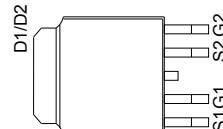
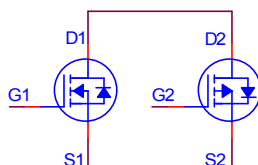


PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	40	30m Ω	12A
P-Channel	-40	55m Ω	-8.8A



G : GATE
D : DRAIN
S : SOURCE

100% Rg tested
100% UIS tested

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	N-Channel	P-Channel	UNITS
Drain-Source Voltage		V_{DS}	40	-40	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Continuous Drain Current	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	12	-8.8	A
	$T_C = 70\text{ }^{\circ}\text{C}$		8	-5.8	
Pulsed Drain Current ¹		I_{DM}	50	-50	
Avalanche Current		I_{AS}	19	-18	
Avalanche Energy	L = 0.1mH	E_{AS}	20	19	mJ
Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	P_D	3		W
	$T_C = 70\text{ }^{\circ}\text{C}$		2.1		
Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150		$^{\circ}\text{C}$
Lead Temperature (¹ / ₁₆ " from case for 10 sec.)		T_L	275		

THERMAL RESISTANCE RATINGS

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

¹Pulse width limited by maximum junction temperature.

²Duty cycle $\leq 1\%$

ELECTRICAL CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT	
			MIN	TYP	MAX		
STATIC							
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	N-Ch	40		V	
		V _{GS} = 0V, I _D = -250μA	P-Ch	-40			
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	N-Ch	1.7	2.0		3.0
		V _{DS} = V _{GS} , I _D = -250μA	P-Ch	-1.7	-2.0		-3.0

Gate-Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	N-Ch			± 100	nA
		$V_{DS} = 0V, V_{GS} = \pm 20V$	P-Ch			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32V, V_{GS} = 0V$	N-Ch			1	μA
		$V_{DS} = -32V, V_{GS} = 0V$	P-Ch			-1	
		$V_{DS} = 30V, V_{GS} = 0V, T_J = 55^\circ C$	N-Ch			10	
		$V_{DS} = -30V, V_{GS} = 0V, T_J = 55^\circ C$	P-Ch			-10	
On-State Drain Current ¹	$I_{D(ON)}$	$V_{DS} = 5V, V_{GS} = 10V$	N-Ch	50			A
		$V_{DS} = -5V, V_{GS} = -10V$	P-Ch	-50			
Drain-Source Resistance ¹ On-State	$R_{DS(ON)}$	$V_{GS} = 5V, I_D = 6A$	N-Ch		39	50	m Ω
		$V_{GS} = -5V, I_D = -4.5A$	P-Ch		76	99	
		$V_{GS} = 10V, I_D = 7A$	N-Ch		26	30	
		$V_{GS} = -10V, I_D = -5.5A$	P-Ch		47	55	
Forward Transconductance ¹	g_{fs}	$V_{DS} = 10V, I_D = 7A$	N-Ch		18		S
		$V_{DS} = -10V, I_D = -5.5A$	P-Ch		10		

DYNAMIC							
Input Capacitance	C_{iss}	N-Channel $V_{GS} = 0V, V_{DS} = 10V, f = 1MHz$ P-Channel $V_{GS} = 0V, V_{DS} = -10V, f = 1MHz$	N-Ch		495	643	pF
Output Capacitance	C_{oss}		P-Ch		558	725	
Reverse Transfer Capacitance	C_{rss}		N-Ch		110	143	
			P-Ch		250	325	
Gate Resistance	R_g	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$	N-Ch		41	53	Ω
			P-Ch		60	78	
Total Gate Charge ²	Q_g	N-Channel $V_{DS} = 0.5V_{(BR)DSS}, V_{GS} = 10V,$ $I_D = 7A$ P-Channel $V_{DS} = 0.5V_{(BR)DSS}, V_{GS} = -10V,$ $I_D = -5.5A$	N-Ch		1.8		nC
Gate-Source Charge ²	Q_{gs}		P-Ch		7		
Gate-Drain Charge ²	Q_{gd}		N-Ch		12		
			P-Ch		11		
			N-Ch		1.8		
			P-Ch		1.7		
			N-Ch		1.6		
			P-Ch		1.5		

Turn-On Delay Time ²	t _{d(on)}	N-Channel	N-Ch		1.7	3.2	nS
			P-Ch		5.4	12	
Rise Time ²	t _r	V _{DS} = 20V	N-Ch		5.6	10	
		I _D ≅ 1A, V _{GS} = 10V, R _{GEN} = 6 Ω	P-Ch		7.8	16.5	
Turn-Off Delay Time ²	t _{d(off)}	P-Channel	N-Ch		7.6	14	
			P-Ch		16	30	
Fall Time ²	t _f	V _{DS} = -20V	N-Ch		2.8	5.5	
		I _D ≅ -1A, V _{GS} = -10V, R _{GEN} = 6 Ω	P-Ch		10	18	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T _J = 25 °C)							
Forward Voltage ¹	V _{SD}	I _F = 7A, V _{GS} = 0V	N-Ch			1.2	V
		I _F = -5.5A, V _{GS} = 0V	P-Ch			-1.2	
Reverse Recovery Time	t _{rr}	I _F = 7A, dI _F /dt = 100A / μS	N-Ch		40		nS
		I _F = -5.5A, dI _F /dt = 100A / μS	P-Ch		50		
Reverse Recovery Charge	Q _{rr}		N-Ch		28		nC
			P-Ch		50		

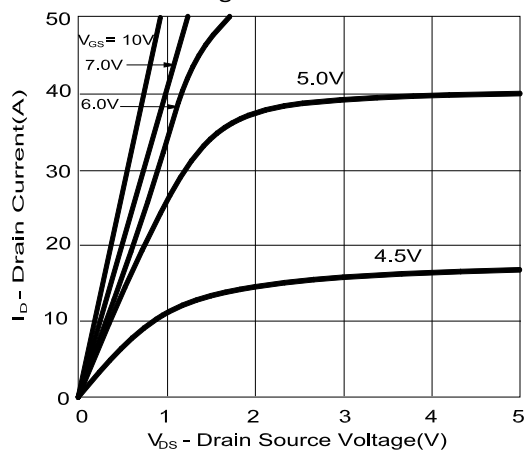
¹Pulse test : Pulse Width $\leq 300 \mu sec$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

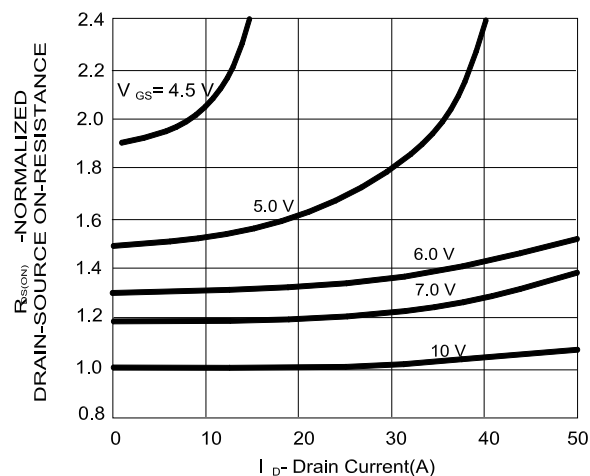
REMARK: THE PRODUCT MARKED WITH "P3004ND5G", DATE CODE or LOT #

N-CHANNEL

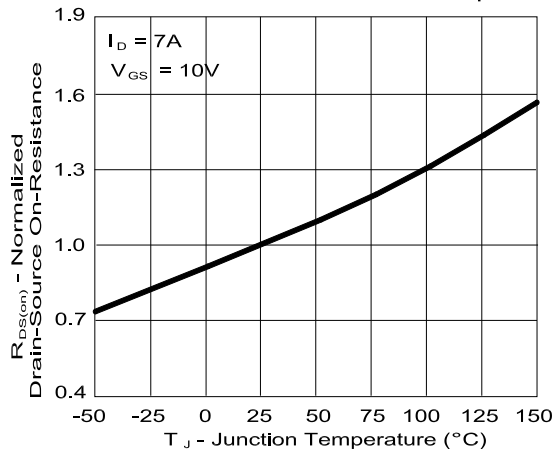
On-Region Characteristics



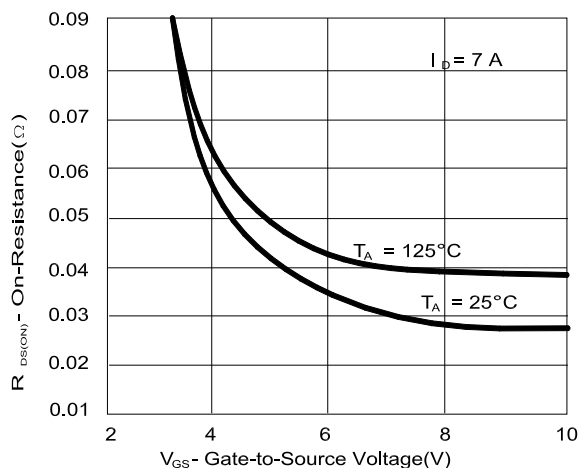
On-Resistance Variation with Drain Current and Gate Voltage



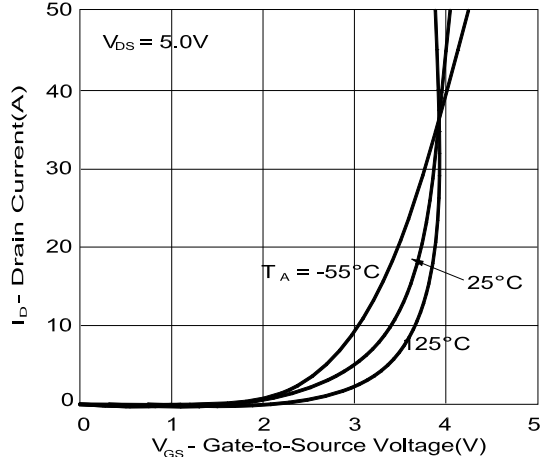
On-Resistance Variation with Temperature



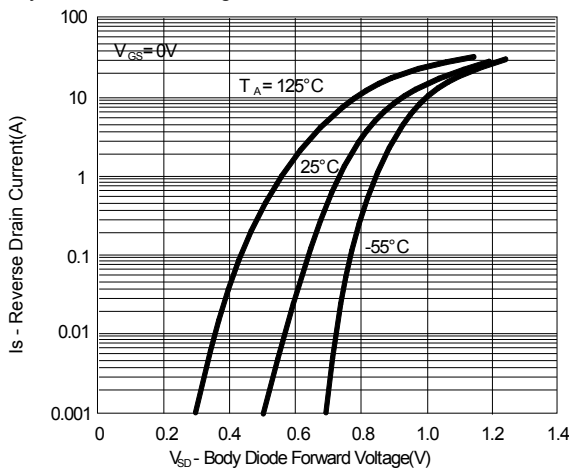
On-Resistance Variation with Gate-to-Source Voltage

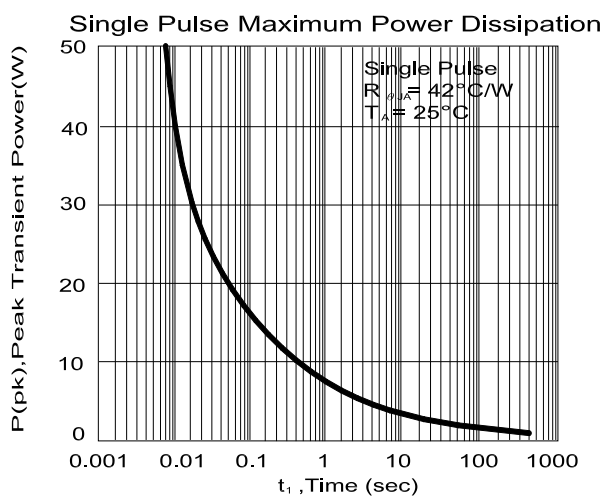
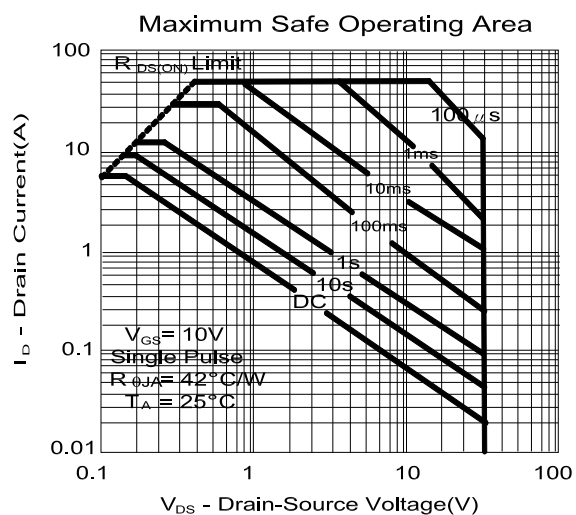
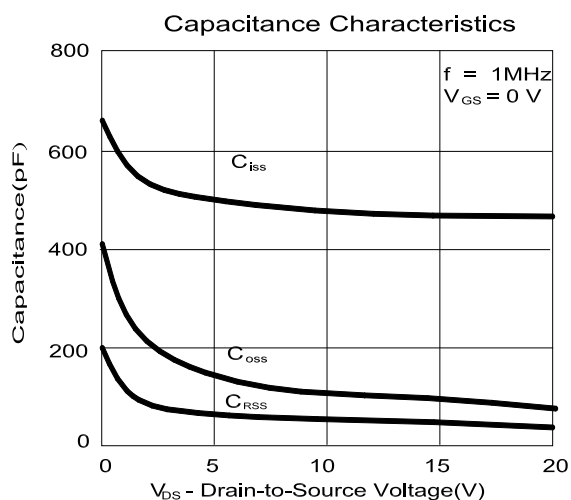
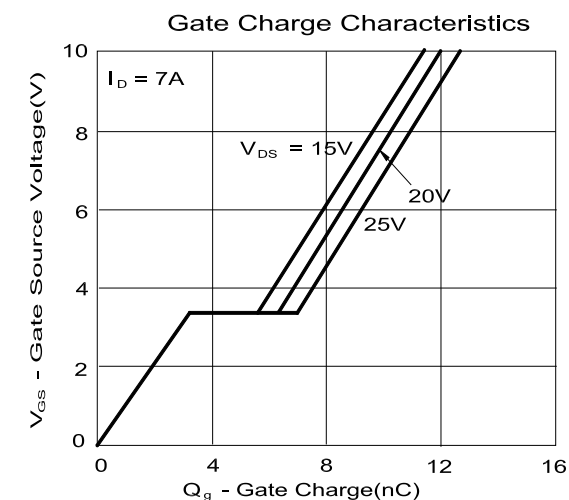


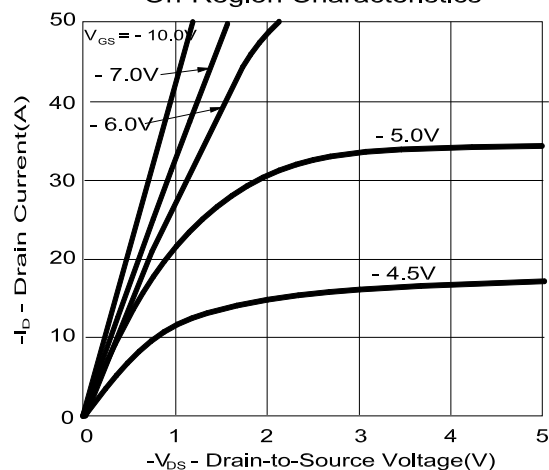
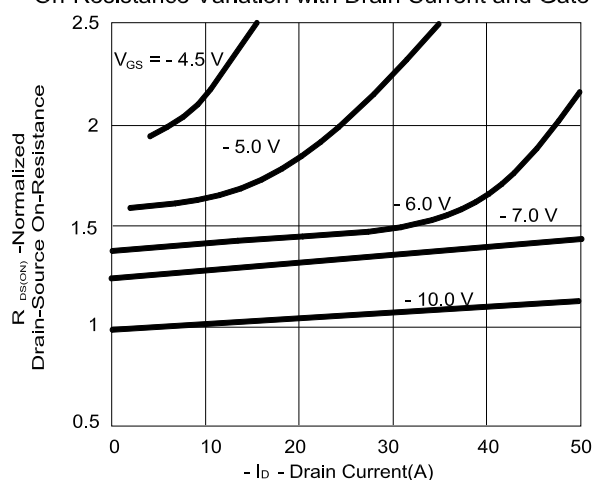
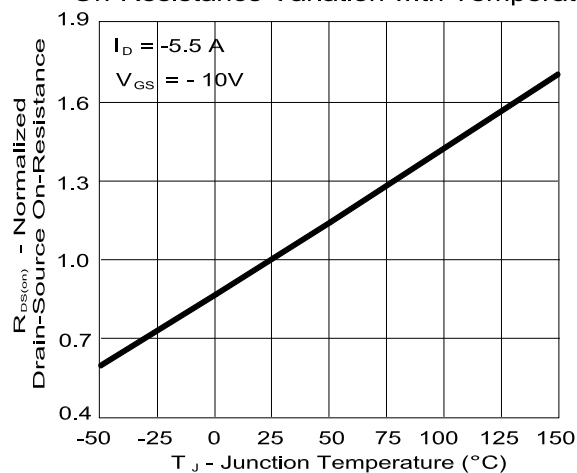
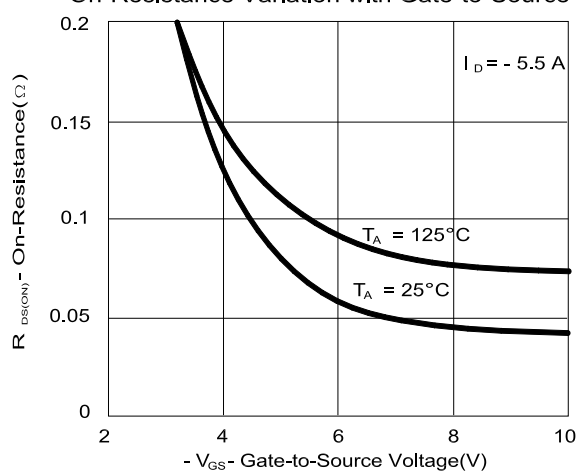
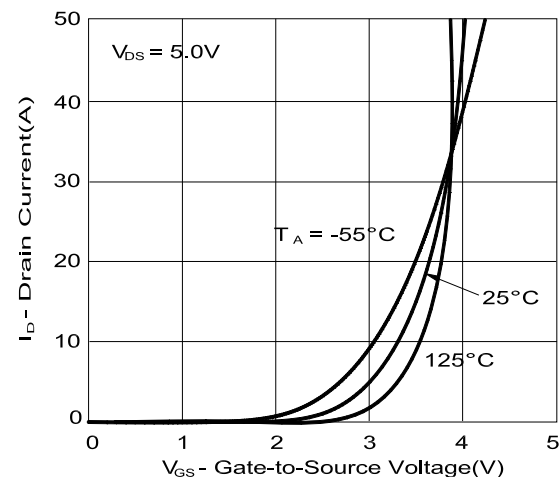
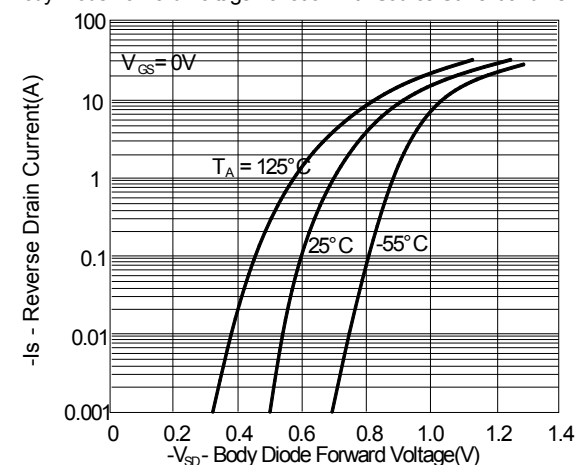
Transfer Characteristics

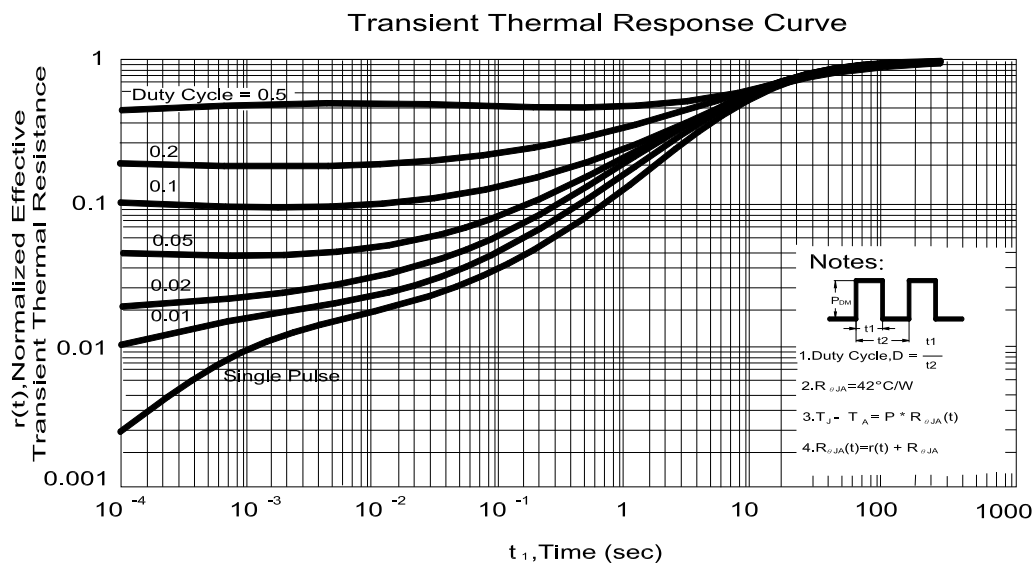
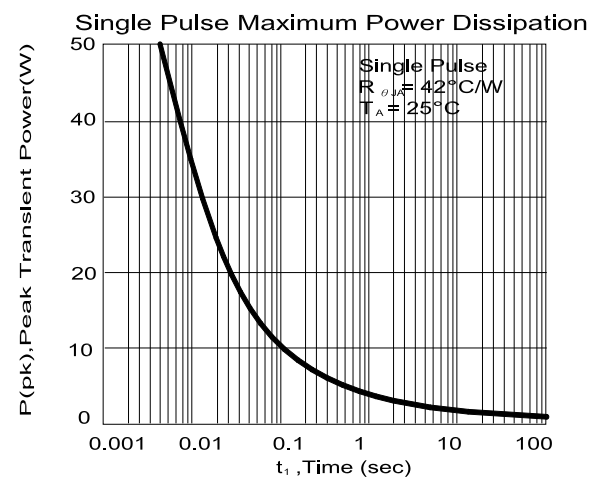
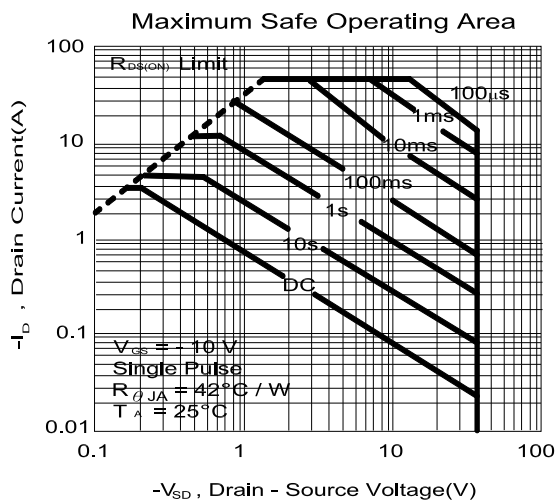
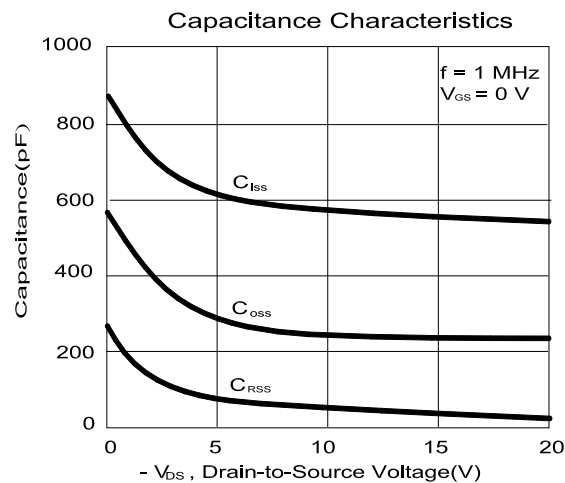
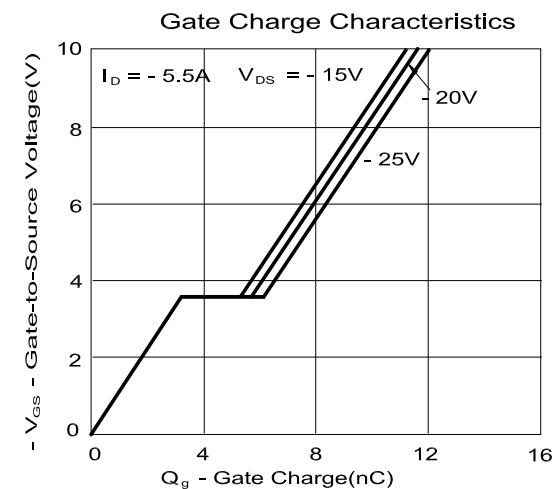


Body Diode Forward Voltage Variation with Source Current and Temperature





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




TO-252-4 (DPAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.0	9.5	10.4	H	0.9	1.5	1.7
B	2.1	2.3	2.5	I	6.3	6.5	6.8
C	0.4	0.5	0.6	J	4.8	5.0	5.5
D	0.95	1.2	1.3	K	1.0	1.3	1.6
E	0.4	0.5	0.6	L	0.3	0.5	0.7
F	0.0		0.3	M	1.1	1.3	1.5
G	5.3	5.5	6.2	N			

