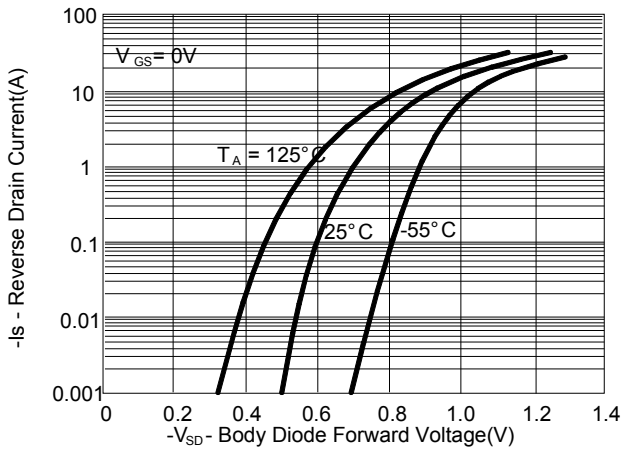
On-Resistance Variation with Gate-to-Source Voltage



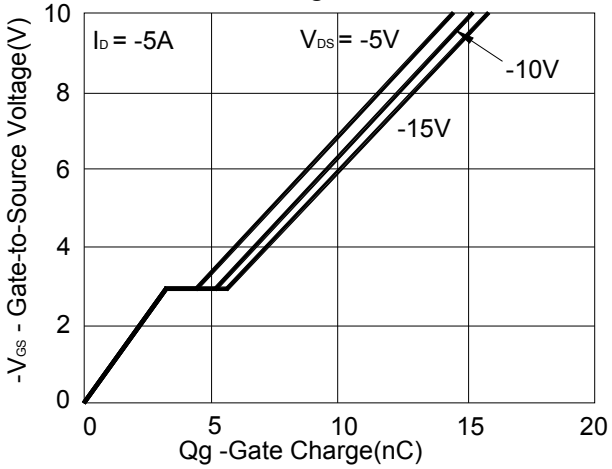
Transfer Characteristics



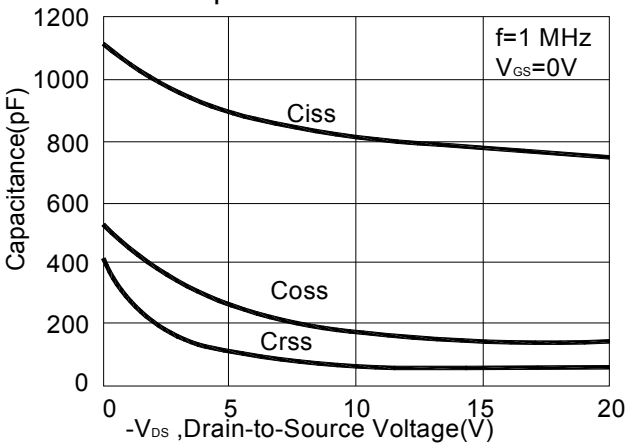
Body Diode Forward Voltage Variation with Source Current and Temperature



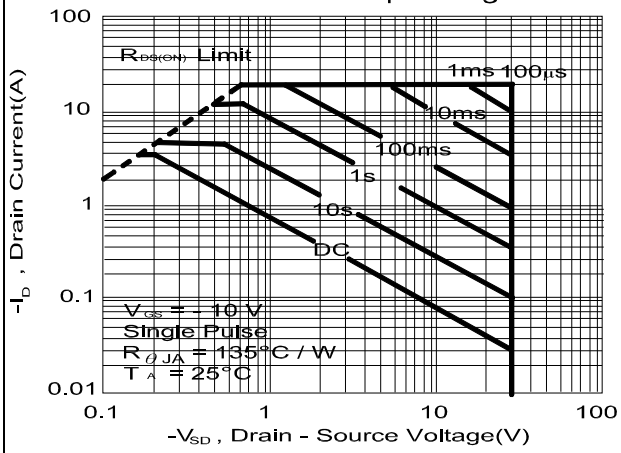
Gate Charge Characteristics



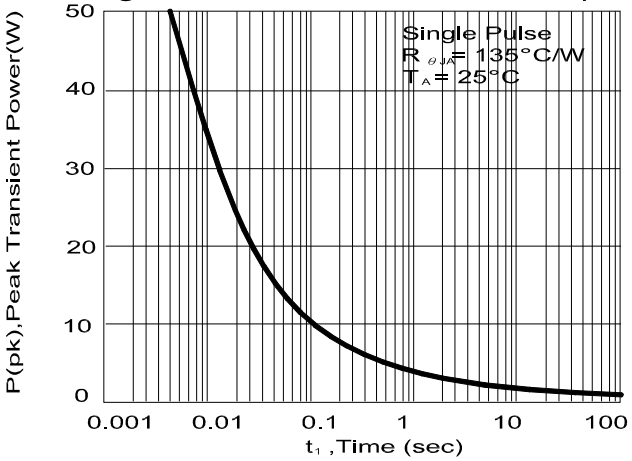
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve