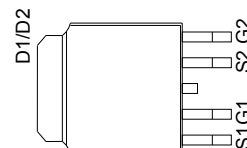
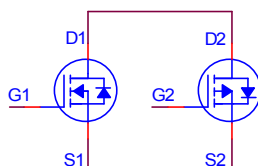


PRODUCT SUMMARY

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



G : GATE
D : DRAIN
S : SOURCE

ABSOLUTE MAXIMUM RATINGS ($T_C = 25\text{ °C}$ 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	$T_C = 25\text{ °C}$	I_D	24	-19	A
	$T_C = 70\text{ °C}$		19	-15	
Pulsed Drain Current ¹		I_{DM}	60	-60	
Power Dissipation	$T_C = 25\text{ °C}$	P_D	20.8		W
	$T_C = 70\text{ °C}$		13.3		
Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150		°C

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	°C / W

¹Pulse width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS ($T_C = 25\text{ °C}$, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT	
			MIN	TYP	MAX		
STATIC							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	N-Ch	40		V	
		$V_{GS} = 0V, I_D = -250\mu A$	P-Ch	-40			
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	N-Ch	1.6	2.0		3.0
		$V_{DS} = V_{GS}, I_D = -250\mu A$	P-Ch	-1.6	-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	60			A
		$V_{DS} = -5V, V_{GS} = -10V$	P-Ch	-60			
Drain-Source Resistance ¹	On-State $R_{DS(ON)}$	$V_{GS} = 7.0V, I_D = 7A$	N-Ch		25	33	$m\Omega$
		$V_{GS} = -7.0V, I_D = -5A$	P-Ch		32	40	
		$V_{GS} = 10V, I_D = 10A$	N-Ch		19	22	
		$V_{GS} = -10V, I_D = -7A$	P-Ch		28	33	
Forward Transconductance ¹	g_{fs}	$V_{DS} = 10V, I_D = 10A$	N-Ch		25		S
		$V_{DS} = -10V, I_D = -7A$	P-Ch		18		

DYNAMIC							
Input Capacitance	C_{iss}		N-Ch		1145	1450	pF
			P-Ch		1000	1260	
Output Capacitance	C_{oss}	$V_{GS} = 0V, V_{DS} = 10V, f = 1MHz$	N-Ch		253	355	pF
			P-Ch		450	625	
Reverse Transfer Capacitance	C_{rss}	$V_{GS} = 0V, V_{DS} = -10V, f = 1MHz$	N-Ch		94	142	
			P-Ch		108	163	
Total Gate Charge ²	Q_g	$V_{DS} = 0.5V_{(BR)DSS}, V_{GS} = 10V, I_D = 10A$	N-Ch		23		nC
			P-Ch		20		
Gate-Source Charge ²	Q_{gs}		N-Ch		3.6		
			P-Ch		3.2		

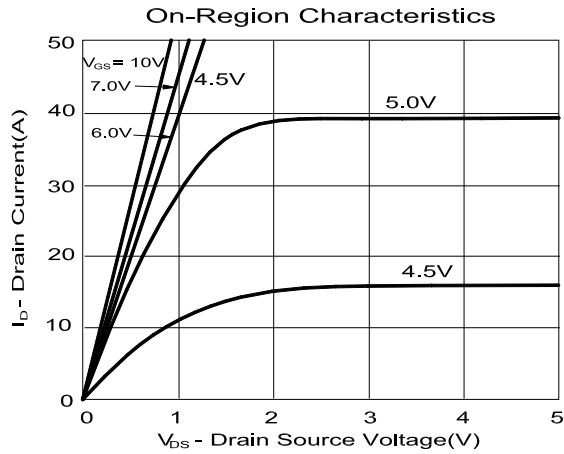
Gate-Drain Charge ²	Q_{gd}	$V_{DS} = 0.5V_{(BR)DSS}, V_{GS} = -10V,$ $I_D = -7A$	N-Ch		3.0			
			P-Ch		2.7			
Turn-On Delay Time ²	$t_{d(on)}$	N-Channel	N-Ch		3.2	6.4	nS	
			P-Ch		9.7	19.4		
Rise Time ²	t_r	$V_{DS} = 20V$ $I_D \equiv 1A, V_{GS} = 10V, R_{GEN} = 6\Omega$	N-Ch		10.8	21.7		
			P-Ch		14.0	28.1		
Turn-Off Delay Time ²	$t_{d(off)}$	P-Channel	N-Ch		17.1	30.8		
			P-Ch		28.7	51.6		
Fall Time ²	t_f	$V_{DS} = -20V$ $I_D \equiv -1A, V_{GS} = -10V, R_{GEN} = 6\Omega$	N-Ch		5.3	10.7		
			P-Ch		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-Ch			1.2		V
		$I_F = -7A, V_{GS} = 0V$	P-Ch			-1.2		
Reverse Recovery Time	t_{rr}	$I_F = 10A, di_F/dt = 100A / \mu S$	N-Ch		60		nS	
		$I_F = -7A, di_F/dt = 100A / \mu S$	P-Ch		80			
Reverse Recovery Charge	Q_{rr}		N-Ch		43		nC	
			P-Ch		75			

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

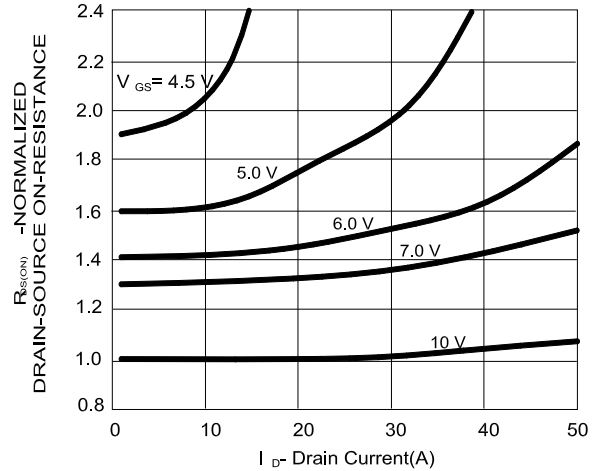
²Independent of operating temperature.

REMARK: THE PRODUCT MARKED WITH “P2204ND5G”, DATE CODE or LOT #

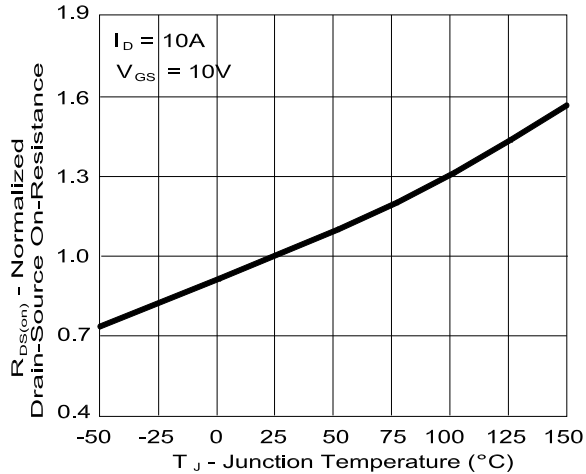
N-CHANNEL



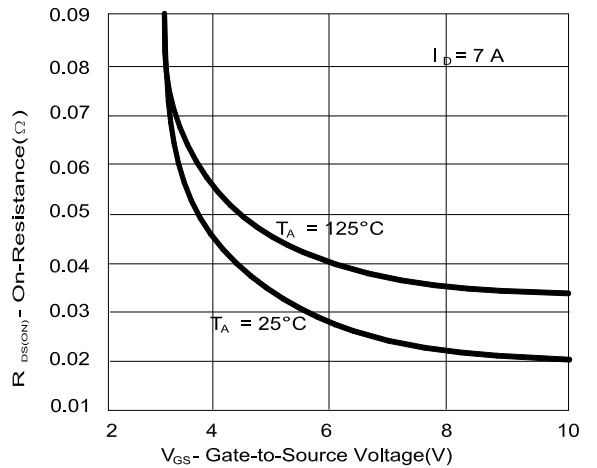
On-Resistance Variation with Drain Current and Gate Voltage



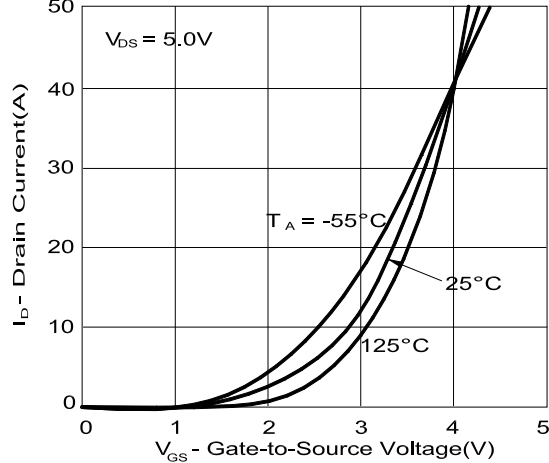
On-Resistance Variation with Temperature



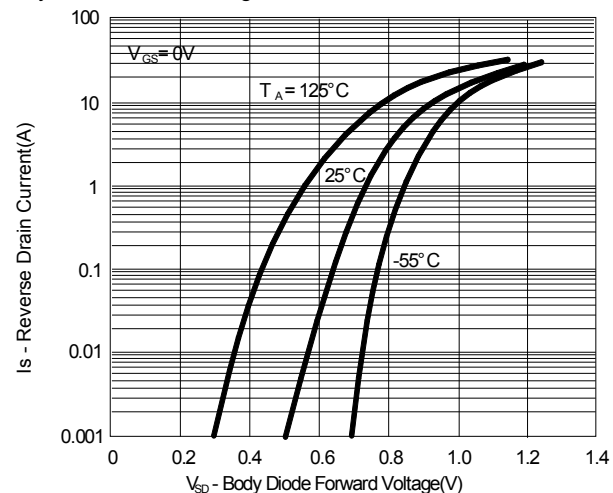
On-Resistance Variation with Gate-to-Source Voltage

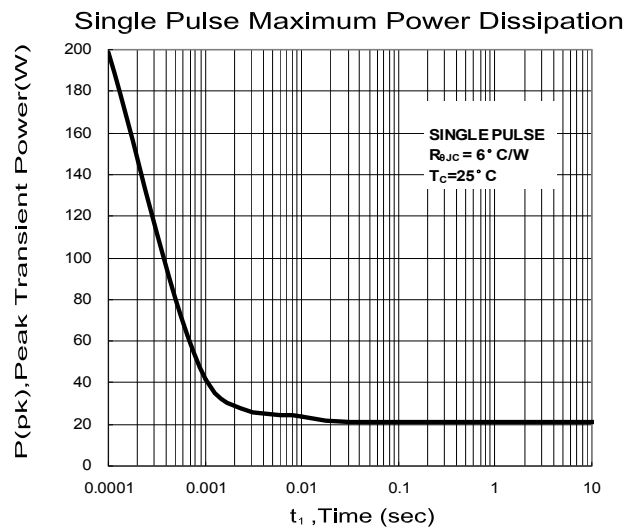
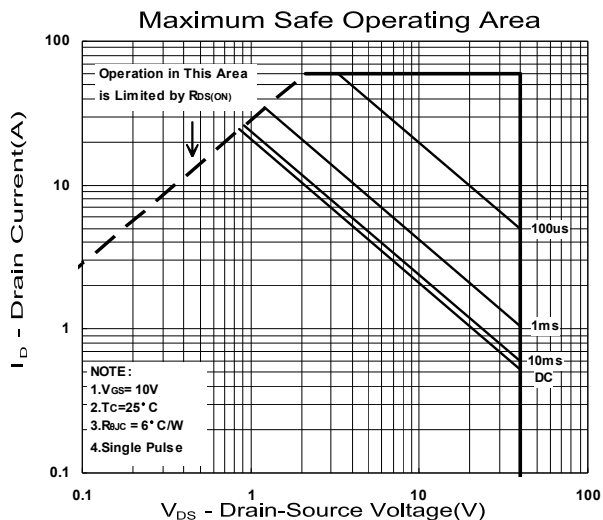
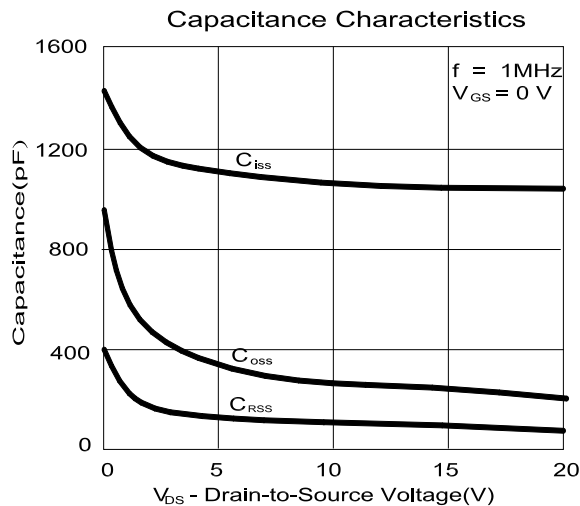
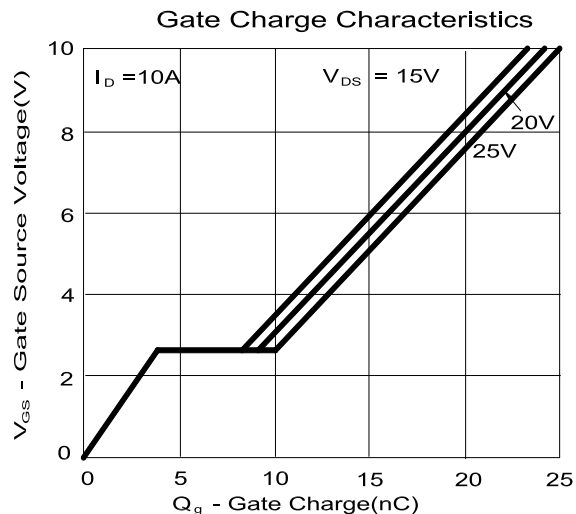


Transfer Characteristics



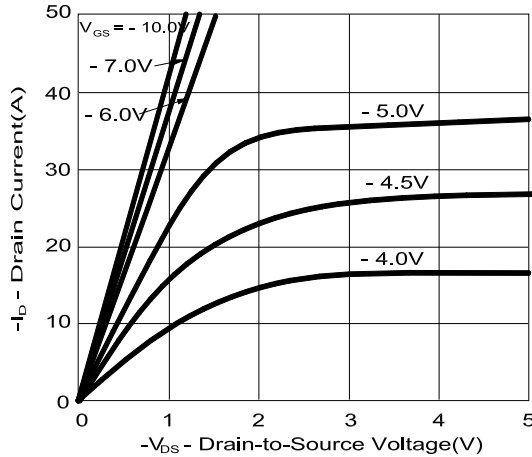
Body Diode Forward Voltage Variation with Source Current and Temperature



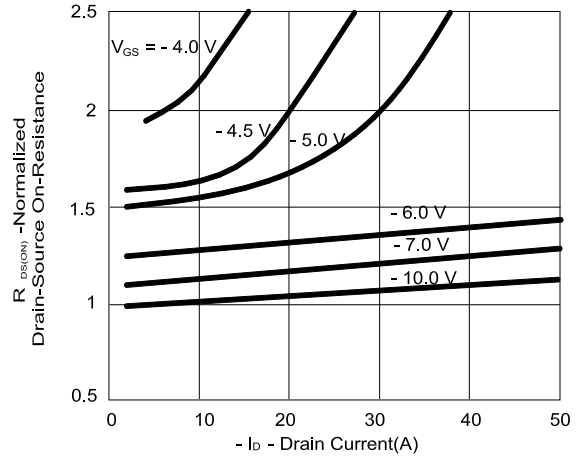


P-CHANNEL

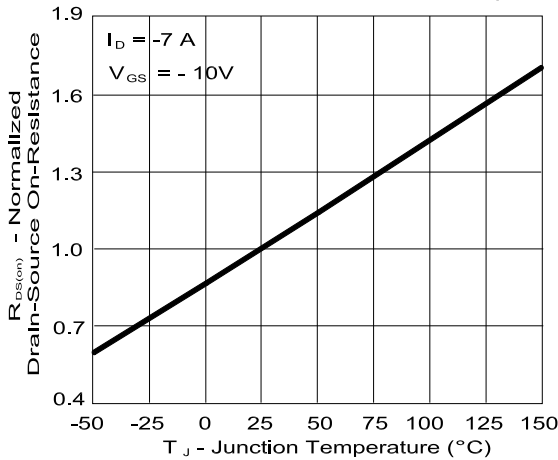
On-Region Characteristics



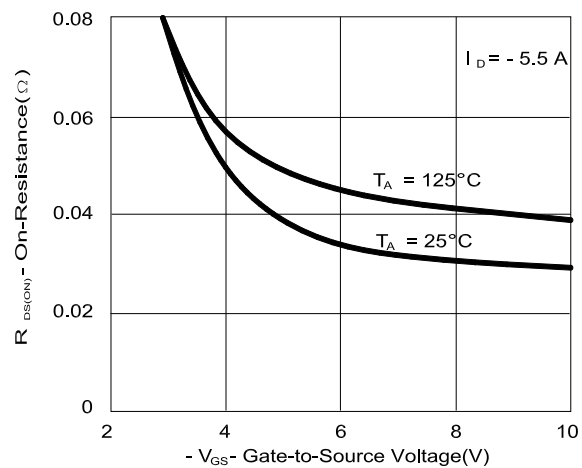
On-Resistance Variation with Drain Current and Gate Voltage



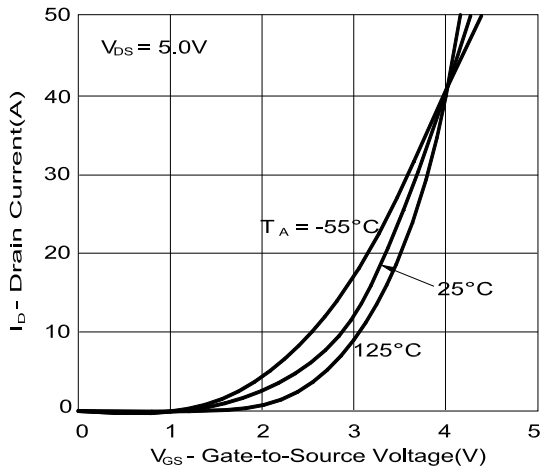
On-Resistance Variation with Temperature



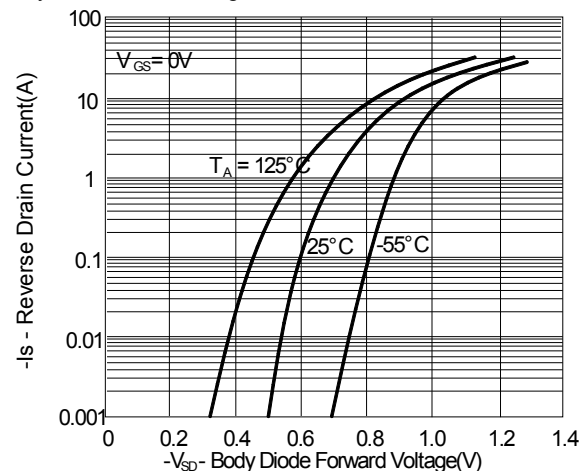
On-Resistance Variation with Gate-to-Source Voltage

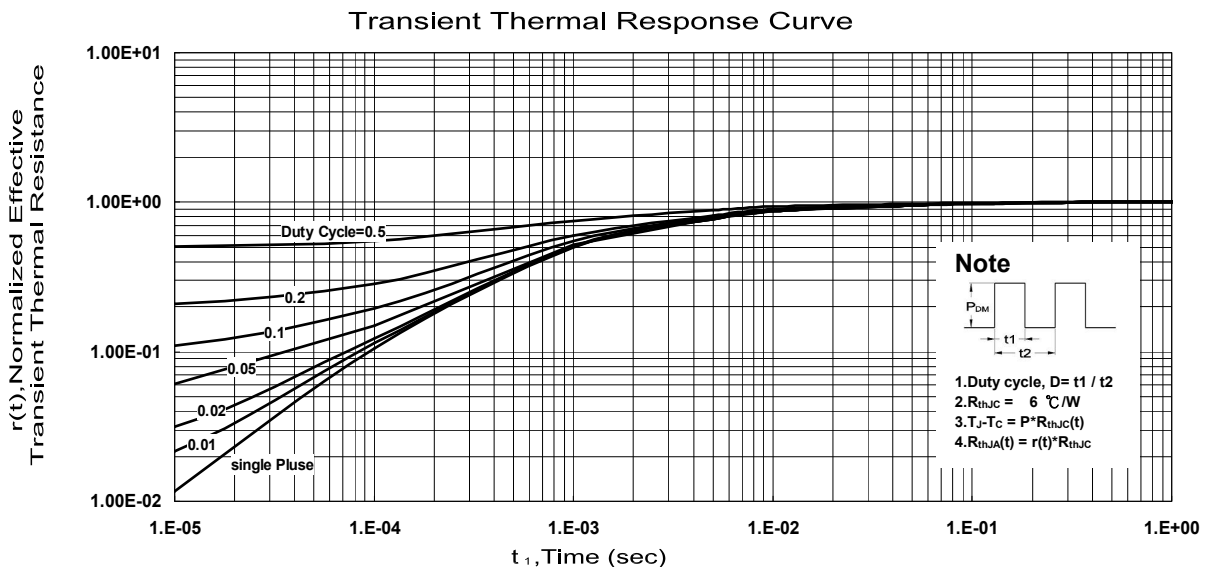
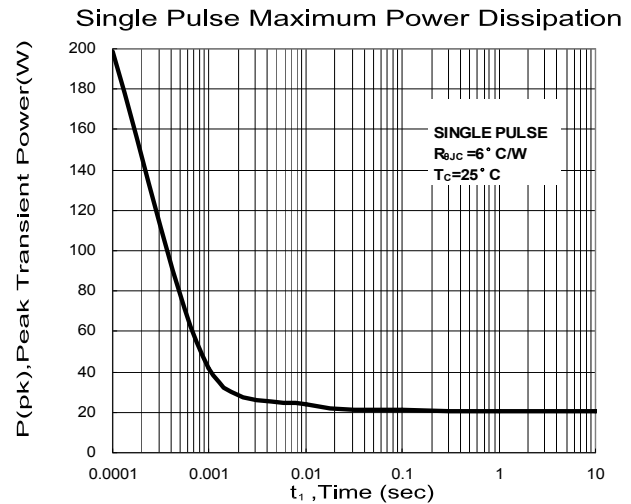
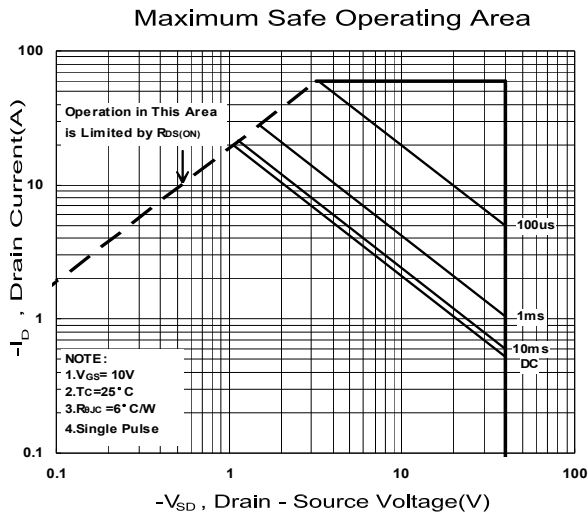
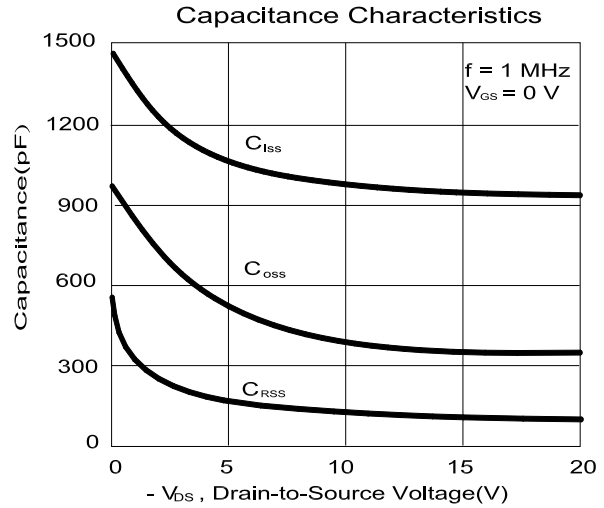
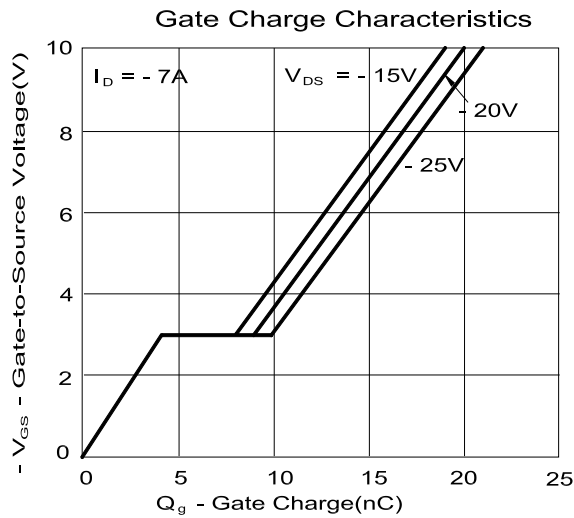


Transfer Characteristics



Body Diode Forward Voltage Variation with Source Current and Temperature





TO-252-5 (DPAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.0	9.5	10.0	H	1.3	1.5	1.7
B	2.1	2.3	2.5	I	6.3	6.5	6.7
C	0.4	0.5	0.6	J	4.8	5.0	5.2
D	1.1	1.2	1.3	K	0.8	1.3	1.8
E	0.4	0.5	0.6	L	0.3	0.5	0.7
F	0.00		0.3	M	1.1	1.3	1.5
G	5.3	5.5	5.7	N			

