UNIKC Semiconductor

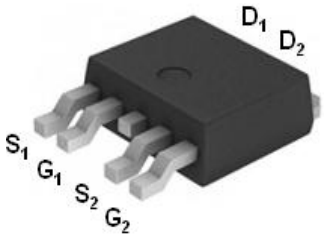
RoHS Compliant

P2804ND5G

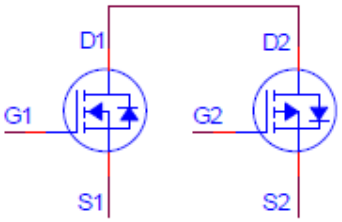
N&P-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D	Channel
40V	28mΩ @V_{GS} =10V	21A	N
-40V	48mΩ @V_{GS} = -10V	-16A	P



TO-252-5



ABSOLUTE MAXIMUM RATINGS (T_A = 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	21	A
			P	-16	
	T_C = 100°C		N	13	
			P	-10	
Pulsed Drain Current[1]		I_{DM}	N	50	
			P	-50	
Avalanche Current		I_{AS}	N	26	
			P	-26	
Avalanche Energy	L = 0.1mH	E_{AS}	N	33	mJ
			P	33	
Power Dissipation	T_C = 25 °C	P_D	N	21	W
			P		
	T_C = 100 °C		N	8	
			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	$R_{\theta JA}$		40	

[1]Pulse width limited by maximum junction temperature.

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

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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		797		pF
			P		856		
Output Capacitance	C_{oss}		N		180		
			P		191		
Reverse Transfer Capacitance	C_{rss}		N		132		
			P		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		17		nC
			P		18		
Gate-Source Charge[2]	Q_{gs}		N		4		
			P		4		
Gate-Drain Charge[2]	Q_{gd}		N		5		
			P		6		
Turn-On Delay Time[2]	$t_{d(on)}$	N-Channel V_{DS} = 20V $I_D \cong$ 1A, V_{GS} = 10V, R_{GEN} = 6Ω P-Channel V_{DS} = -20V $I_D \cong$ -1A, V_{GS} = -10V, R_{GEN} = 6Ω	N		10		nS
			P		10		
Rise Time[2]	t_r		N		15		
			P		10		
Turn-Off Delay Time[2]	$t_{d(off)}$		N		20		
			P		25		
Fall Time[2]	t_f		N		10		
			P		5		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current	I_S		N			21	A
			P			-16	
Forward Voltage[1]	V_{SD}	I_F = 7A, V_{GS} = 0V	N			1	V
		I_F = -5.5A, V_{GS} = 0V	P			-1	
Reverse Recovery Time	t_{rr}	I_F = 7A, dI_F/dt = 100A / μS	N		25		nS
		I_F = -5.5A, dI_F/dt = 100A / μS	P		35		
Reverse Recovery Charge	Q_{rr}		N		35		nC
			P		40		

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

[2]Independent of operating temperature.

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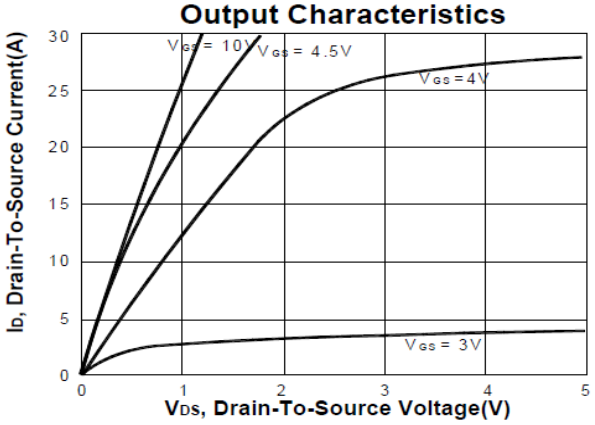
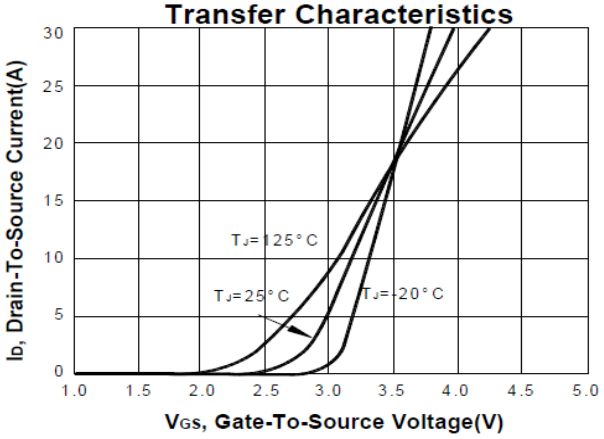
TYPICAL PERFORMANCE CHARACTERISTICS
N-CHANNEL

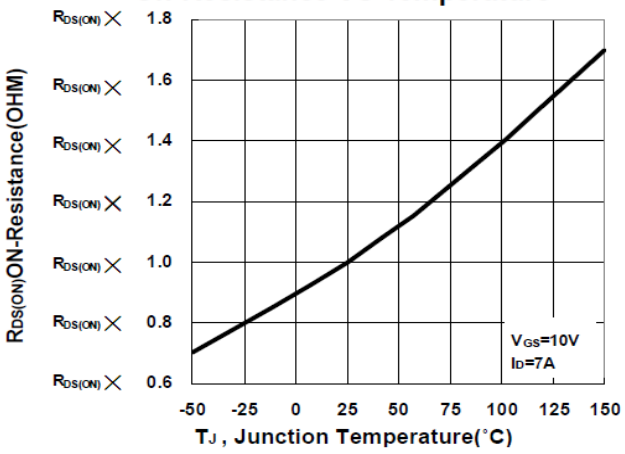
Output Characteristics



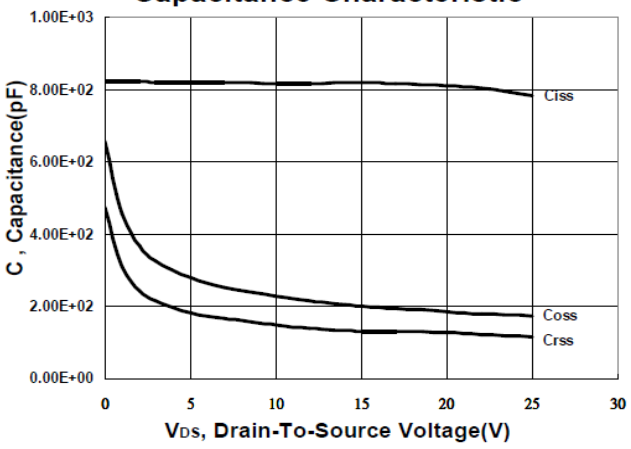
Transfer Characteristics



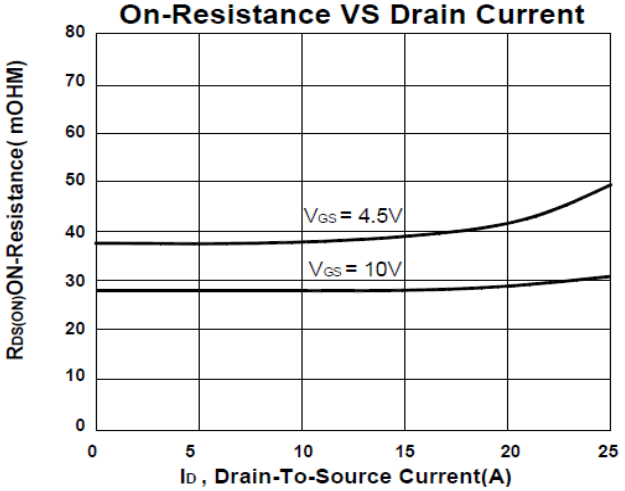
On-Resistance VS Temperature



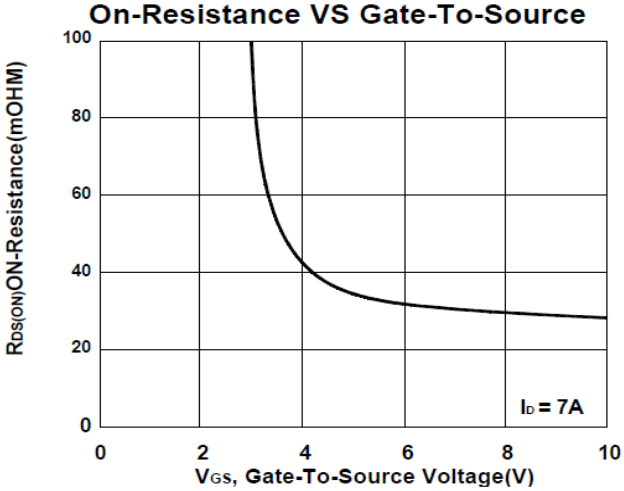
Capacitance Characteristic



On-Resistance VS Drain Current



On-Resistance VS Gate-To-Source



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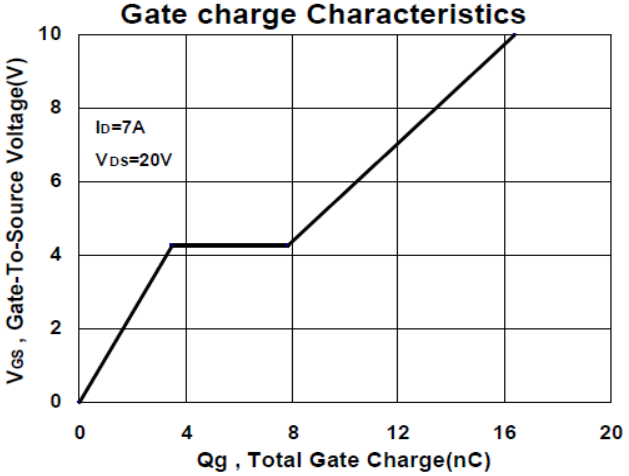
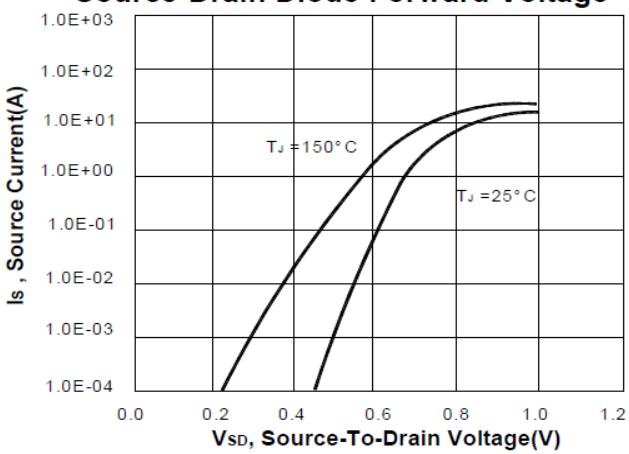
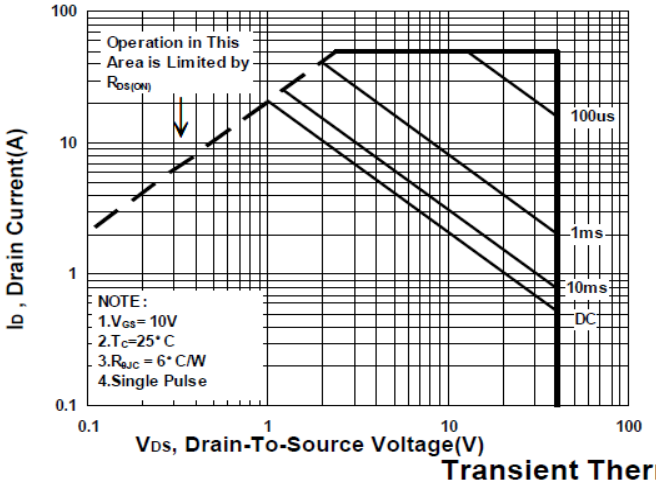
Gate charge Characteristics



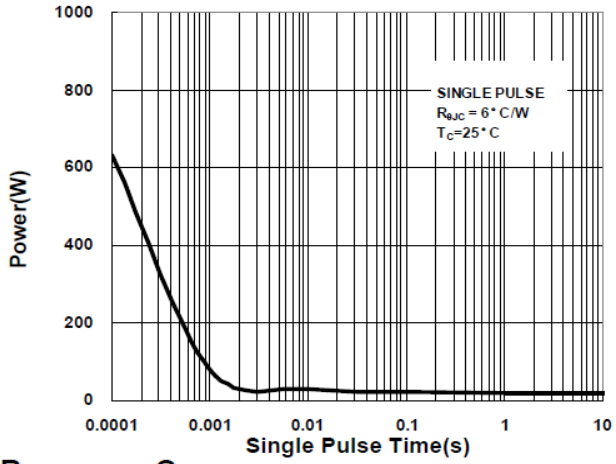
Source-Drain Diode Forward Voltage



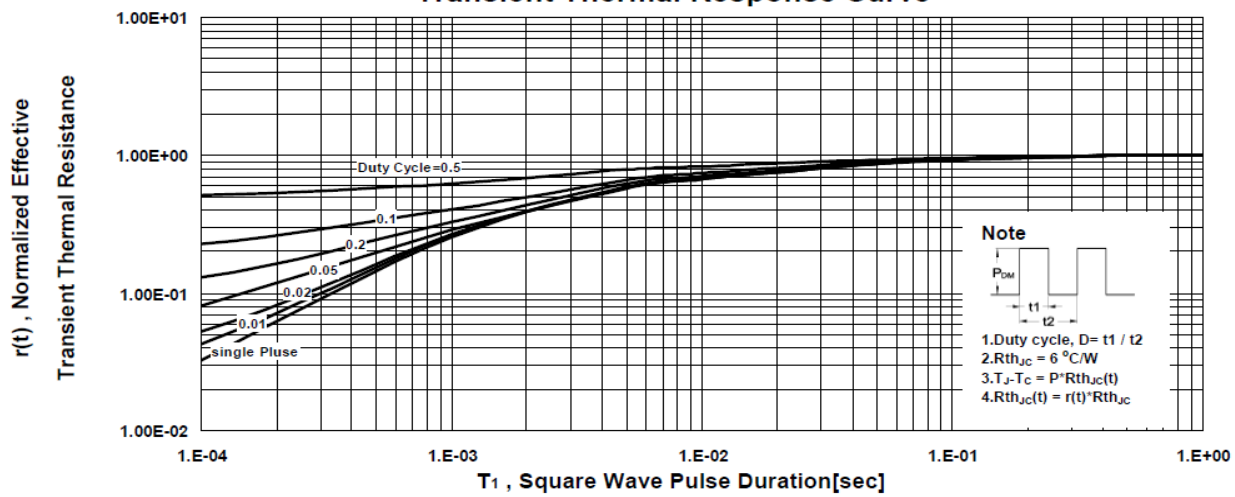
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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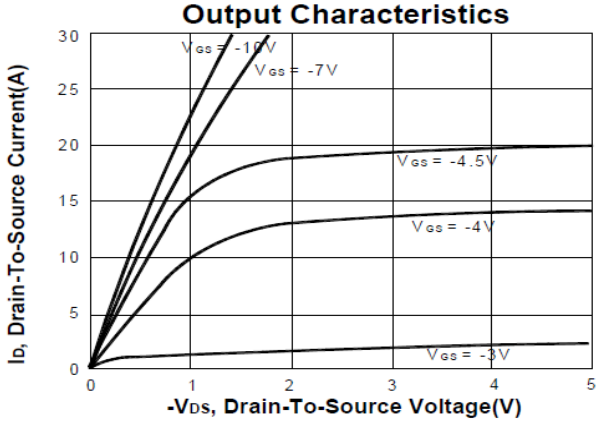
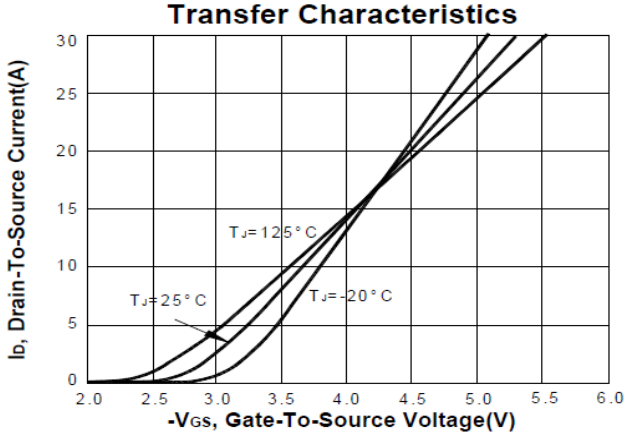
TYPICAL PERFORMANCE CHARACTERISTICS
P-CHANNEL

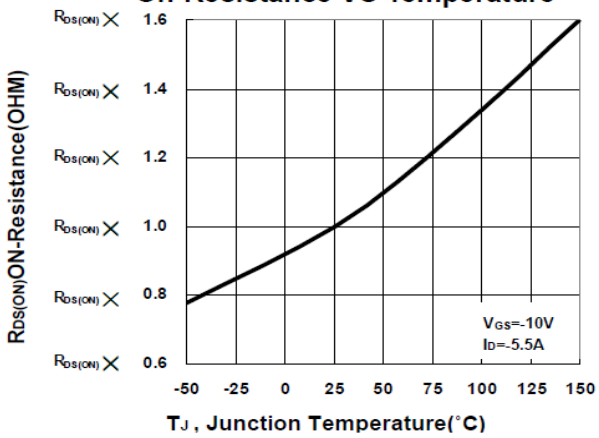
Output Characteristics



Transfer Characteristics



On-Resistance VS Temperature



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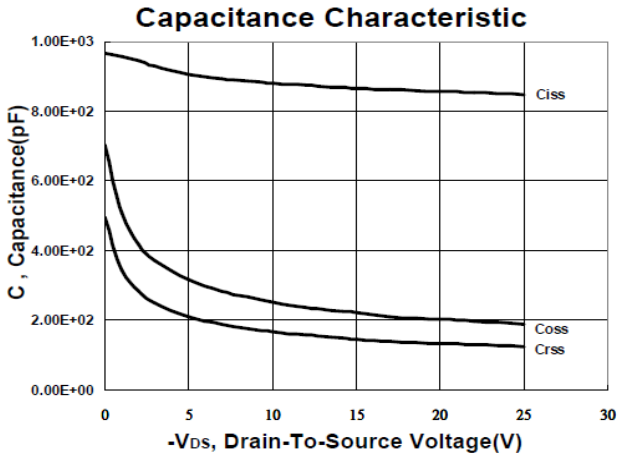
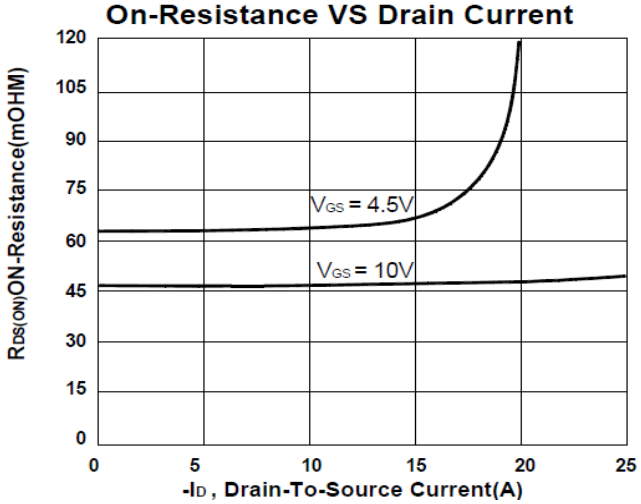
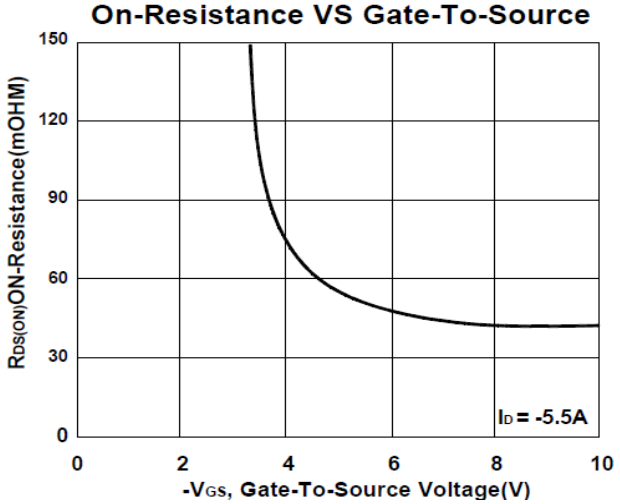


On-Resistance VS Drain Current



On-Resistance VS Gate-To-Source



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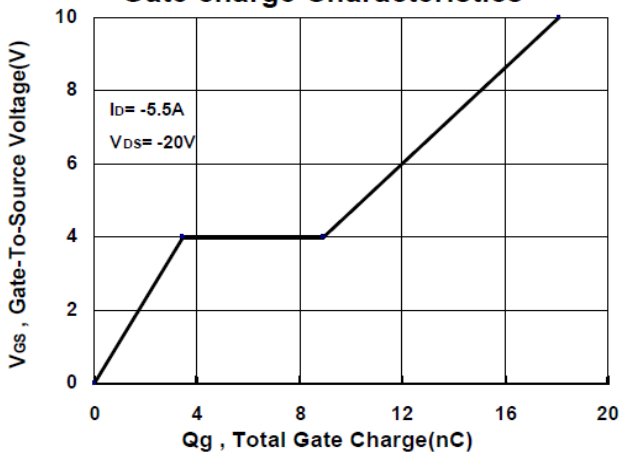

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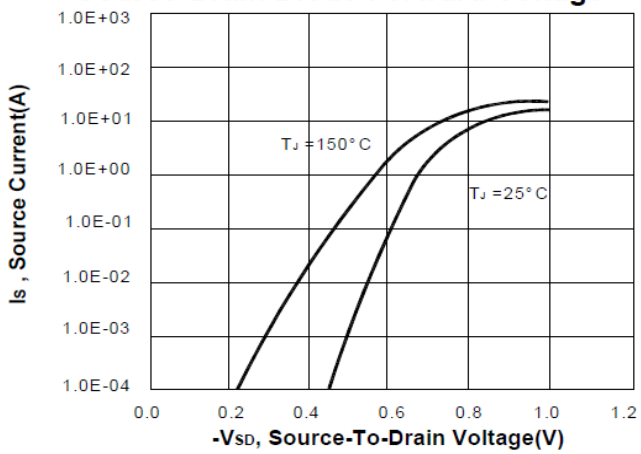

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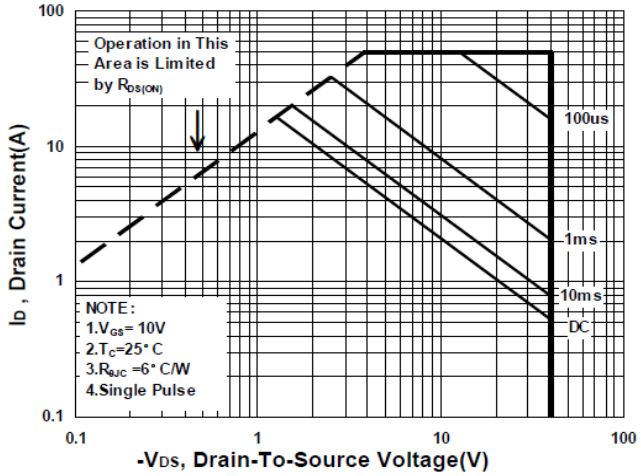

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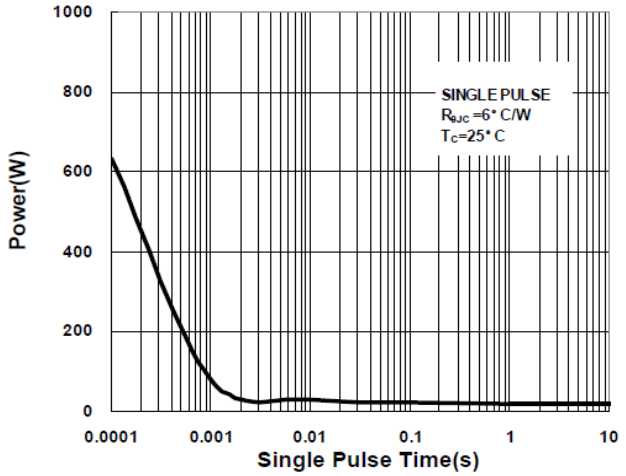

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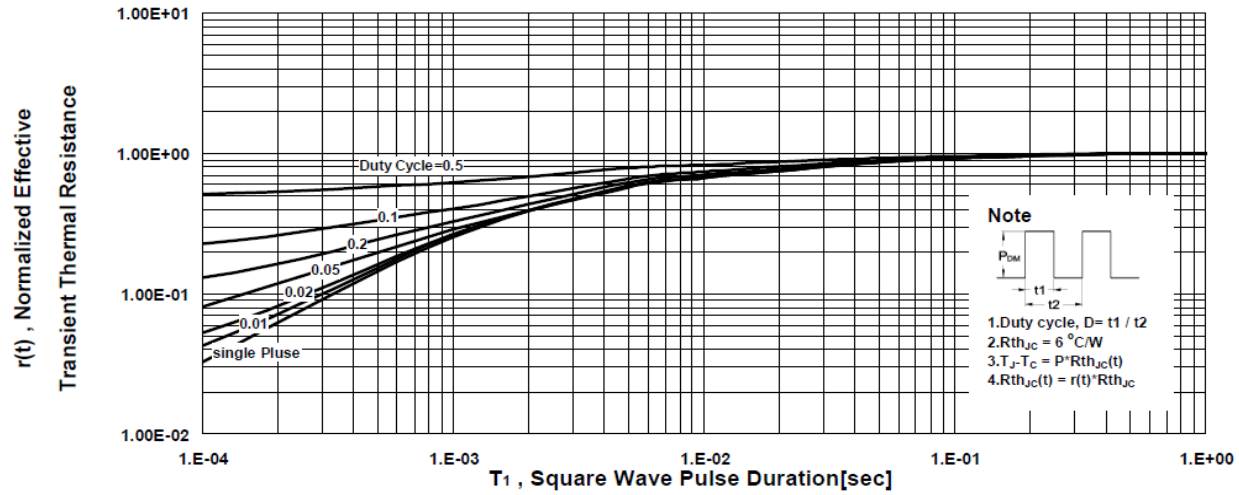

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Package Dimension

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				

