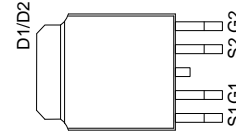
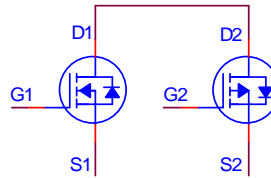


**PRODUCT SUMMARY**

	$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$
N-Channel	30	20m $\Omega$	25A
P-Channel	-30	36m $\Omega$	-19A



G : GATE  
D : DRAIN  
S : SOURCE

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

PARAMETERS/TEST CONDITIONS		SYMBOL	N-Channel	P-Channel	UNITS
Drain-Source Voltage		$V_{DS}$	30	-30	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current	$T_C = 25\text{ }^\circ\text{C}$	$I_D$	25	-19	A
	$T_C = 70\text{ }^\circ\text{C}$		20	-15	
	$T_A = 25\text{ }^\circ\text{C}$		9	-7	
	$T_A = 70\text{ }^\circ\text{C}$		7	-5.7	
Pulsed Drain Current <sup>2</sup>		$I_{DM}$	65	-45	
Avalanche Current		$I_{AS}$	19	-18	
Avalanche Energy	L = 0.1mH	$E_{AS}$	18	17	mJ
Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	$P_D$	21		W
	$T_C = 70\text{ }^\circ\text{C}$		13		
	$T_A = 25\text{ }^\circ\text{C}$		3		
	$T_A = 70\text{ }^\circ\text{C}$		2		
Junction & Storage Temperature Range		$T_j, T_{stg}$	-55 to 150		$^\circ\text{C}$
Lead Temperature ( <sup>1</sup> / <sub>16</sub> " 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	$^\circ\text{C} / \text{W}$

<sup>1</sup> Pulse width limited by maximum junction temperature.

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

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	N-Ch	30		V
		$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$	P-Ch	-30		

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	N-Ch	1	1.7	2.5	
		$V_{DS} = V_{GS}, I_D = -250\mu A$	P-Ch	-1	-1.6	-2.5	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	N-Ch			$\pm 100$	nA
		$V_{DS} = 0V, V_{GS} = \pm 20V$	P-Ch			$\pm 100$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24V, V_{GS} = 0V$	N-Ch			1	$\mu A$
		$V_{DS} = -24V, V_{GS} = 0V$	P-Ch			-1	
		$V_{DS} = 20V, V_{GS} = 0V, T_J = 55^\circ C$	N-Ch			10	
		$V_{DS} = -20V, V_{GS} = 0V, T_J = 55^\circ C$	P-Ch			-10	
On-State Drain Current <sup>1</sup>	$I_{D(ON)}$	$V_{DS} = 5V, V_{GS} = 10V$	N-Ch	65			A
		$V_{DS} = -5V, V_{GS} = -10V$	P-Ch	-45			
Drain-Source On-State Resistance <sup>1</sup>	$R_{DS(ON)}$	$V_{GS} = 4.5V, I_D = 6A$	N-Ch		26	31	$m\Omega$
		$V_{GS} = -4.5V, I_D = -5A$	P-Ch		58	61	
		$V_{GS} = 10V, I_D = 7A$	N-Ch		17	20	
		$V_{GS} = -10V, I_D = -6A$	P-Ch		35	36	
Forward Transconductance <sup>1</sup>	$g_{fs}$	$V_{DS} = 10V, I_D = 7A$	N-Ch		29		S
		$V_{DS} = -10V, I_D = -6A$	P-Ch		15		

DYNAMIC							
Input Capacitance	$C_{iss}$	N-Channel	N-Ch		480		
			P-Ch		691		
Output Capacitance	$C_{oss}$	$V_{GS} = 0V, V_{DS} = 10V, f = 1MHz$	N-Ch		162		$pF$
			P-Ch		167		
Reverse Transfer Capacitance	$C_{rss}$	$V_{GS} = 0V, V_{DS} = -10V, f = 1MHz$	N-Ch		100		
			P-Ch		117		
Gate Resistance	$R_g$	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$	N-Ch		2		$\Omega$
			P-Ch		6.27		
Total Gate Charge <sup>2</sup>	$Q_g$	N-Channel	N-Ch		9.8		
			P-Ch		12.8		
Gate-Source Charge <sup>2</sup>	$Q_{gs}$	$V_{DS} = 0.5V_{(BR)DSS}, V_{GS} = 10V,$ $I_D = 6A$	N-Ch		2.1		$nC$
			P-Ch		2.9		
Gate-Drain Charge <sup>2</sup>	$Q_{gd}$	$V_{DS} = 0.5V_{(BR)DSS}, V_{GS} = -10V,$ $I_D = -5A$	N-Ch		1.8		
			P-Ch		2.1		

Turn-On Delay Time <sup>2</sup>	$t_{d(on)}$	N-Channel	N-Ch		15		nS
			P-Ch		15		
Rise Time <sup>2</sup>	$t_r$	$V_{DS} = 20V$	N-Ch		26		
		$I_D \cong 1A, V_{GS} = 10V, R_{GEN} = 6\Omega$	P-Ch		12		
Turn-Off Delay Time <sup>2</sup>	$t_{d(off)}$	P-Channel	N-Ch		14		
			P-Ch		11		
Fall Time <sup>2</sup>	$t_f$	$V_{DS} = -20V, R_L = 1\Omega$	N-Ch		21		
		$I_D \cong -1A, V_{GS} = -10V, R_{GEN} = 6\Omega$	P-Ch		25		

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>c</sub> = 25 °C)**

Continuous Current	$I_S$		N-Ch			9	A
			P-Ch			-7	
Forward Voltage <sup>1</sup>	$V_{SD}$	$I_F = I_S, V_{GS} = 0V$	N-Ch			1	V
		$I_F = I_S, V_{GS} = 0V$	P-Ch			-1	

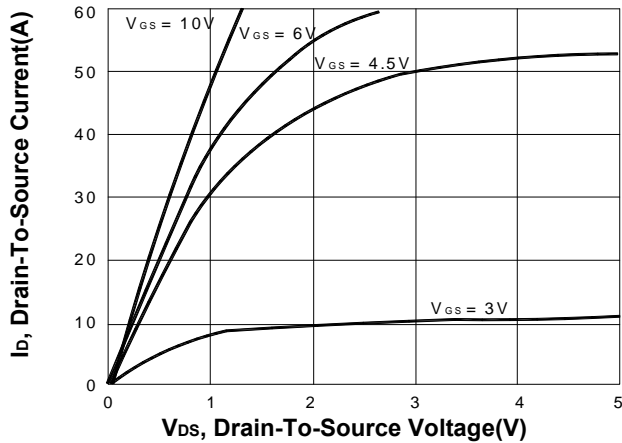
<sup>1</sup>Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

<sup>2</sup>Independent of operating temperature.

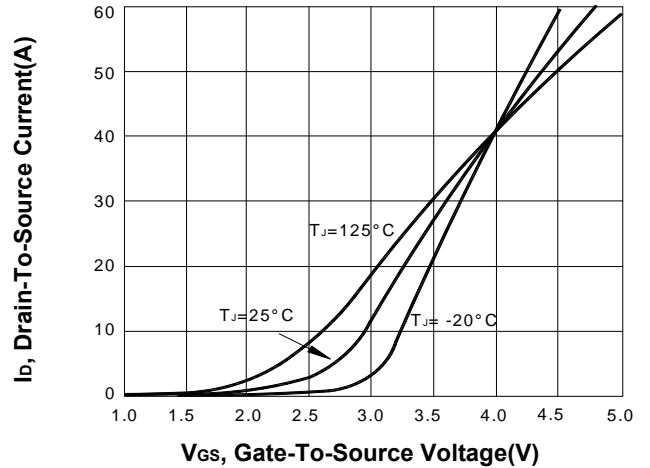
**REMARK: THE PRODUCT MARKED WITH “P2003ND5G”, DATE CODE or LOT #**

**TYPICAL PERFORMANCE CHARACTERISTICS  
N-CHANNEL**

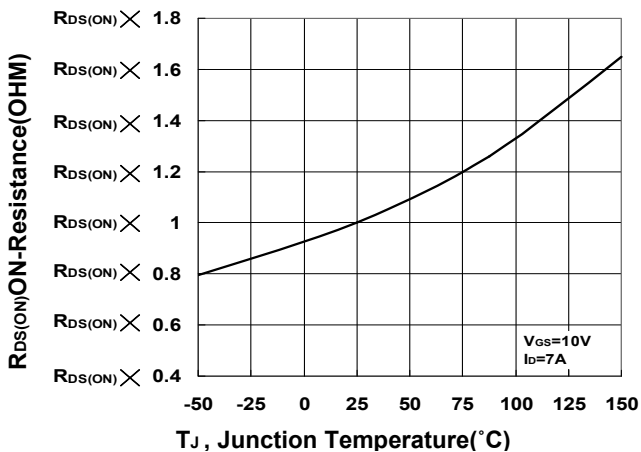
**Output Characteristics**



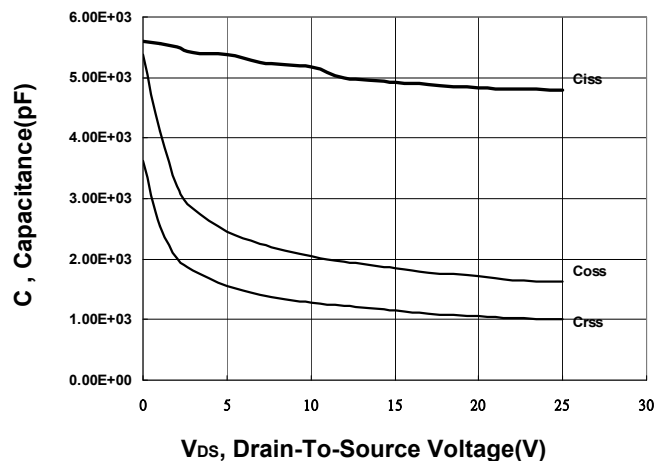
**Transfer Characteristics**



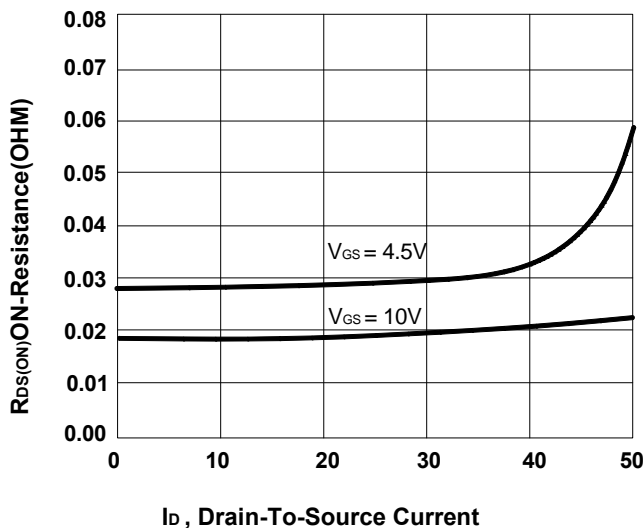
**On-Resistance VS Temperature**



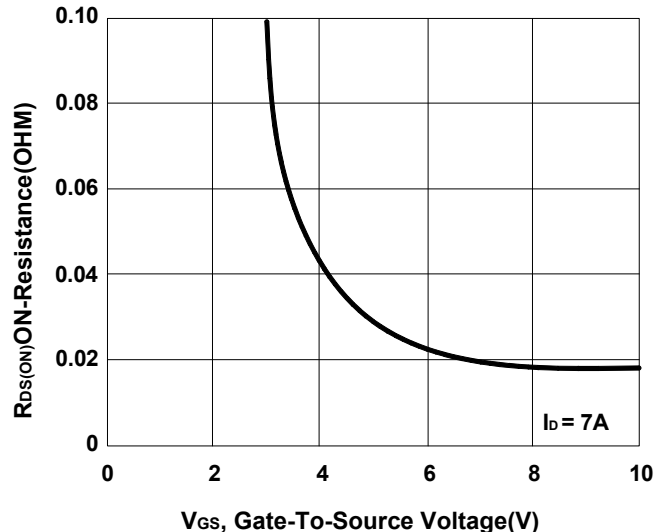
**Capacitance Characteristic**



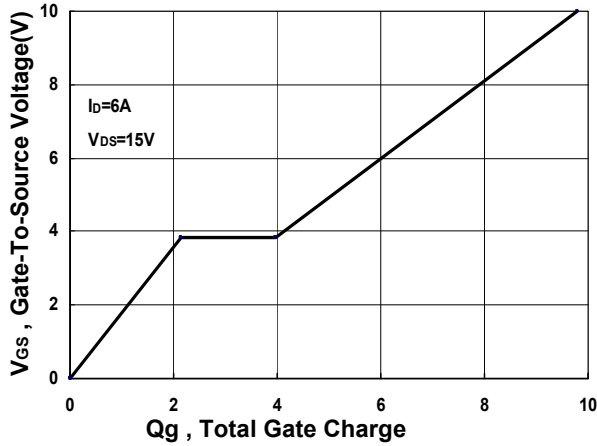
**On-Resistance VS Drain Current**



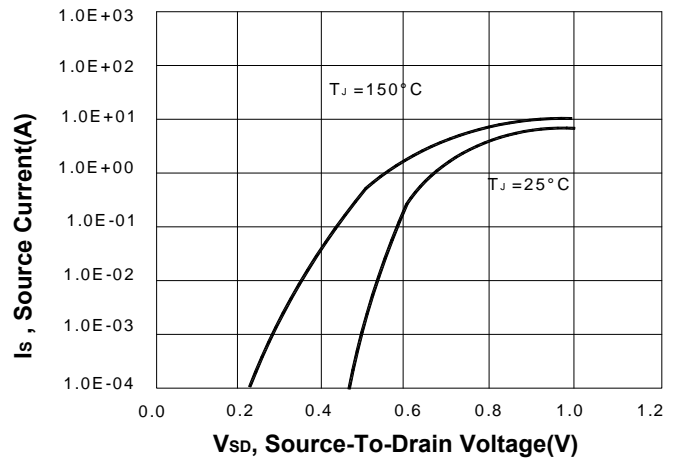
**On-Resistance VS Gate-To-Source**



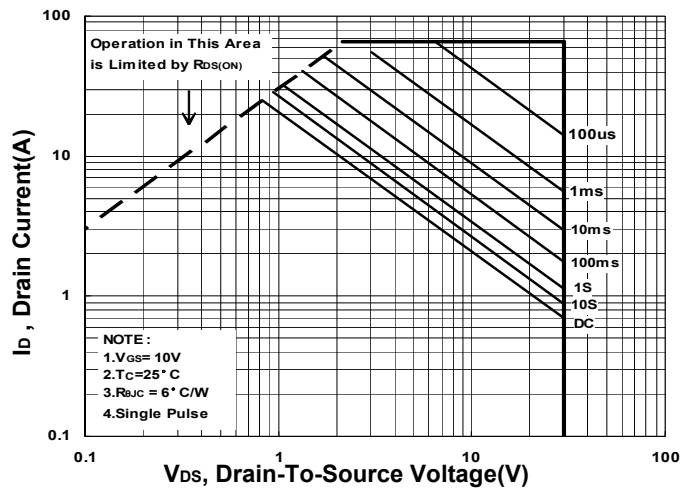
**Gate charge Characteristics**



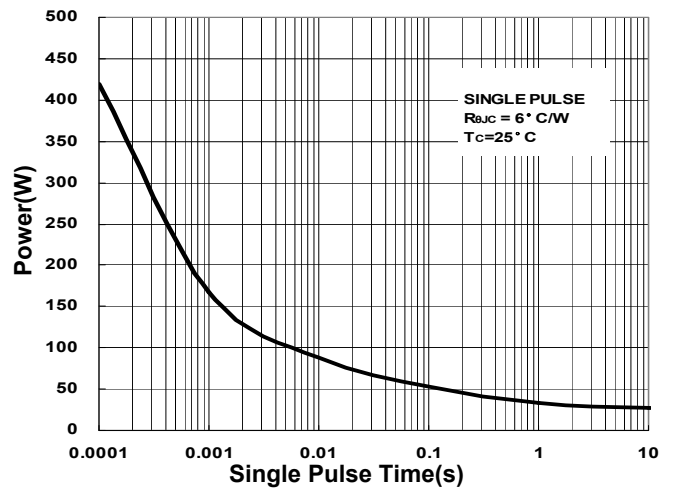
**Source-Drain Diode Forward Voltage**



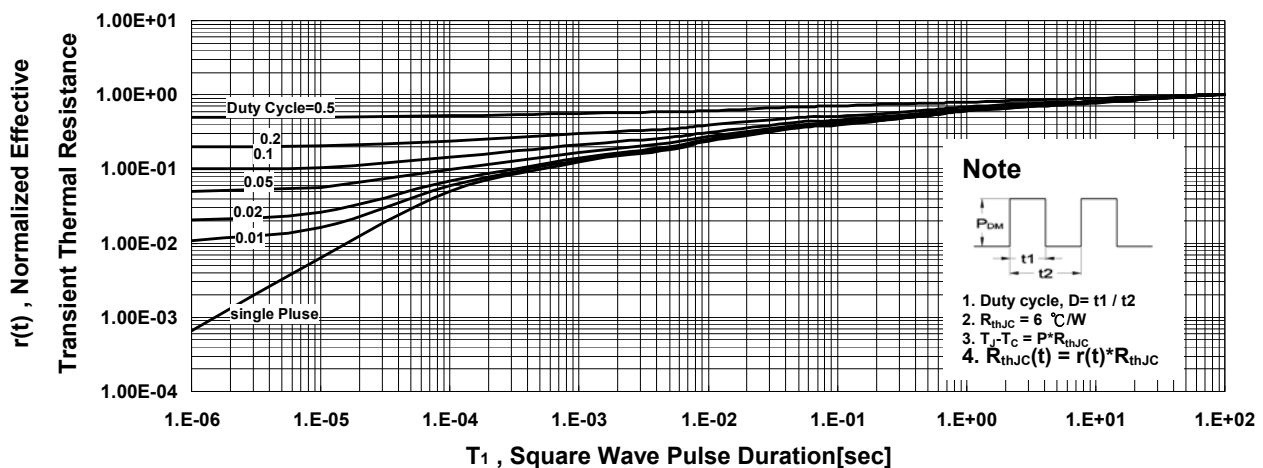
**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**

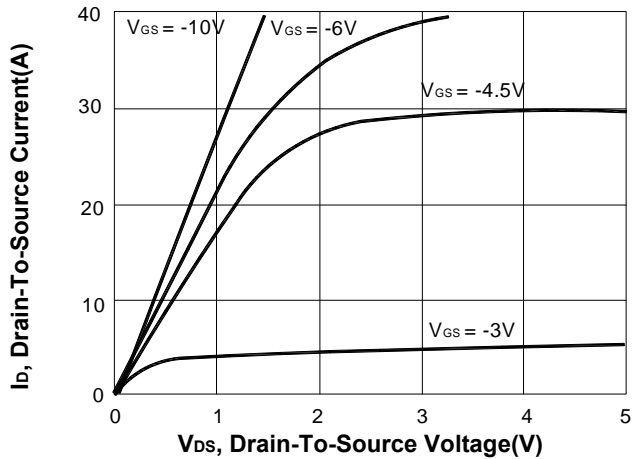


**Transient Thermal Response Curve**

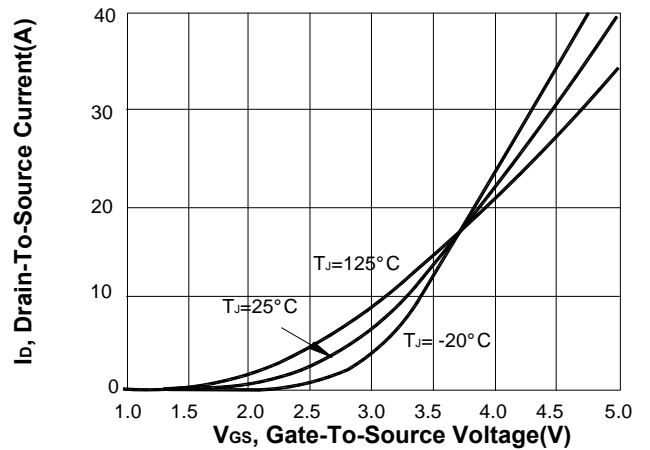


**P-CHANNEL**

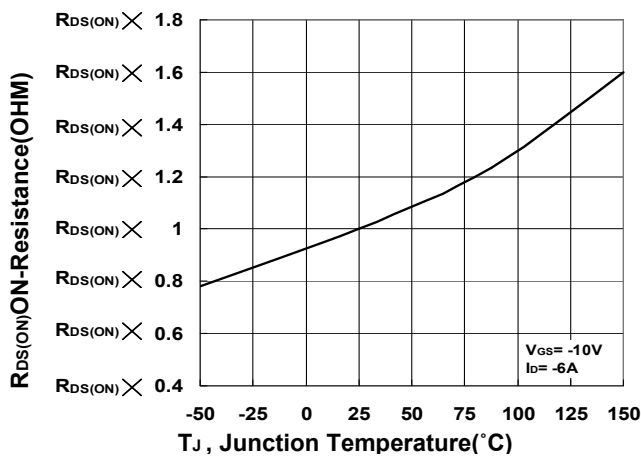
**Output Characteristics**



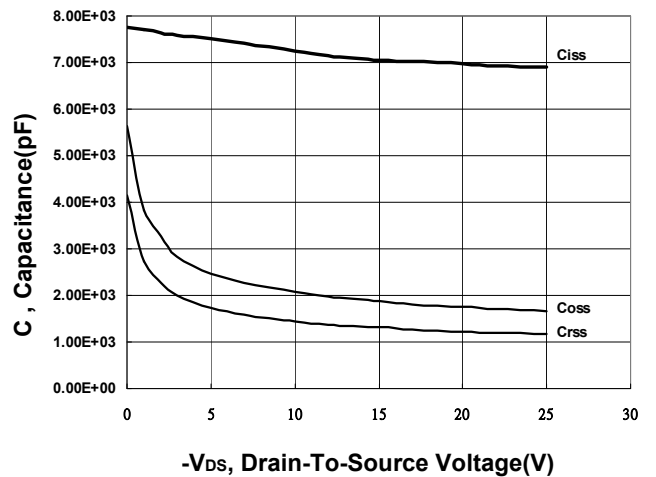
**Transfer Characteristics**



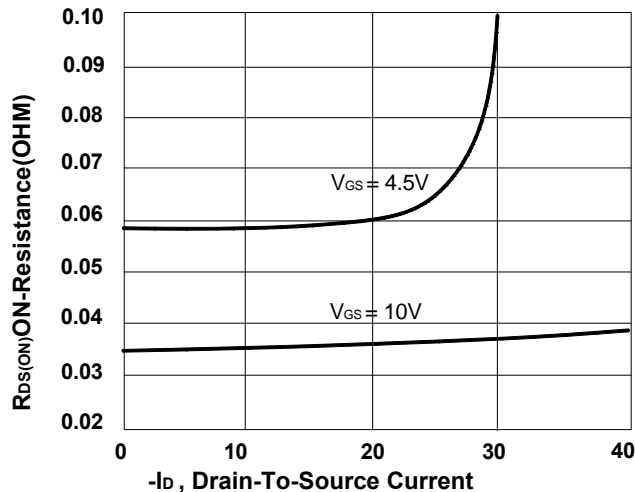
**On-Resistance VS Drain-Current**



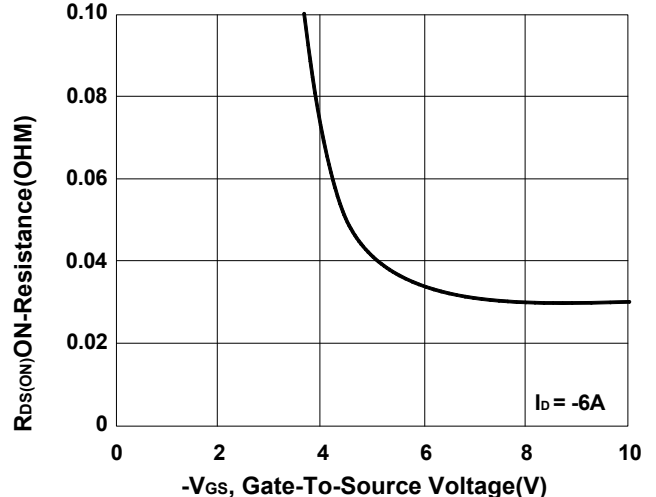
**Capacitance Characteristic**



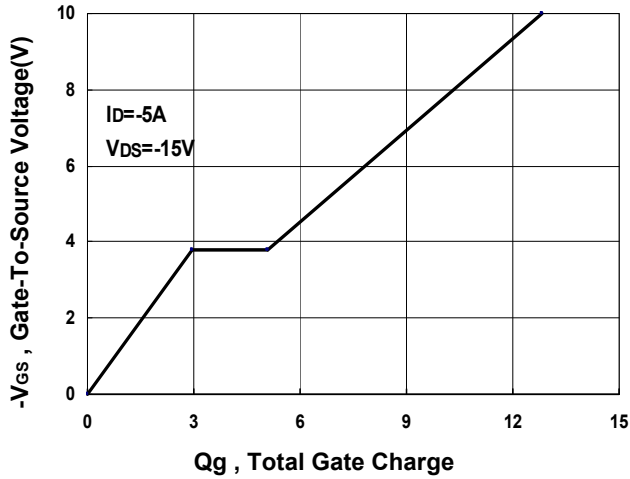
**On-Resistance VS Drain Current**



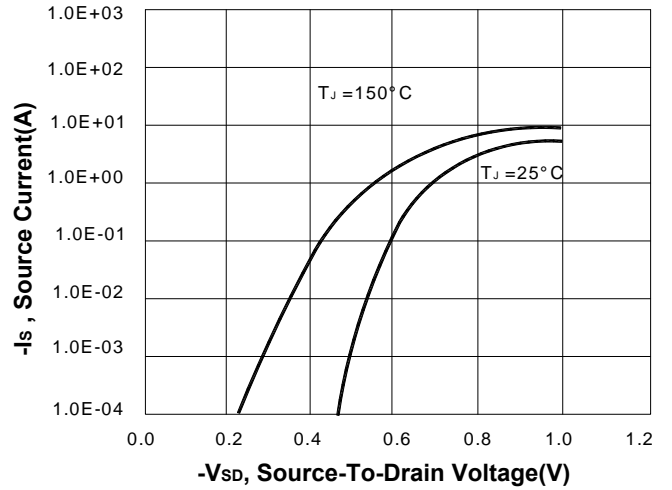
**On-Resistance VS Gate-To-Source**



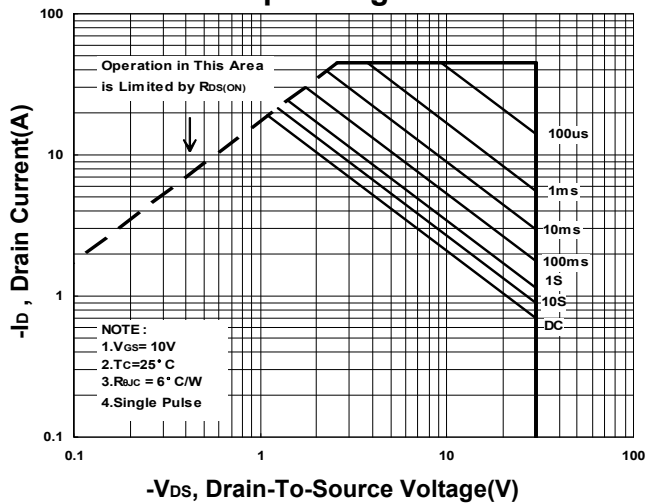
**Gate charge Characteristics**



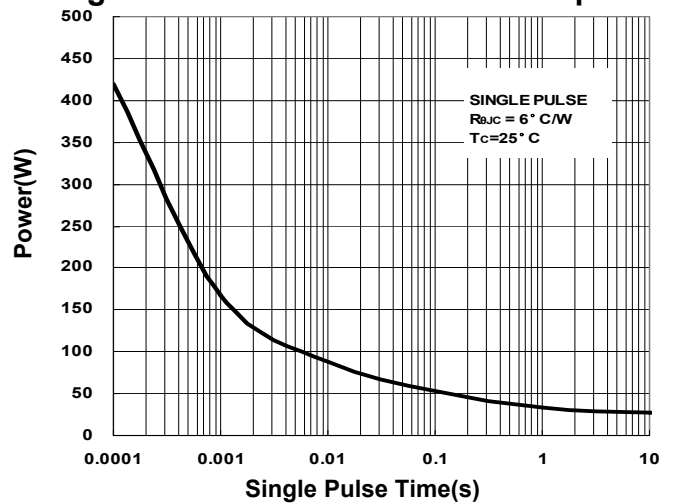
**Source-Drain Diode Forward Voltage**



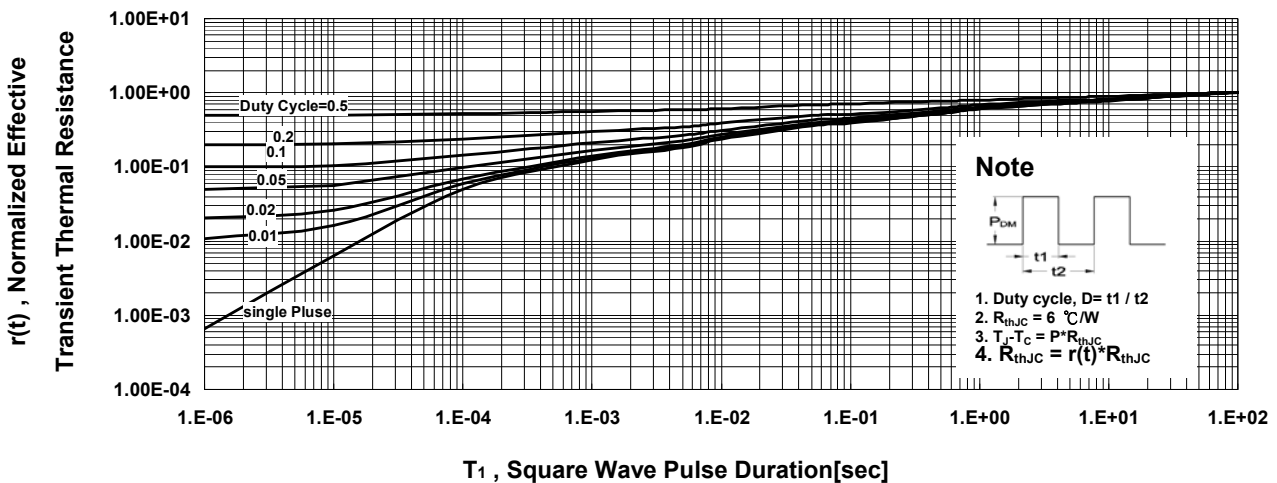
**Safe Operating Area**



**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			

