UNIKC Semiconductor

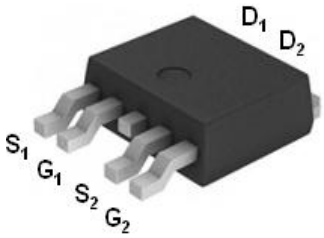
RoHS Compliant

P2204ND5G

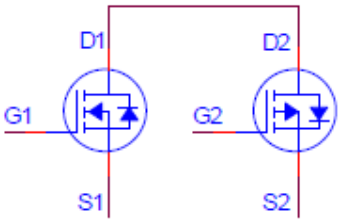
N&P-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D	Channel
40V	22mΩ @V_{GS} =10V	24A	N
-40V	33mΩ @V_{GS} = -10V	-19A	P



TO-252-5



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

PARAMETERS/TEST CONDITIONS		SYMBOL	CH.	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	N	40	V
			P	-40	
Gate-Source Voltage		V_{GS}	N	±20	
			P	±20	
Continuous Drain Current	T_C = 25 °C	I_D	N	24	A
			P	-19	
	T_C = 100°C		N	19	
			P	-15	
Pulsed Drain Current[1]		I_{DM}	N	60	
			P	-60	
Power Dissipation	T_C = 25 °C	P_D	N	20.8	W
			P		
	T_C = 100 °C		N	13.3	
			P		
Junction & Storage Temperature Range		T_j, T_{stg}		-55 to 150	°C

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THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		6	°C / W
Junction-to-Ambient	$R_{\theta JA}$		42	

[1]Pulse width limited by maximum junction temperature.

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

PARAMETER	SYMBOL	TEST CONDITIONS	CH.	LIMITS			UNITS
				MIN	TYP	MAX	
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	N	40			V
		V_{GS} = 0V, I_D = -250μA	P	-40			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	N	1.6	2	3	
		V_{DS} = V_{GS}, I_D = -250μA	P	-1.6	-2	-3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	N			±100	nA
		V_{DS} = 0V, V_{GS} = ±20V	P			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32V, V_{GS} = 0V	N			1	μA
		V_{DS} = -32V, V_{GS} = 0V	P			-1	
		V_{DS} =30V, V_{GS} = 0V, T_J = 55 °C	N			10	
		V_{DS} = -30V, V_{GS} = 0V, T_J = 55 °C	P			-10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	N	60			A
		V_{DS} = -5V, V_{GS} = -10V	P	-60			
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 7V, I_D = 7A	N		25	33	mΩ
		V_{GS} = -7V, I_D = -5A	P		32	40	
		V_{GS} = 10V, I_D =10A	N		19	22	
		V_{GS} = -10V, I_D = -7A	P		28	33	
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 10A	N		25		S
		V_{DS} = -10V, I_D = -7A	P		18		

UNIKC Semiconductor

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DYNAMIC							
Input Capacitance	C_{iss}	N-Channel V_{GS} = 0V, V_{DS} = 10V, f = 1MHz	N		1145	1450	pF
			P		1000	1260	
Output Capacitance	C_{oss}		N		253	355	
		P-Channel V_{GS} = 0V, V_{DS} = -10V, f = 1MHz	P		450	625	
Reverse Transfer Capacitance	C_{rss}		N		94	142	
			P		108	163	
Total Gate Charge[2]	Q_g	N-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = 10V, I_D = 10A	N		23		nC
			P		20		
Gate-Source Charge[2]	Q_{gs}		N		3.6		
		P-Channel V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -10V, I_D = -7A	P		3.2		
Gate-Drain Charge[2]	Q_{gd}		N		3		
			P		2.7		
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DS} = 20V $I_D \cong$ 1A, V_{GS} = 10V, R_{GEN} = 6Ω	N		3.2	6.4	nS
			P		9.7	19.4	
Rise Time[2]	t_r		N		10.8	21.7	
			P		14	28.1	
Turn-Off Delay Time[2]	$t_{d(off)}$	P-Channel V_{DS} = -20V $I_D \cong$ -1A, V_{GS} = -10V, R_{GEN} = 6Ω	N		17.1	30.8	
			P		28.7	51.6	
Fall Time[2]	t_f		N		5.3	10.7	
			P		17.8	32.2	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)							
Forward Voltage[1]	V_{SD}	I_F = 10A, V_{GS} = 0V	N			1.2	V
		I_F = -7A, V_{GS} = 0V	P			-1.2	
Reverse Recovery Time	t_{rr}	I_F = 10A, dI_F/dt = 100A / μS	N		60		nS
		I_F = -7A, dI_F/dt = 100A / μS	P		80		
Reverse Recovery Charge	Q_{rr}		N		43		nC
			P		75		

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

[2]Independent of operating temperature.

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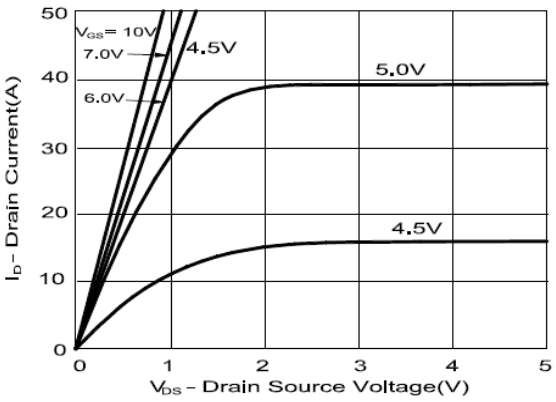
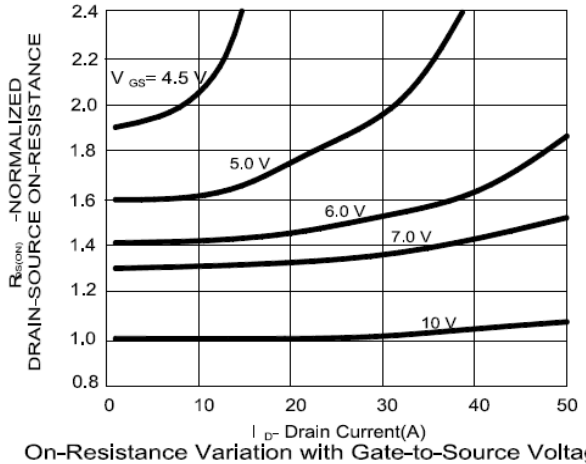
N-CHANNEL

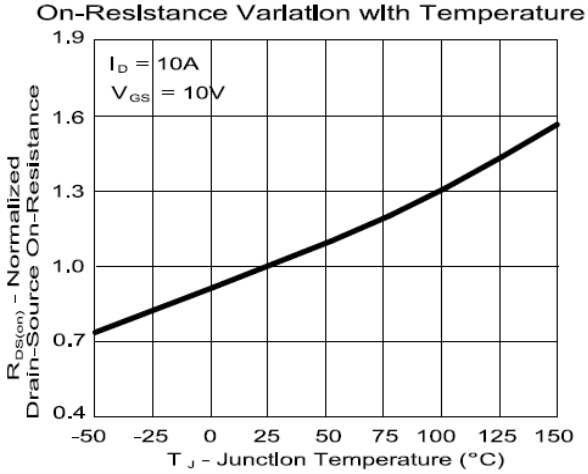
On-Region Characteristics



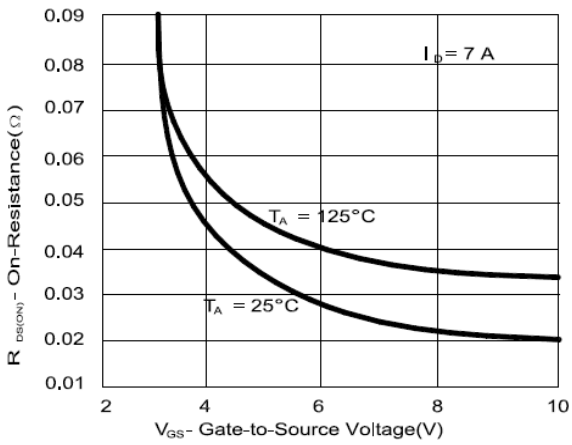
On-Resistance Variation with Drain Current and Gate Voltage



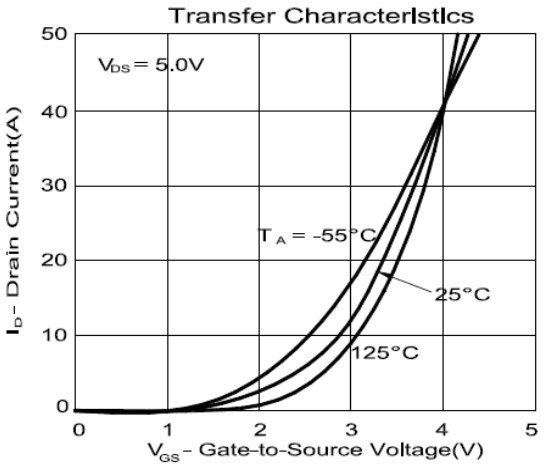
On-Resistance Variation with Temperature



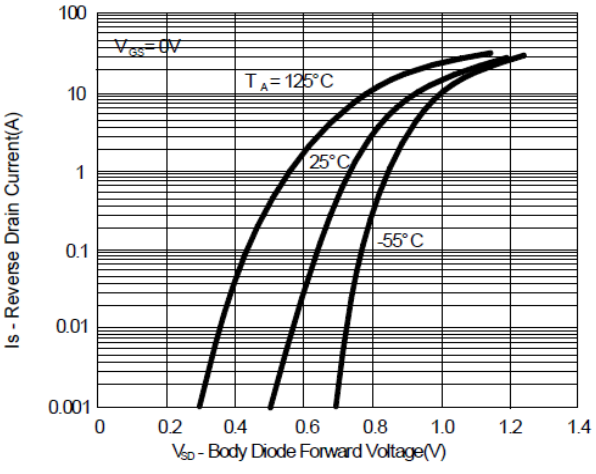
On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics



Body Diode Forward Voltage Variation with Source Current and Temperature



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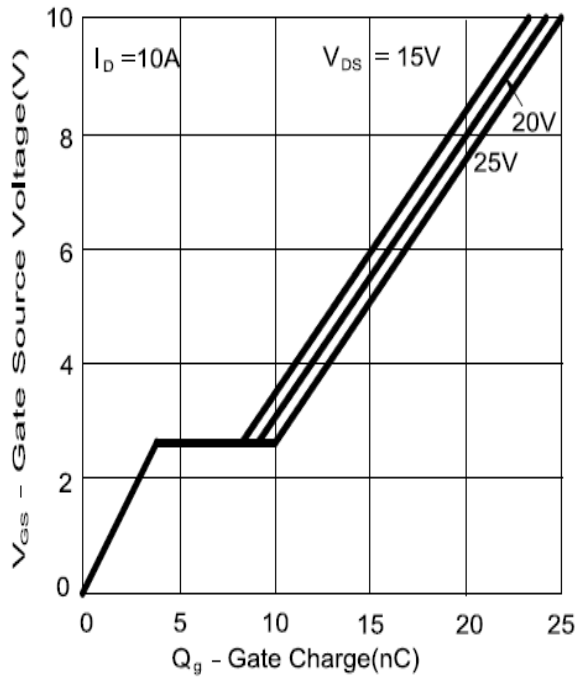
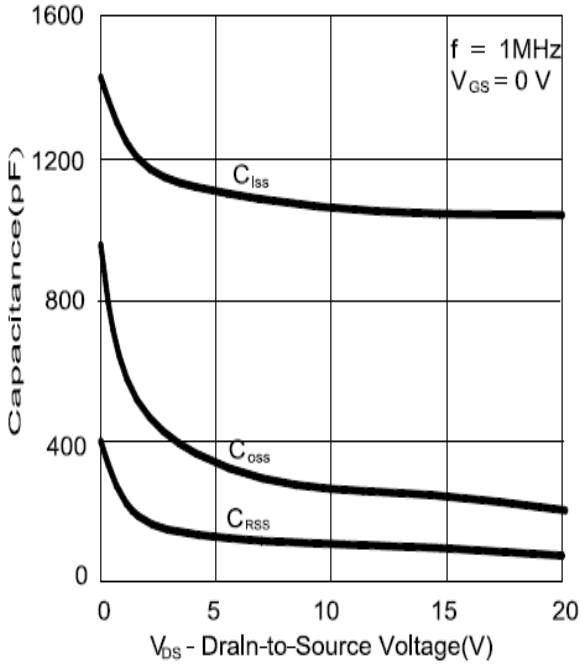
N&P-Channel Enhancement Mode MOSFET

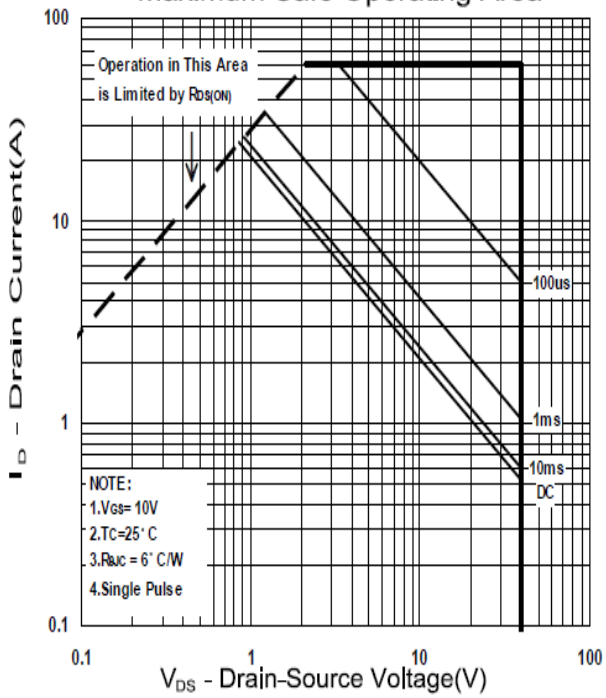
Gate Charge Characteristics



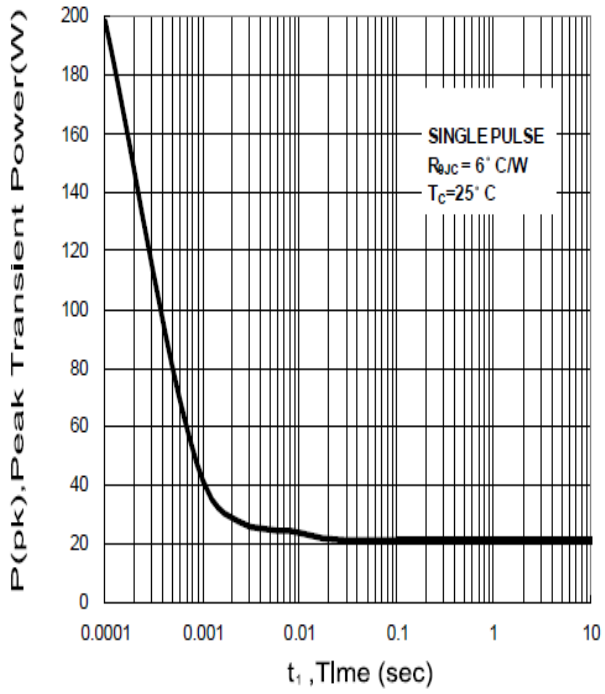
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



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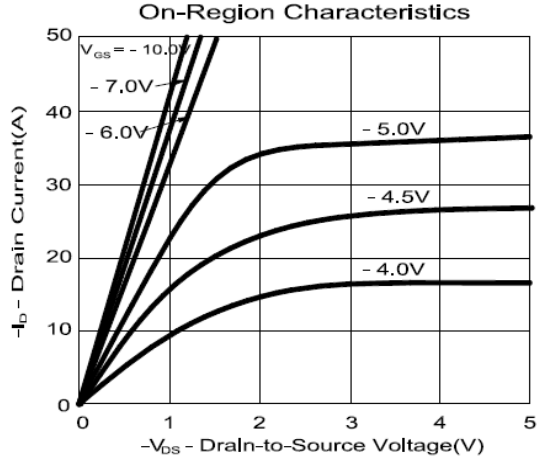
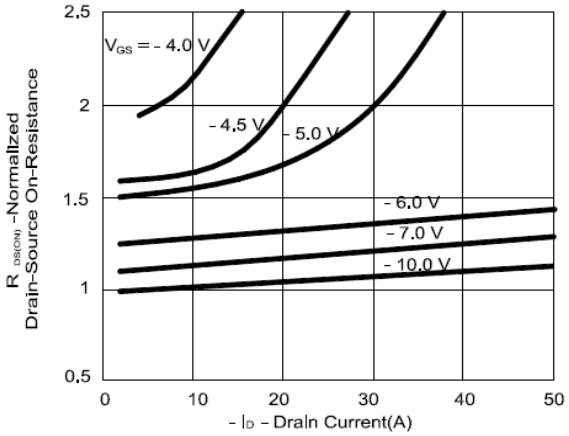
P-CHANNEL

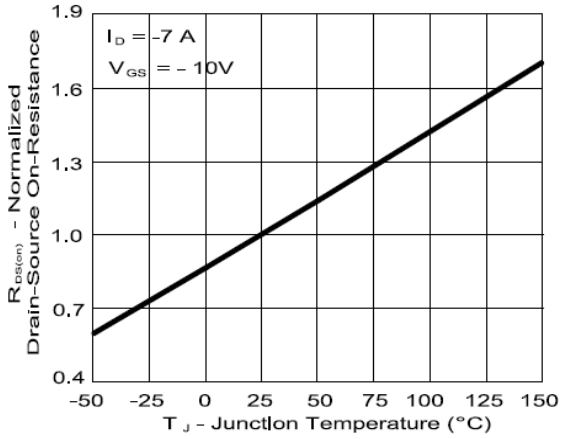
On-Region Characteristics



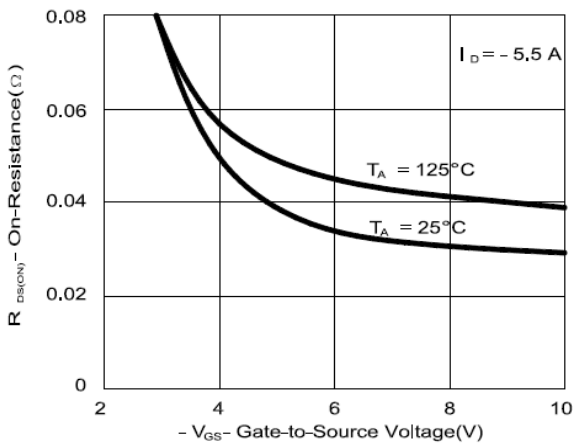
On-Resistance Variation with Drain Current and Gate Voltage



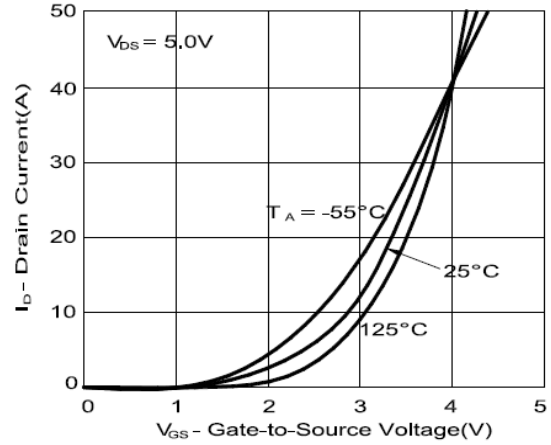
On-Resistance Variation with Temperature



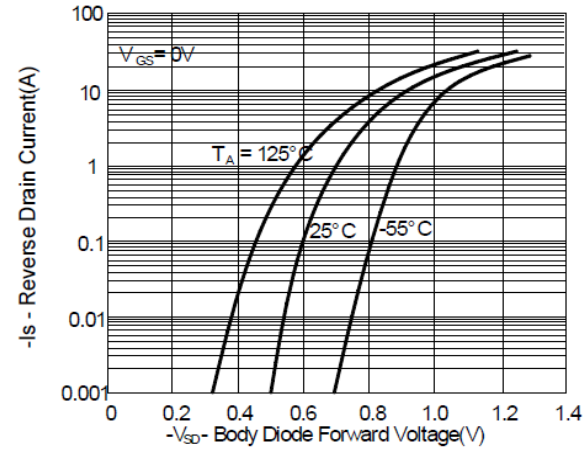
On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics



Body Diode Forward Voltage Variation with Source Current and Temperature



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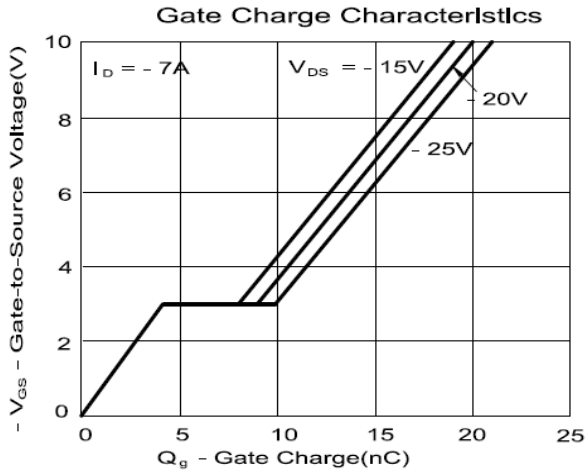

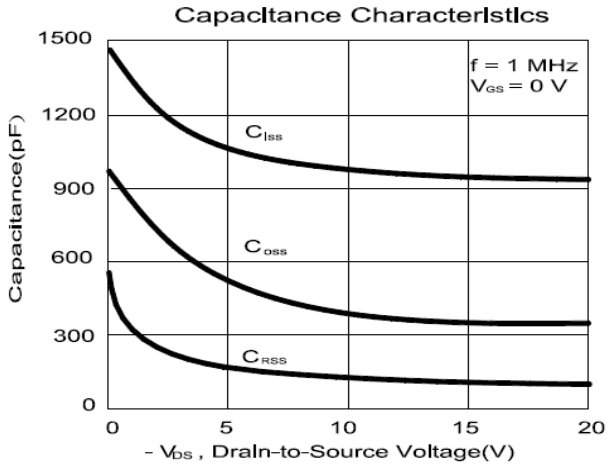

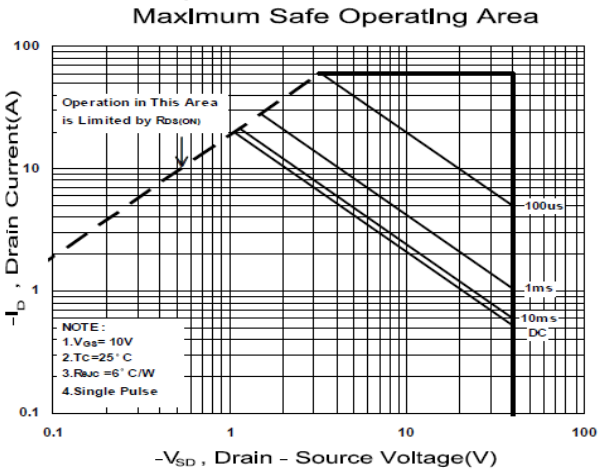

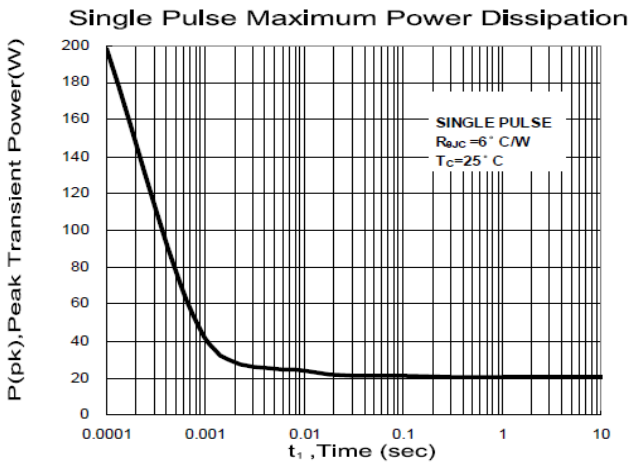

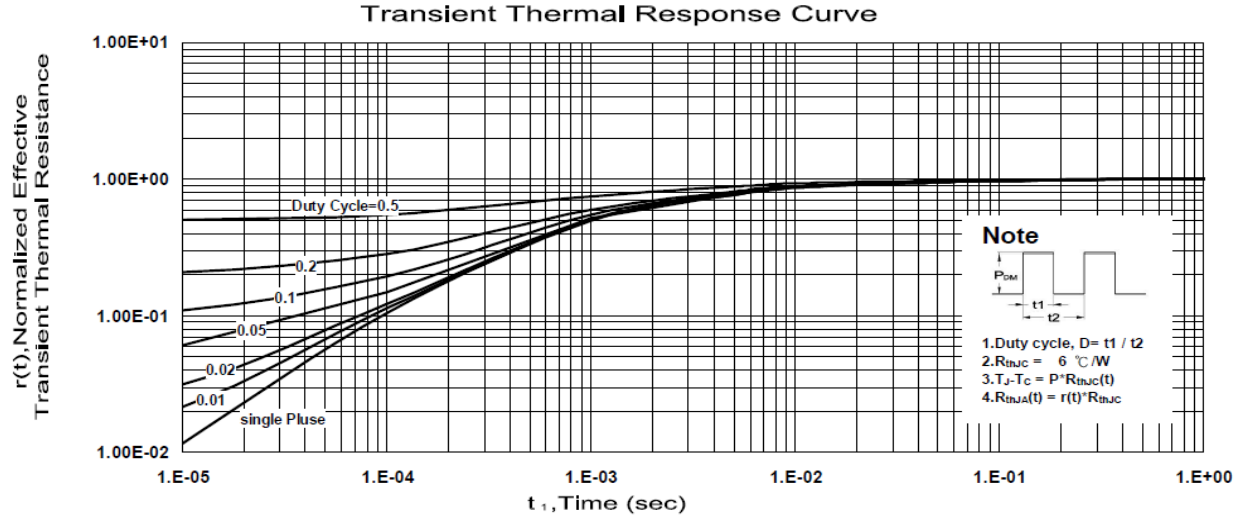

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Package Dimension

TO-252-5 MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9	9.5	10.4	J	4.8	5.0	5.5
B	2.1	2.3	2.5	L	0.3	0.56	0.7
C	0.4	0.5	0.6	M	1.1	1.3	1.5
E		0.51		S	4.57	5.0	5.51
F	0	0.1	0.3	T	3.81	5.0	5.0
G	5.3	6.1	6.22	U	1.4	1.5	1.77
H	0.89	1.1	1.7	V	0.55	1.2	1.5
I	6.5	6.6	6.8