

**Features**

- Low RDS(on)
- Operated at Low Logic Level Gate Drive
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

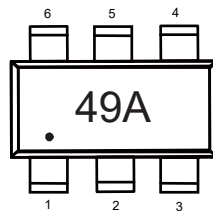
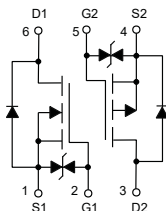
**Maximum Ratings**

- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 833°C/W Junction to Ambient<sup>(Note 2)</sup>

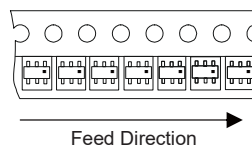
Parameter	Symbol	Rating	Unit
Total Power Dissipation	P <sub>D</sub>	150	mW
<b>N-Channel MOSFET</b>			
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Continuous Drain Current	I <sub>D</sub>	0.75	A
Pulsed Drain Current <sup>(Note 3)</sup>	I <sub>DM</sub>	3	A
<b>P-Channel MOSFET</b>			
Drain-Source Voltage	V <sub>DS</sub>	-20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Continuous Drain Current	I <sub>D</sub>	-0.6	A
Pulsed Drain Current <sup>(Note 3)</sup>	I <sub>DM</sub>	-3	A

- Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.  
 2. Surface Mounted on FR-4 Board Using Minimum Pad Size.  
 3. Pulse Width Limited by Maximum Junction Temperature.

**Internal Structure and Marking Code**

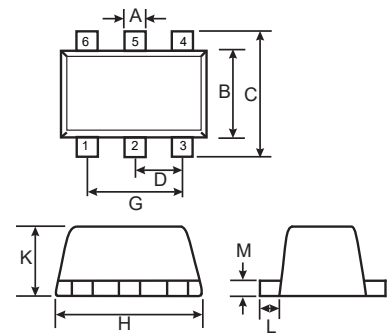


Special packing as below



**Dual  
N&P-Channel  
MOSFET**

**SOT-563**



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.006	0.011	0.15	0.30	
B	0.043	0.051	1.10	1.30	
C	0.059	0.067	1.50	1.70	
D	0.020		0.50		TYP.
G	0.035	0.043	0.90	1.10	
H	0.059	0.067	1.50	1.70	
K	0.022	0.026	0.55	0.65	
L	0.004	0.011	0.10	0.30	
M	0.004	0.007	0.10	0.18	

**N-Channel MOSFET Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage <sup>(Note4)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.74	1.1	V
Drain-Source On-Resistance <sup>(Note4)</sup>	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=500mA$		210	300	m $\Omega$
		$V_{GS}=2.5V, I_D=400mA$		300	400	m $\Omega$
		$V_{GS}=1.8V, I_D=200mA$		520	700	m $\Omega$
Forward transconductance	$g_{FS}$	$V_{DS}=10V, I_D=500mA$	0.8			S
Diode Forward Voltage <sup>(Note4)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=500mA$			1.2	V
<b>Dynamic Characteristics<sup>(Note5,6)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=16V, V_{GS}=0V, f=1MHz$		33		pF
Output Capacitance	$C_{oss}$			20		
Reverse Transfer Capacitance	$C_{rss}$			10		
Total Gate Charge	$Q_g$	$V_{GS}=4.5V, V_{DS}=10V, I_D=1A$		800		pC
Gate-Source Charge	$Q_{gs}$			290		
Gate-Drain Charge	$Q_{gd}$			160		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=4.5V, V_{DS}=10V, I_{DS}=0.5A, R_G=10\Omega$		4		ns
Turn-On Rise Time	$t_r$			18		
Turn-Off Delay Time	$t_{d(off)}$			11.6		
Turn-Off Fall Time	$t_f$			24		

**P-Channel MOSFET Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate-Threshold Voltage <sup>(Note 4)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-0.64	-1.1	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1.0	$\mu A$
Gate-body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 10$	$\mu A$
Drain-Source On-Resistance <sup>(Note 4)</sup>	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-500mA$		0.62	0.85	$\Omega$
		$V_{GS}=-2.5V, I_D=-300mA$		0.9	1.2	
		$V_{GS}=-1.8V, I_D=-200mA$		1.4	2.0	
Forward transconductance	$g_{FS}$	$V_{DS}=-10V, I_D=-500mA$	0.8			S
Diode Forward Voltage <sup>(Note 4)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-500mA$			-1.2	V
<b>Dynamic Characteristics<sup>(Note 5,6)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-16V, V_{GS}=0V, f=1MHz$		40		pF
Output Capacitance	$C_{oss}$			16		
Reverse Transfer Capacitance	$C_{rss}$			11		
Total Gate Charge	$Q_g$	$V_{GS}=-4.5V, V_{DS}=-10V, I_D=-1A$		860		pC
Gate-Source Charge	$Q_{gs}$			320		
Gate-Drain Charge	$Q_{gd}$			200		
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-500mA, R_G=10\Omega$		3.8		ns
Turn-off Delay Time	$t_{d(off)}$			9.4		
Rise Time	$t_r$			19		
Fall Time	$t_f$			23		

Note 4. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

5. Switching characteristics are independent of operating junction temperature.

6. Guaranteed by Design, Not Subject to Production Testing.

### Curve Characteristics(N-Channel)

Fig. 1 - Output Characteristics

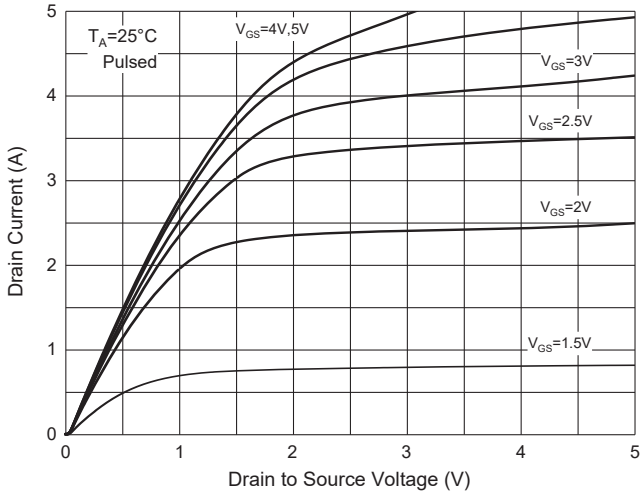


Fig. 2 - Transfer Characteristics

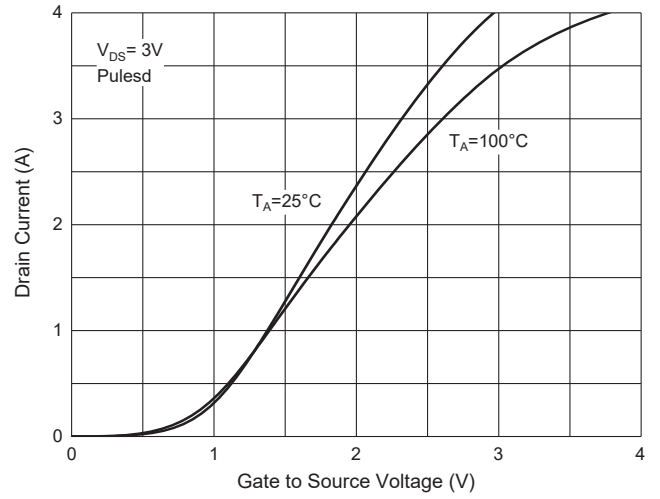


Fig. 3 -  $R_{DS(ON)} - I_D$

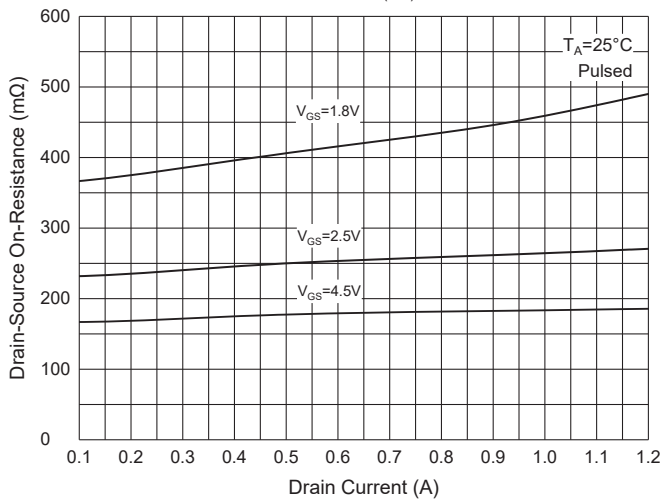


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

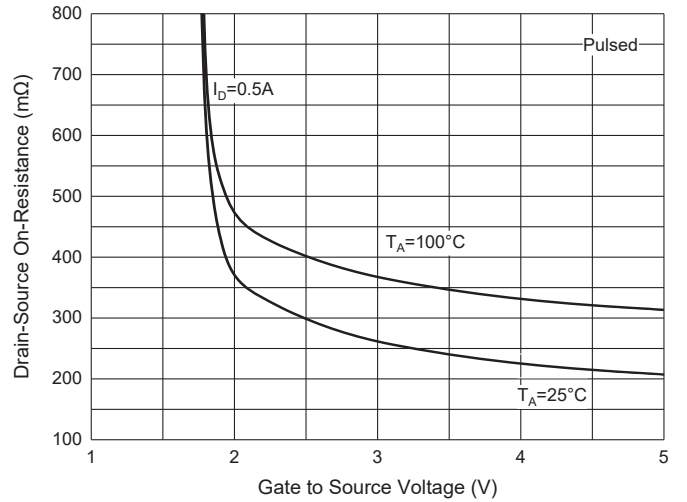


Fig. 5 -  $I_S - V_{SD}$

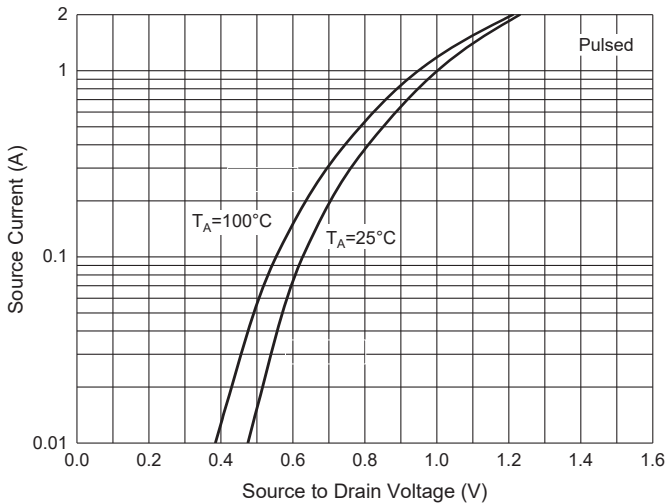
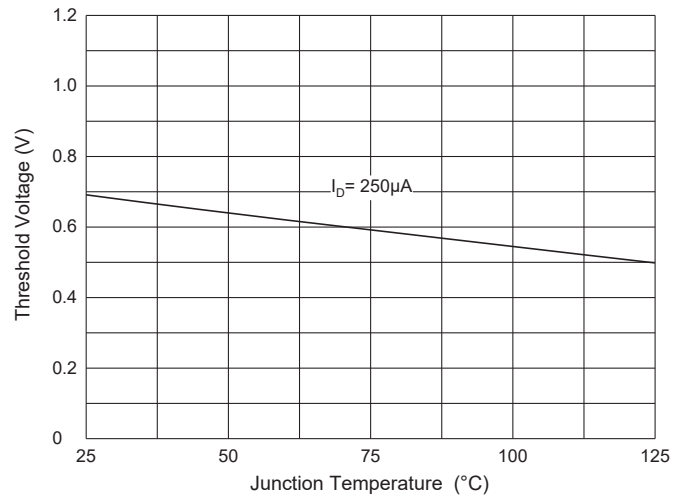


Fig. 6 - Threshold Voltage



**Curve Characteristics(N-Channel)**

Fig. 7 - Capacitance Characteristics

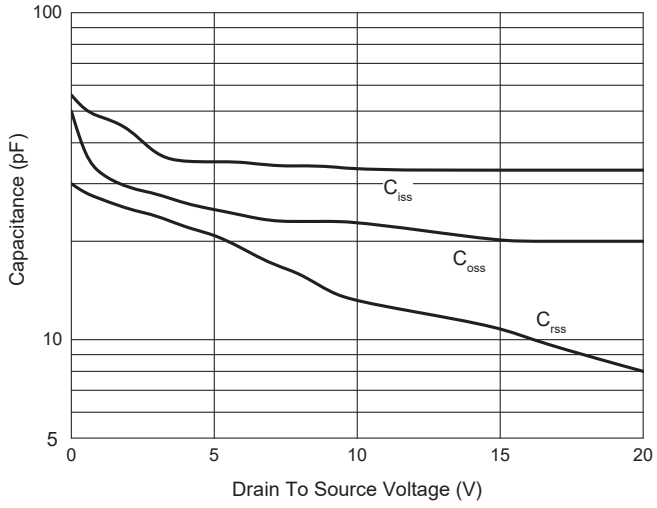
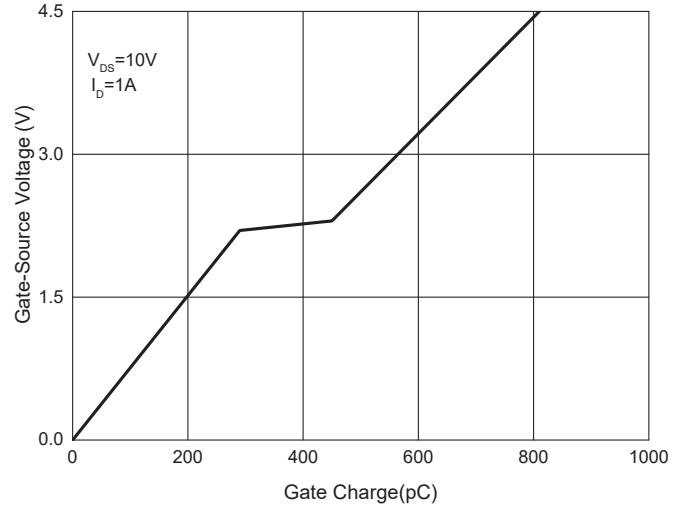


Fig. 8 - Gate Charge



### Curve Characteristics(P-Channel)

Fig. 1 - Typical Output Characteristics

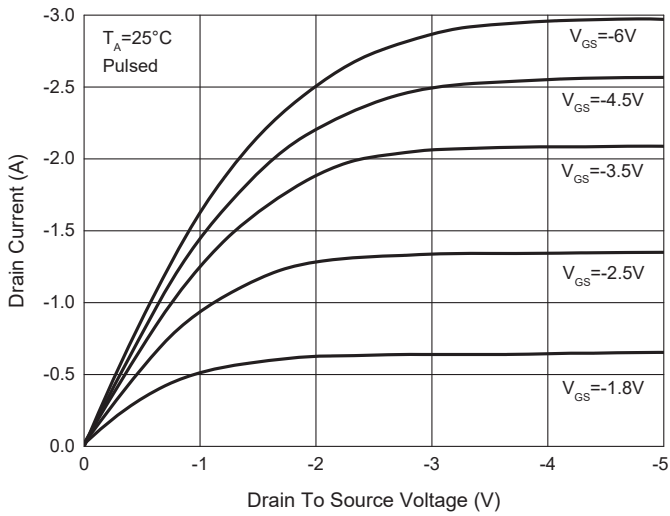


Fig. 2 - Transfer Characteristics

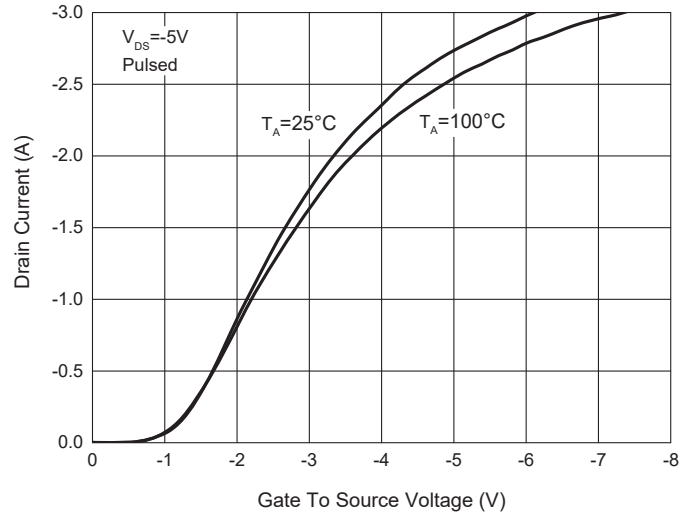


Fig. 3 -  $R_{DS(ON)} - I_D$

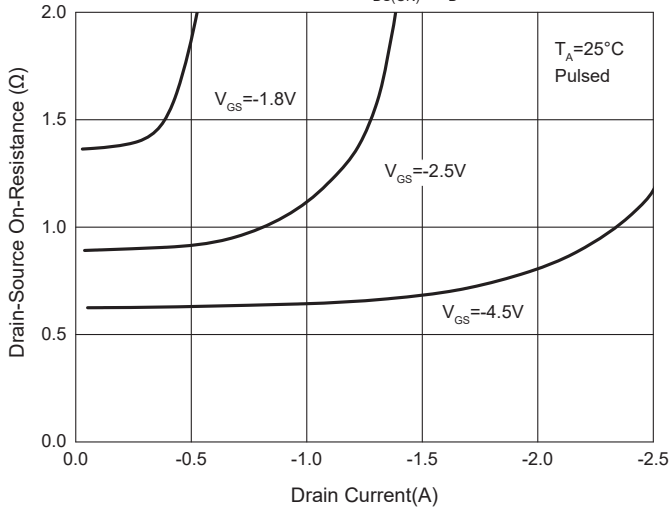


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

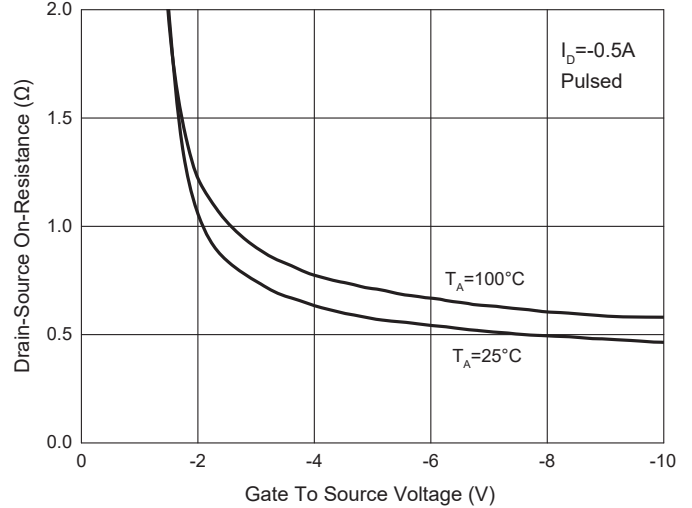


Fig. 5 -  $I_S - V_{SD}$

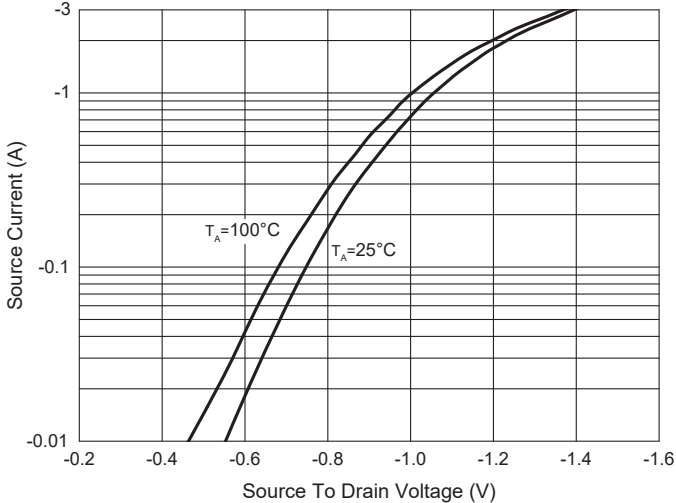
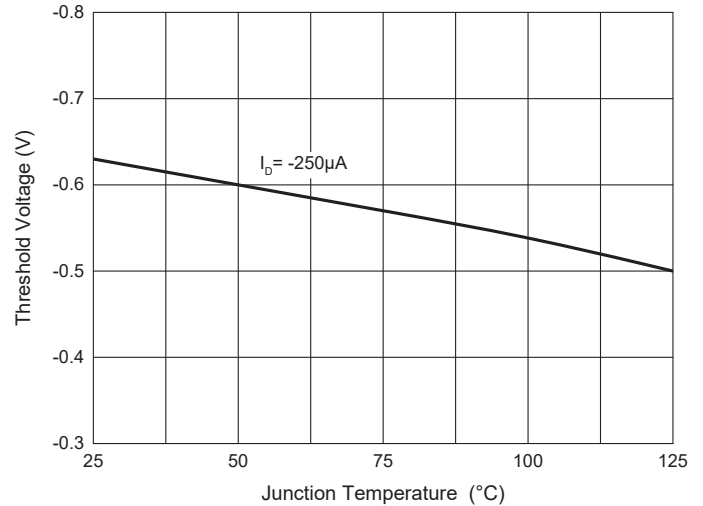


Fig. 6 - Threshold Voltage



**Curve Characteristics(P-Channel)**

Fig. 7 - Capacitance Characteristics

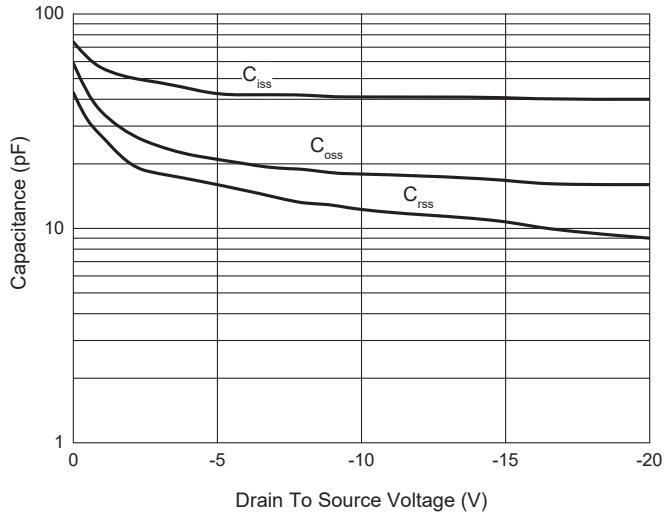
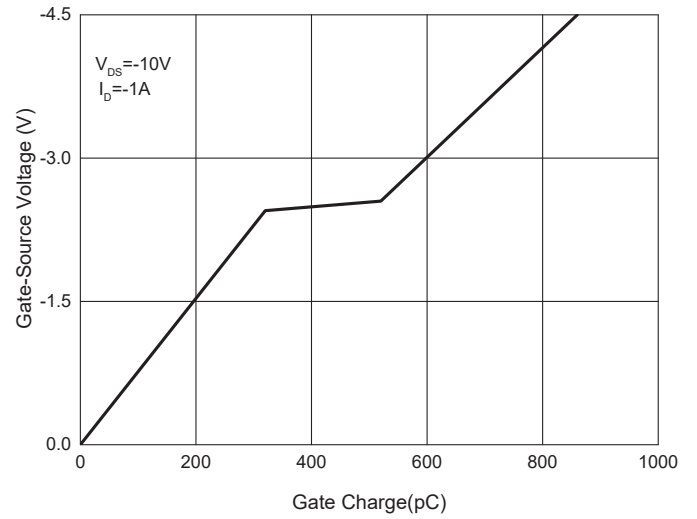


Fig. 8 - Gate Charge



## Ordering Information

Device	Packing
Part Number-TPQ2	Tape&Reel: 3Kpcs/Reel

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