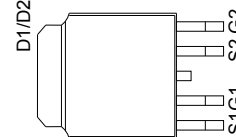
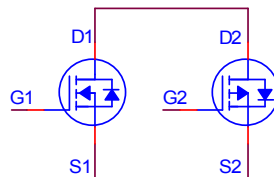


PRODUCT SUMMARY

	$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
N-Channel	40	30mΩ	12A
P-Channel	-40	55mΩ	-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		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 ≤ 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	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	N-Ch	40		V
		$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$	P-Ch	-40		
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	N-Ch	1.7	2.0	3.0
		$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	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	N-Ch		495	643	
			P-Ch		558	725	
Output Capacitance	C_{oss}	$V_{GS} = 0V, V_{DS} = 10V, f = 1MHz$ P-Channel	N-Ch		110	143	pF
			P-Ch		250	325	
Reverse Transfer Capacitance	C_{rss}	$V_{GS} = 0V, V_{DS} = -10V, f = 1MHz$	N-Ch		41	53	
			P-Ch		60	78	
Gate Resistance	R_g	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$	N-Ch		1.8		Ω
			P-Ch		7		
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		12		nC
Gate-Source Charge ²	Q_{gs}		P-Ch		11		
			N-Ch		1.8		
Gate-Drain Charge ²	Q_{gd}		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	
		$I_D \cong 1A, V_{GS} = 10V, R_{GEN} = 6\Omega$	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	
		$I_D \cong -1A, V_{GS} = -10V, R_{GEN} = 6\Omega$	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}	$I_F = 7A, di_F/dt = 100A / \mu S$	N-Ch		40		nS
		$I_F = -5.5A, di_F/dt = 100A / \mu S$	P-Ch		50		
Reverse Recovery Charge	Q_{rr}		N-Ch		28		nC
			P-Ch		50		

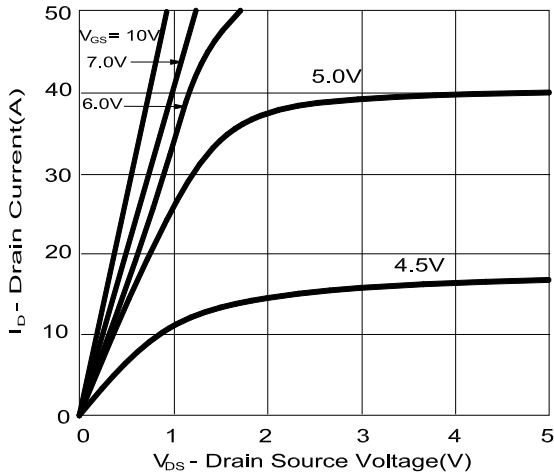
¹Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

²Independent of operating temperature.

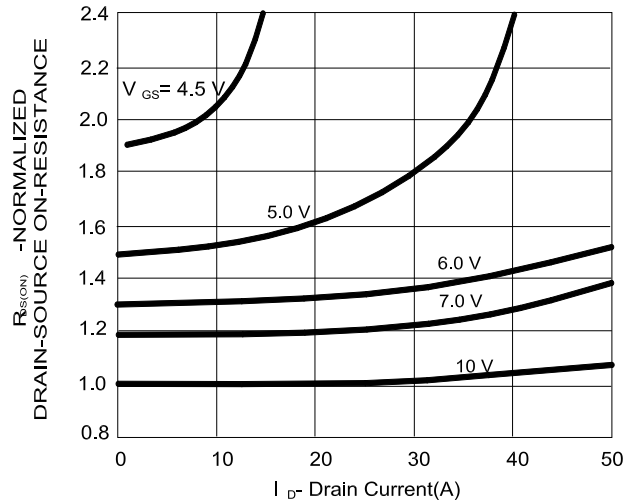
REMARK: THE PRODUCT MARKED WITH “P3004ND5G”, DATE CODE or LOT #

N-CHANNEL

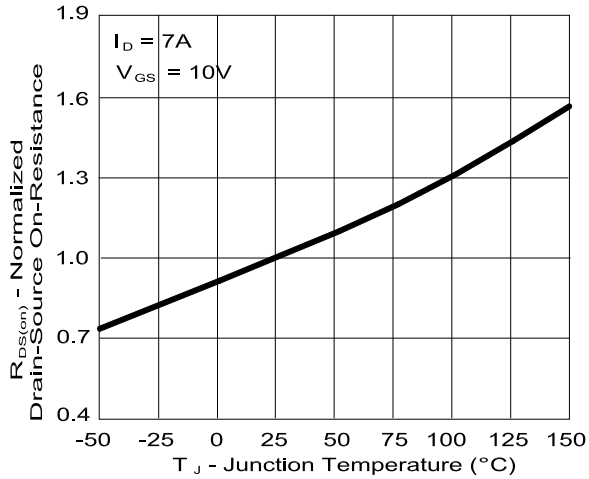
On-Region Characteristics



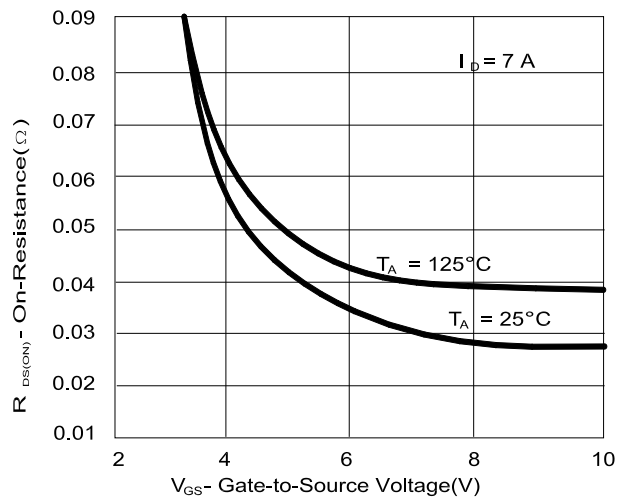
On-Resistance Variation with Drain Current and Gate Voltage



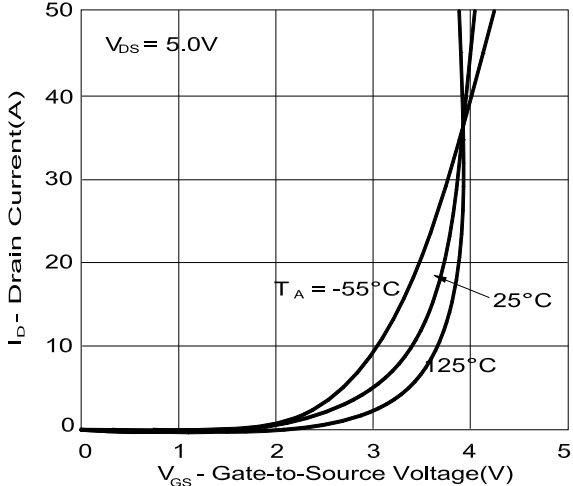
On-Resistance Variation with Temperature



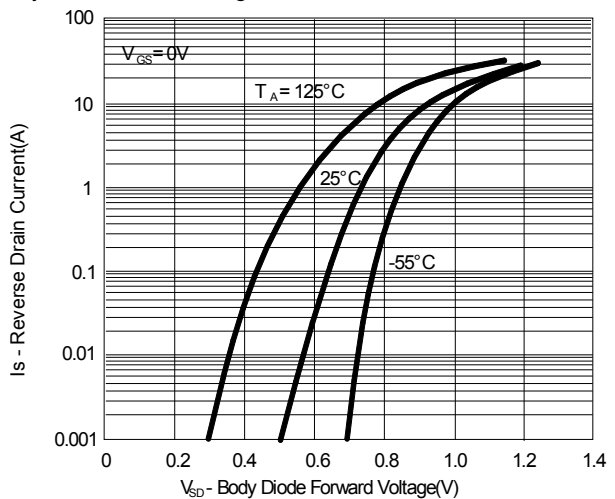
On-Resistance Variation with Gate-to-Source Voltage

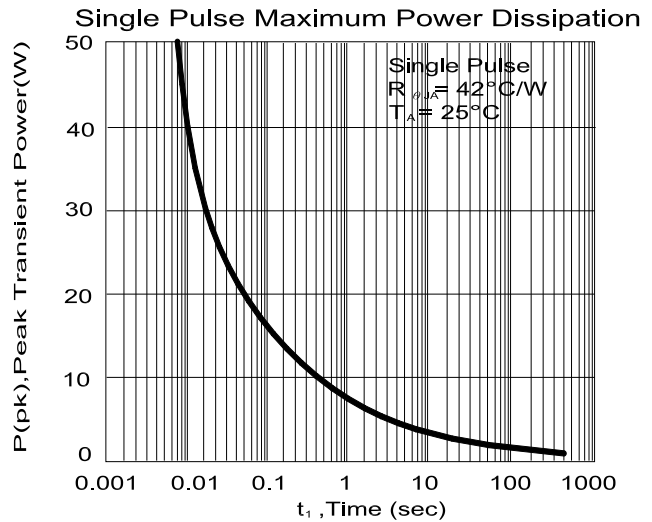
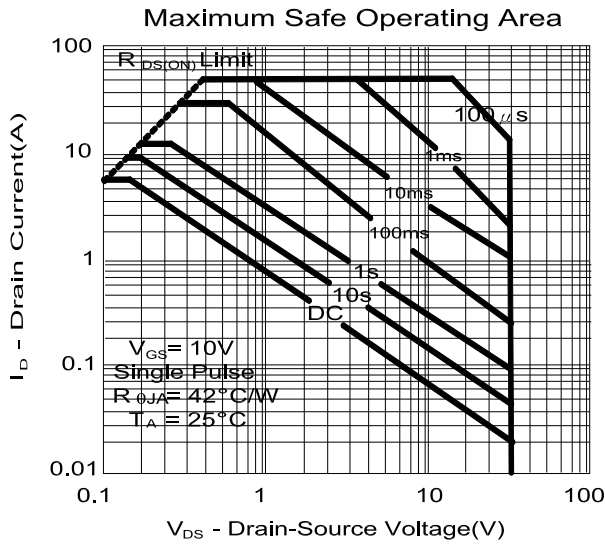
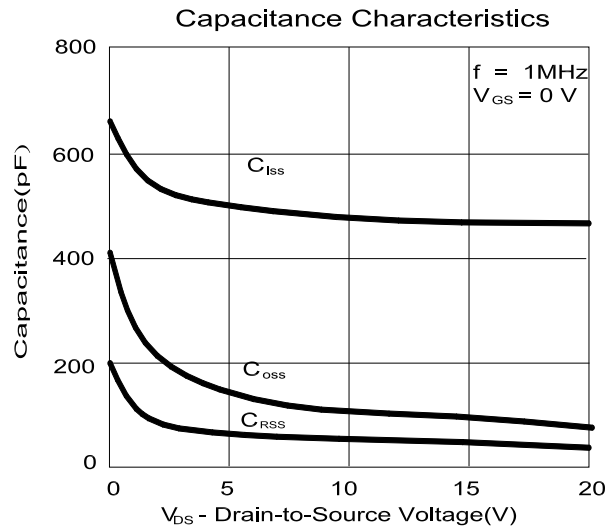
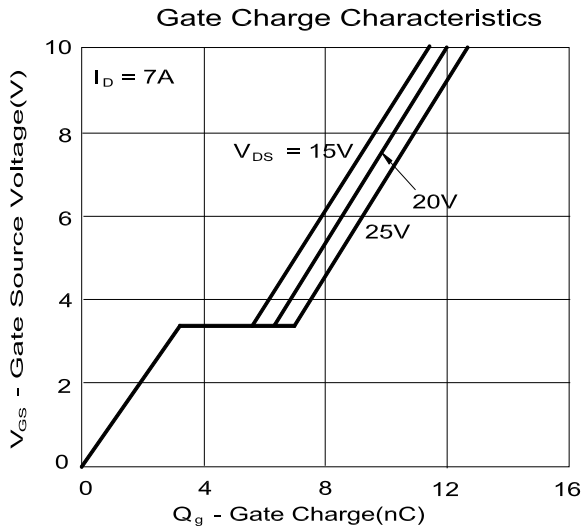


Transfer Characteristics



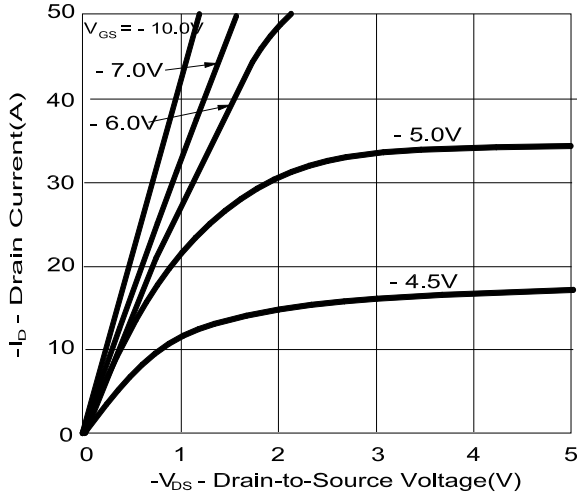
Body Diode Forward Voltage Variation with Source Current and Temperature



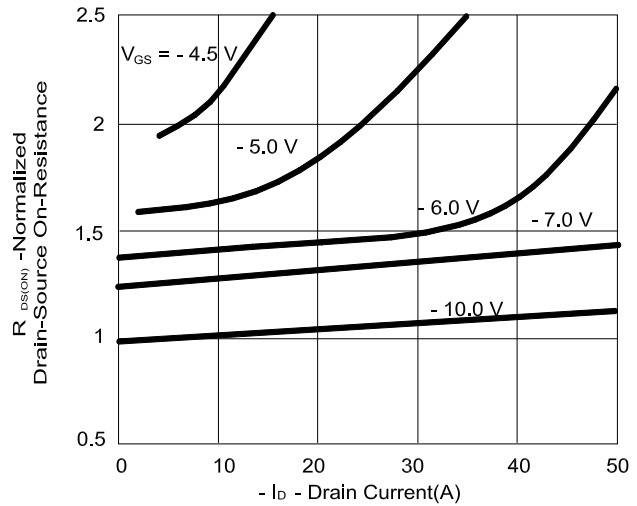


P-CHANNEL

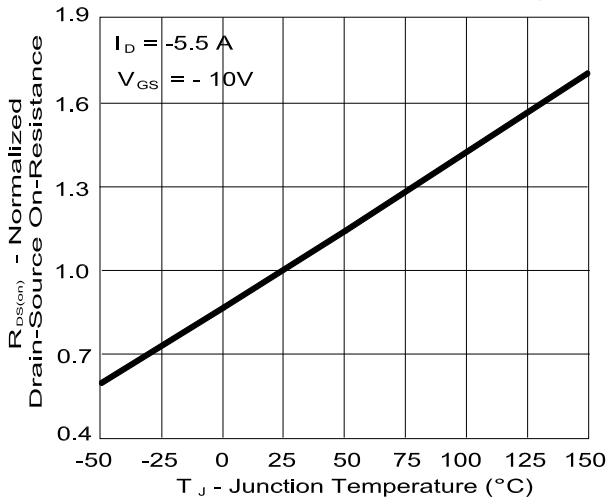
On-Region Characteristics



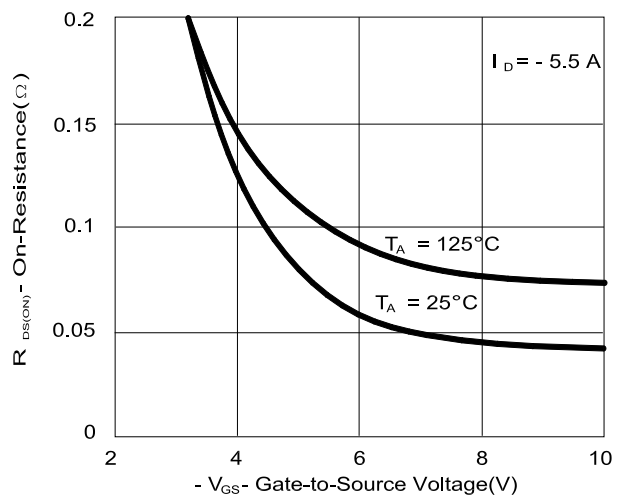
On-Resistance Variation with Drain Current and Gate Voltage



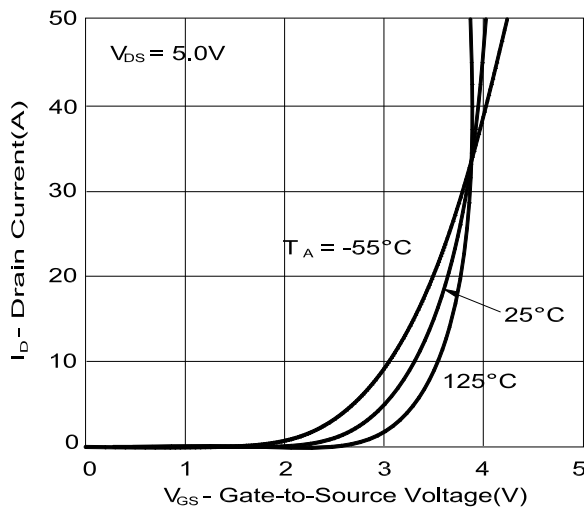
On-Resistance Variation with Temperature



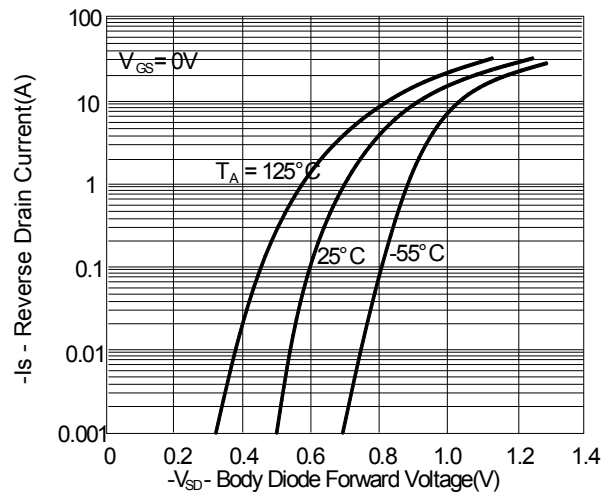
On-Resistance Variation with Gate-to-Source Voltage



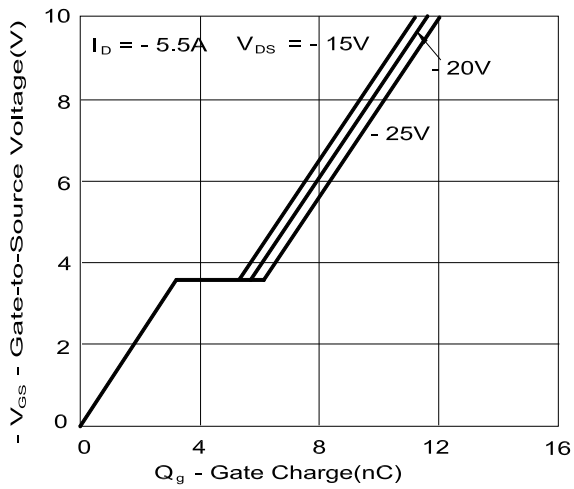
Transfer Characteristics



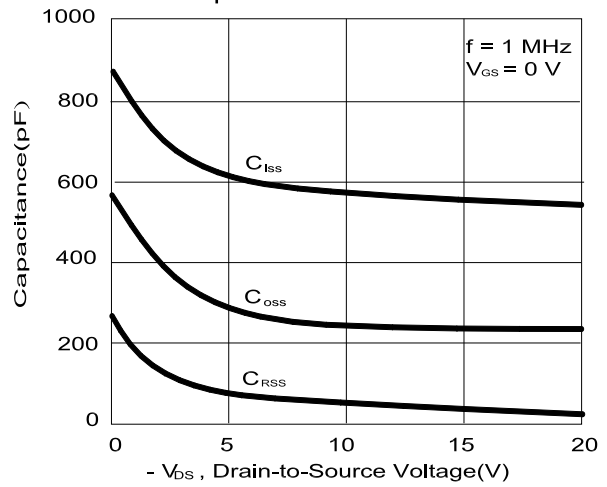
Body Diode Forward Voltage Variation with Source Current and Temperature



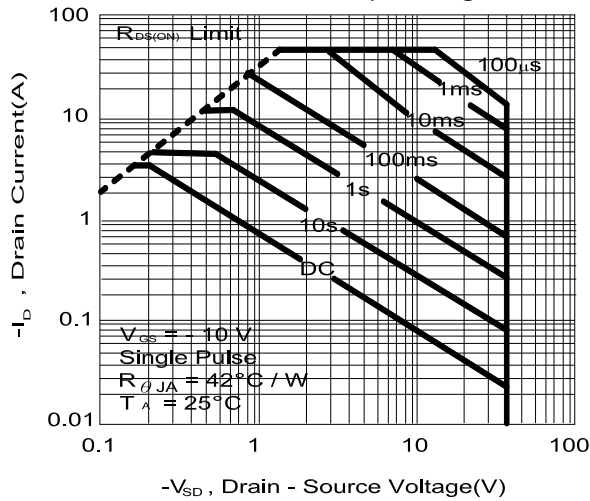
Gate Charge Characteristics



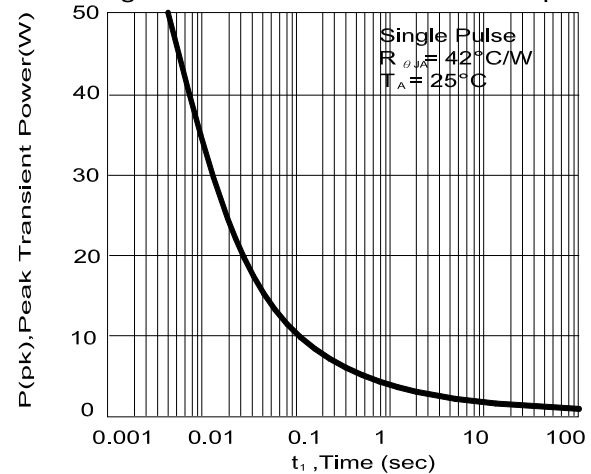
Capacitance Characteristics



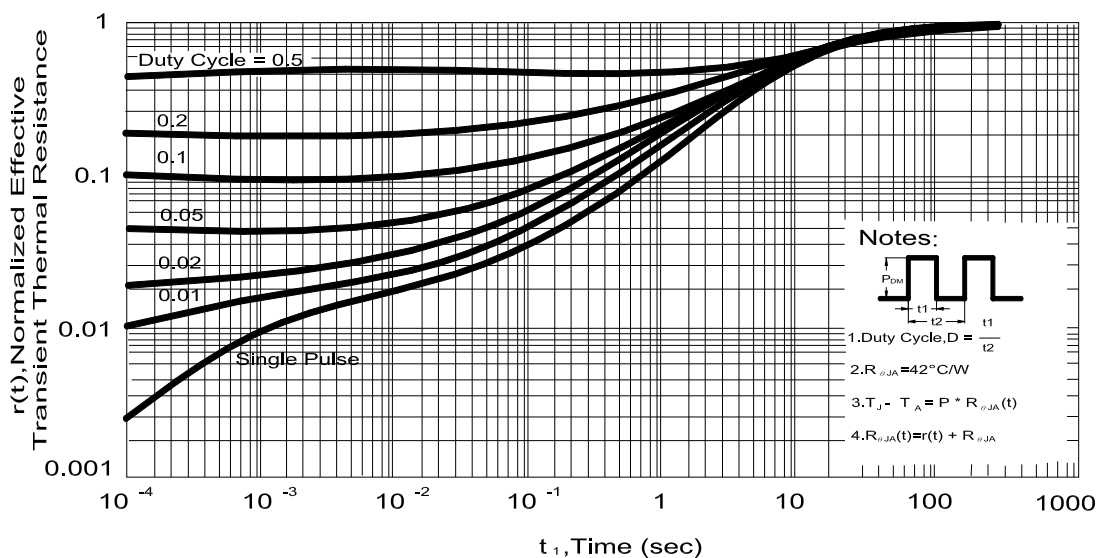
Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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			

