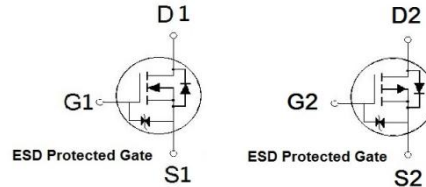




**PRODUCT SUMMARY**

	$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$
N-Channel	20V	300mΩ	0.96A
P-Channel	-20V	520mΩ	-0.68A

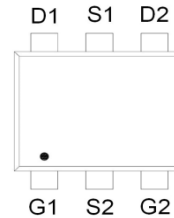


**Features**

- Pb-Free, Halogen Free and RoHS compliant.
- Low  $R_{DS(on)}$  to Minimize Conduction Losses.
- Ohmic Region Good  $R_{DS(on)}$  Ratio.
- Optimized Gate Charge to Minimize Switching Losses.
- ESD Protection – HBM Class : 1C.

**Applications**

- Protection Circuits Applications.
- Logic/Load Switch Circuits Applications.



G : GATE  
D : DRAIN  
S : SOURCE

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

PARAMETERS/TEST CONDITIONS		SYMBOL	N-Channel	P-Channel	UNITS
Drain-Source Voltage		$V_{DS}$	20	-20	V
Gate-Source Voltage		$V_{GS}$	±10	±12	V
Continuous Drain Current	$T_A = 25\text{ °C}$	$I_D$	0.96	-0.68	A
	$T_A = 70\text{ °C}$		0.76	-0.54	
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	3	-2.1	
Power Dissipation	$T_A = 25\text{ °C}$	$P_D$	0.49	0.41	W
	$T_A = 70\text{ °C}$		0.31	0.26	
Junction & Storage Temperature Range		$T_j, T_{stg}$	-55 to 150		°C

**THERMAL RESISTANCE RATINGS**

THERMAL RESISTANCE	SYMBOL		TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient <sup>2</sup>	R <sub>θJA</sub>	N-ch		251	°C / W
Junction-to-Ambient <sup>2</sup>	R <sub>θJA</sub>	P-ch		300	

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

<sup>2</sup>The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub> = 25°C.

**ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25 °C, Unless Otherwise Noted)**

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT	
			MIN	TYP	MAX		
<b>STATIC</b>							
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	N-Ch	20		V	
		V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	P-Ch	-20			
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	N-Ch	0.4	0.7		1
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	P-Ch	-0.4	-0.65		-1.2
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±8V	N-Ch			±30	
		V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±10V	P-Ch			±30	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V	N-Ch			1	
		V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V	P-Ch			-1	
		V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55 °C	N-Ch				10
		V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55 °C	P-Ch				-10
Drain-Source On-State Resistance <sup>1</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.5A	N-Ch		146	300	
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.45A	P-Ch		442	520	
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 0.25A	N-Ch		188	400	
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -0.1A	P-Ch		618	800	
Forward Transconductance <sup>1</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 0.5A	N-Ch		2.5	S	
		V <sub>DS</sub> = -5V, I <sub>D</sub> = -0.45A	P-Ch		1		

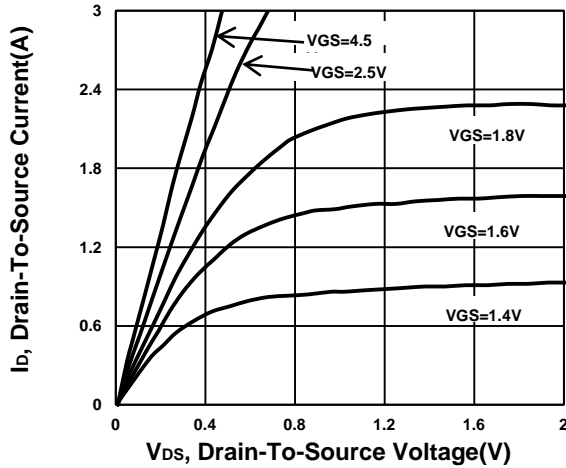
DYNAMIC							
Input Capacitance	$C_{iss}$	N-Channel $V_{GS} = 0V, V_{DS} = 10V, f = 1MHz$	N-Ch		59		pF
			P-Ch		46		
Output Capacitance	$C_{oss}$	P-Channel $V_{GS} = 0V, V_{DS} = -10V, f = 1MHz$	N-Ch		18		pF
			P-Ch		18		
Reverse Transfer Capacitance	$C_{rss}$		N-Ch		9.7		
			P-Ch		9.6		
Total Gate Charge <sup>2</sup>	$Q_g$	N-Channel $V_{DS} = 20V,$	N-Ch		1.4		nC
			P-Ch		1.1		
Gate-Source Charge <sup>2</sup>	$Q_{gs}$	P-Channel $V_{DS} = -20V,$	N-Ch		0.1		nC
			P-Ch		0.2		
Gate-Drain Charge <sup>2</sup>	$Q_{gd}$	N-Channel $I_D \cong 1A, V_{GS} = 4.5V,$	N-Ch		0.3		nC
			P-Ch		0.3		
Turn-On Delay Time <sup>2</sup>	$t_{d(on)}$	P-Channel $I_D \cong -1A, V_{GS} = -4.5V,$	N-Ch		17		nS
			P-Ch		17		
Rise Time <sup>2</sup>	$t_r$	N-Channel $V_{DS} = 10V,$	N-Ch		36		nS
			P-Ch		30		
Turn-Off Delay Time <sup>2</sup>	$t_{d(off)}$	P-Channel $R_{GEN} = 5.1 \Omega$	N-Ch		86		nS
			P-Ch		76		
Fall Time <sup>2</sup>	$t_f$	N-Channel $V_{DS} = -10V,$	N-Ch		173		nS
			P-Ch		46		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ( $T_J = 25^\circ C$ )							
Continuous Current	$I_S$		N-Ch		0.4		A
			P-Ch		-0.34		
Forward Voltage <sup>1</sup>	$V_{SD}$	$I_F = 0.5A, V_{GS} = 0V$	N-Ch		1.2		V
			P-Ch		-1.2		
Reverse Recovery Time	$t_{rr}$	$I_F = 1A, di_F/dt = 100A / \mu S$	N-Ch		111		nS
			P-Ch		46		
Reverse Recovery Charge	$Q_{rr}$	$I_F = -1A, di_F/dt = 100A / \mu S$	N-Ch		102		nC
			P-Ch		28		

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

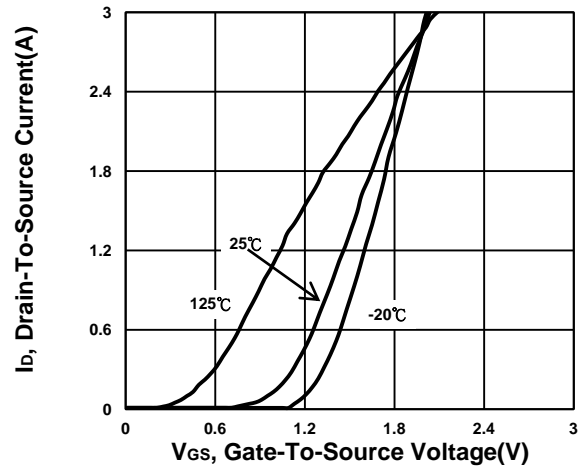
<sup>2</sup>Independent of operating temperature.

**N-CHANNEL**

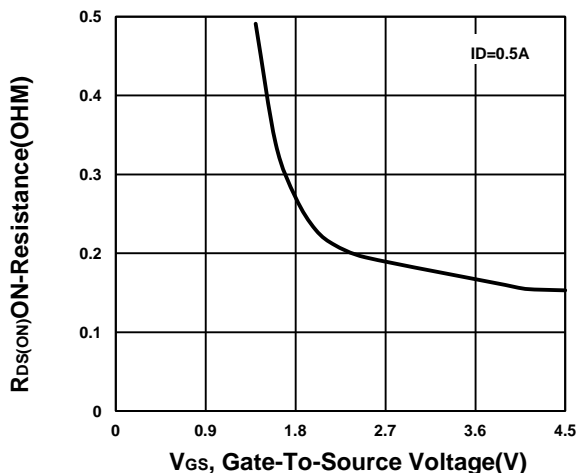
**Output Characteristics**



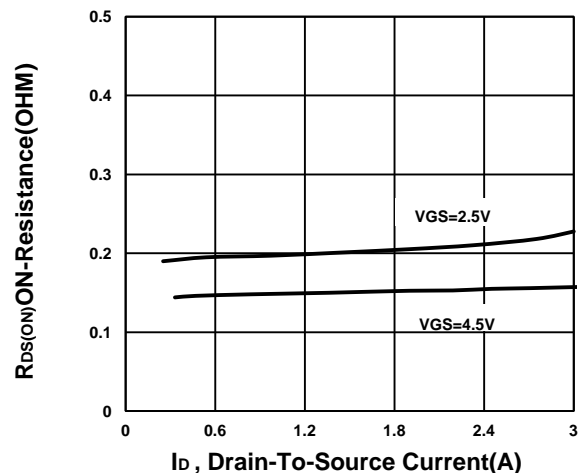
**Transfer Characteristics**



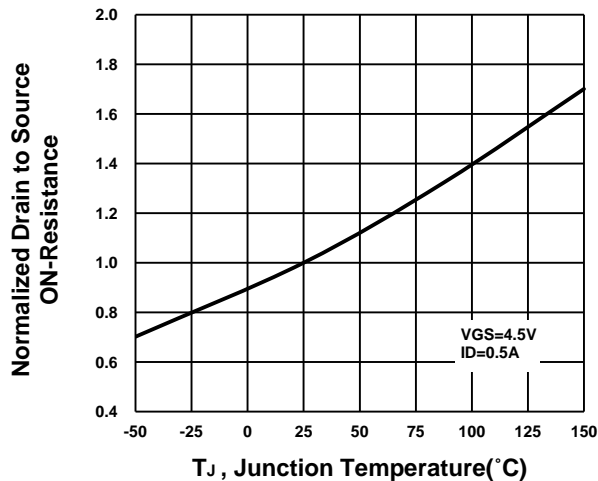
**On-Resistance VS Gate-To-Source**



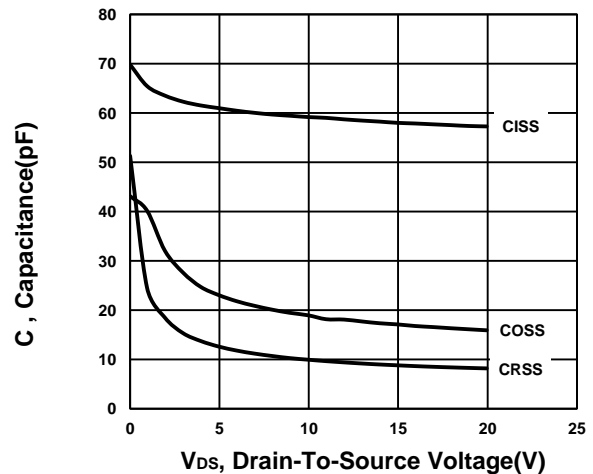
**On-Resistance VS Drain Current**



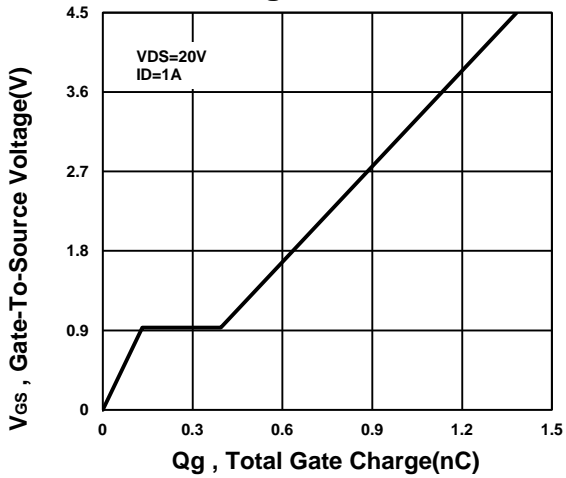
**On-Resistance VS Temperature**



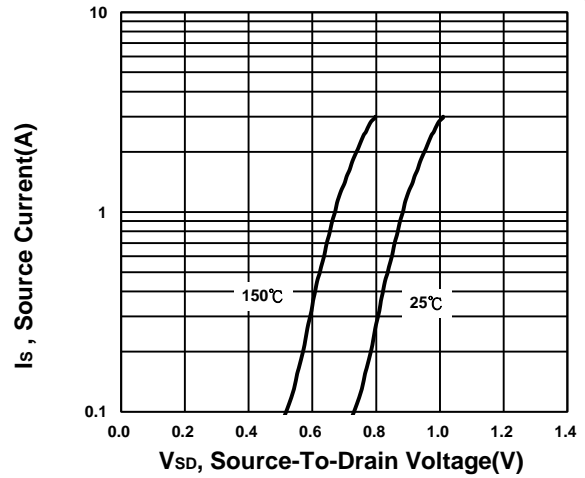
**Capacitance Characteristic**



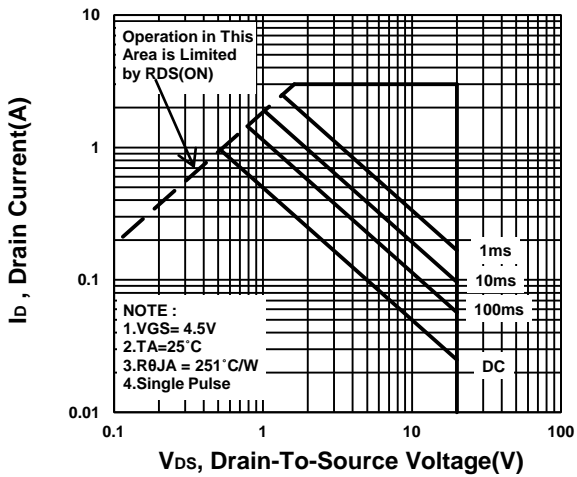
**Gate charge Characteristics**



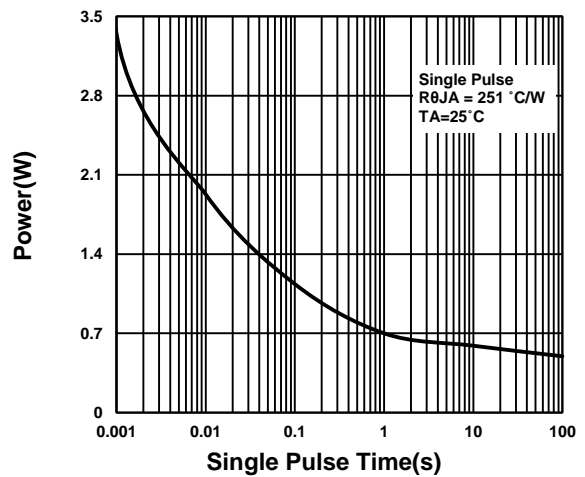
**Source-Drain Diode Forward Voltage**



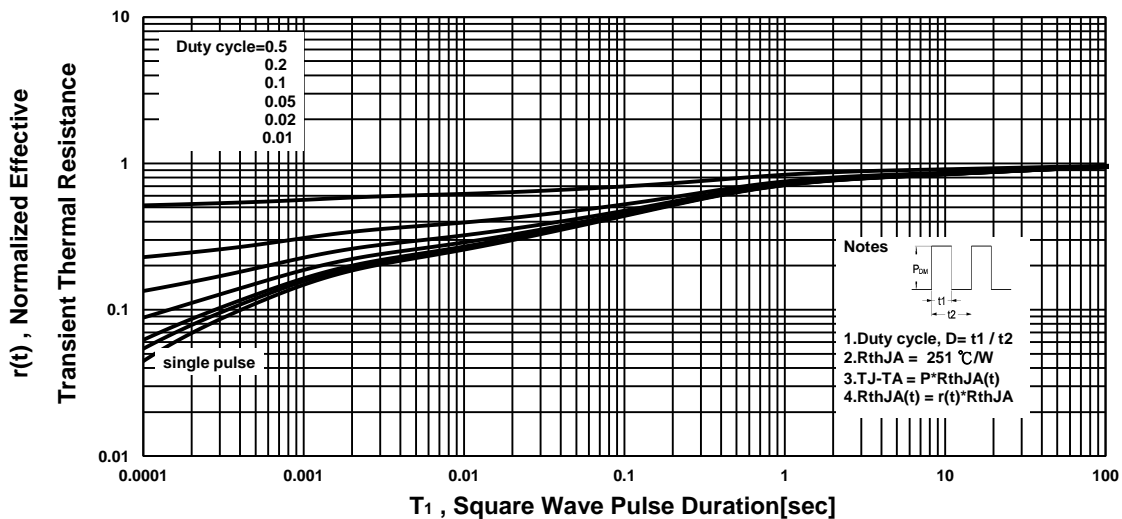
**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**

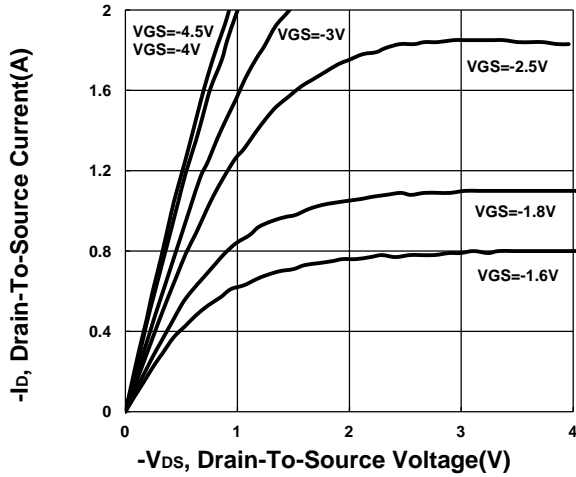


**Transient Thermal Response Curve**

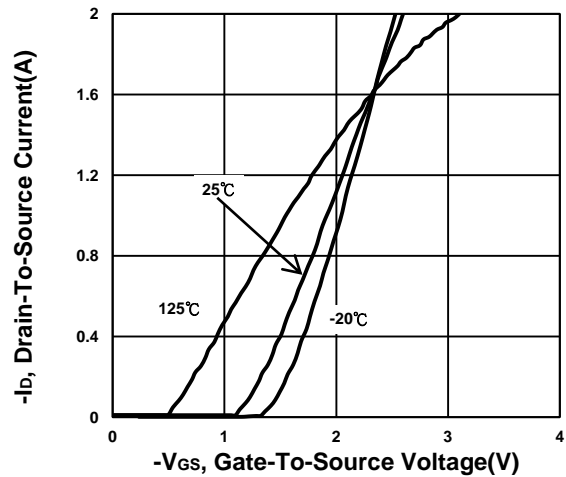


**P-CHANNEL**

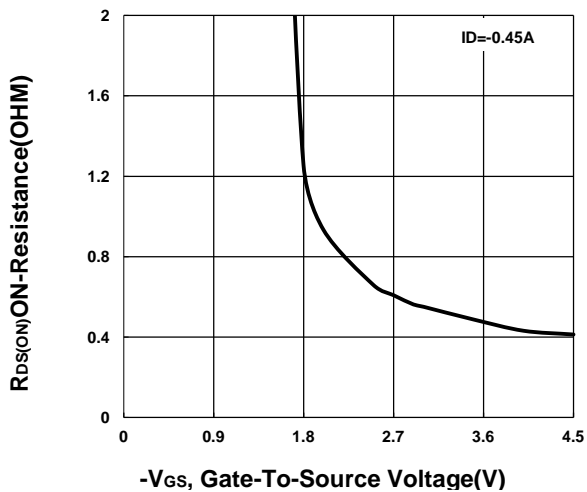
**Output Characteristics**



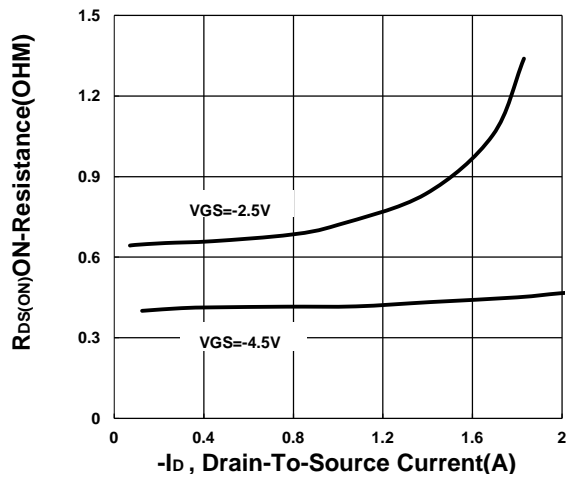
**Transfer Characteristics**



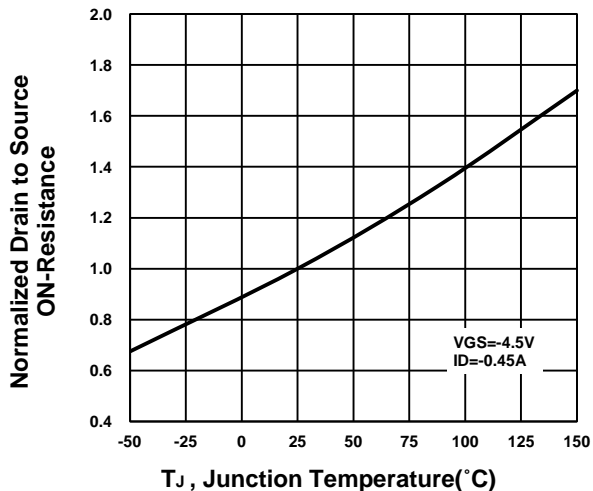
**On-Resistance VS Gate-To-Source**



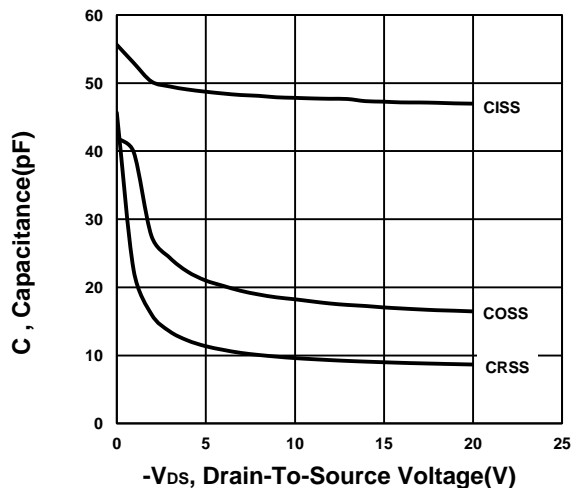
**On-Resistance VS Drain Current**



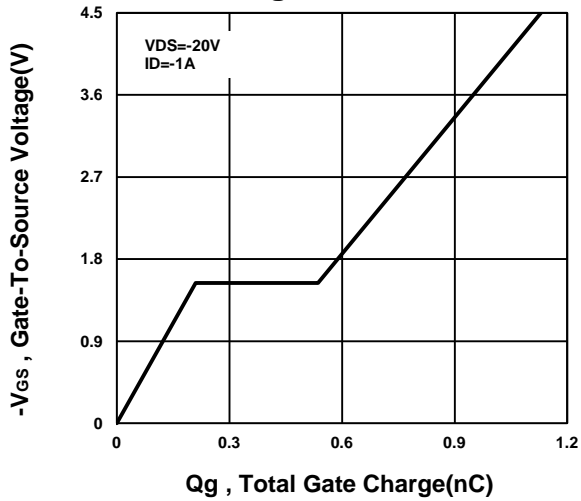
**On-Resistance VS Temperature**



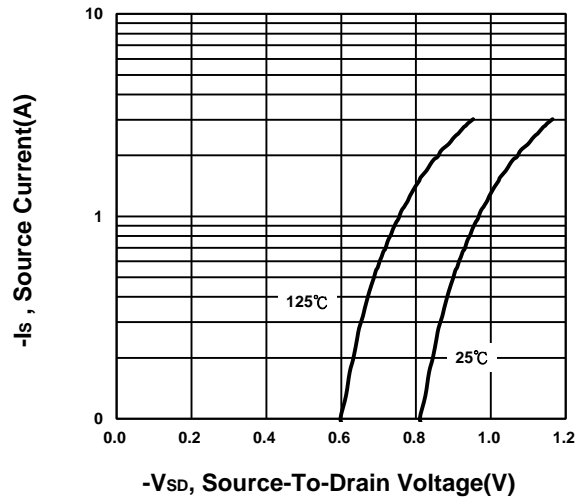
**Capacitance Characteristic**



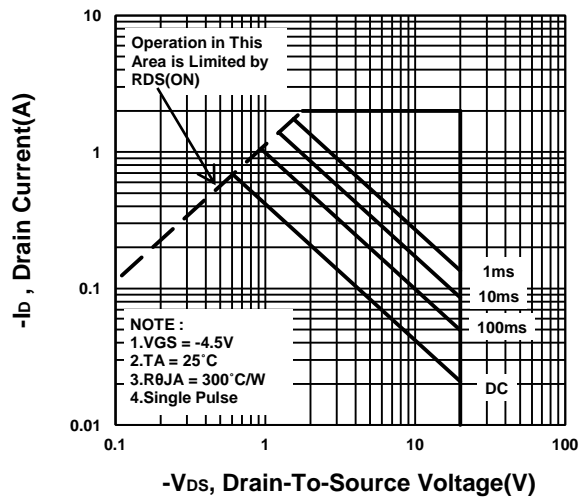
**Gate charge Characteristics**



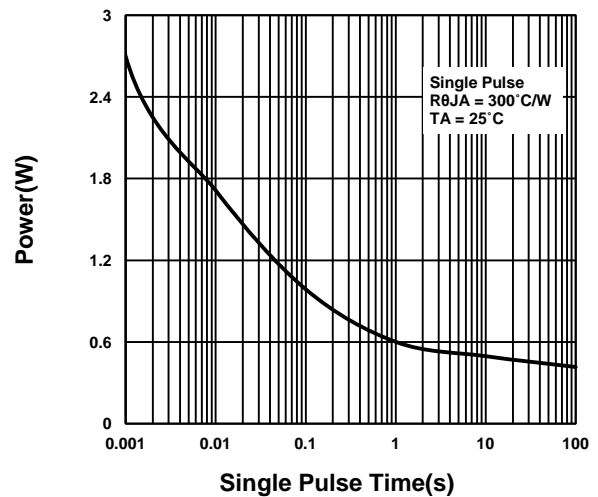
**Source-Drain Diode Forward Voltage**



**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**



**Transient Thermal Response Curve**

