

### Features

- Low RDS(on)
- Operated at Low Logic Level Gate Drive
- ESD Protected up to 3KV (HBM)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

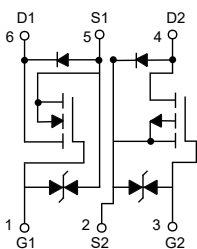
### Maximum Ratings

- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 100°C/W Junction to Ambient<sup>(Note 1)</sup>
- 

Parameter	Symbol	Rating	Unit
Total Power Dissipation	P <sub>D</sub>	1.25	W
<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>	1.3	A
Pulsed Drain Current <sup>(Note 2)</sup>	I <sub>DM</sub>	5	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>	-1.1	A
Pulsed Drain Current <sup>(Note 2)</sup>	I <sub>DM</sub>	-3.3	A

- Notes 1. Device Mounted on FR-4 Substrate PC Board, 2oz Copper, with 1in<sup>2</sup> Copper Plate.  
2. Pulse Width Limited by Maximum Junction Temperature.

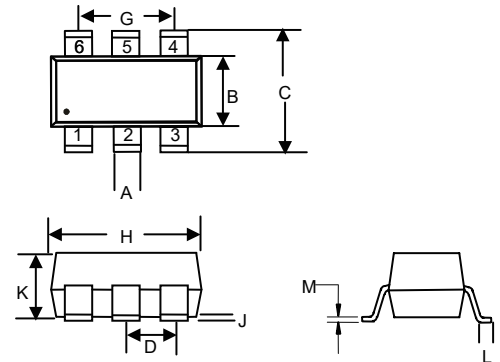
### Internal Structure



Marking:49K

## Dual N&P-Channel MOSFET

### SOT23-6L



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.012	0.020	0.30	0.50	
B	0.051	0.070	1.30	1.80	
C	0.087	0.126	2.20	3.20	
D	0.037		0.95		TYP.
G	0.074		1.90		TYP.
H	0.106	0.122	2.70	3.10	
J	0.002	0.006	0.05	0.15	
K	0.030	0.051	0.75	1.30	
L	0.012	0.024	0.30	0.60	
M	0.003	0.008	0.08	0.22	

**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	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 10$	$\mu A$
		$V_{DS}=0V, V_{GS}=\pm 4.5V$			$\pm 1$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage <sup>(Note 3)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.35	0.75	1.1	V
Drain-Source On-Resistance <sup>(Note 3)</sup>	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=0.65A$		190	380	m $\Omega$
		$V_{GS}=2.5V, I_D=0.55A$		260	450	
		$V_{GS}=1.8V, I_D=0.45A$		390	800	
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=0.15A$			1.2	V
Forward Transconductance <sup>(Note 3)</sup>	$g_{FS}$	$V_{DS}=10V, I_D=0.8A$		1.6		S
<b>Dynamic Characteristics<sup>(Note 5)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=16V, V_{GS}=0V, f=1MHz$		60		pF
Output Capacitance	$C_{oss}$			20		
Reverse Transfer Capacitance	$C_{rss}$			9		
<b>Switching Characteristics<sup>(Note 4,5)</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=10V, V_{GS}=4.5V, I_D=500mA, R_{GEN}=10\Omega$		6.7		ns
Turn-On Rise Time	$t_r$			4.8		
Turn-Off Delay Time	$t_{d(off)}$			17.3		
Turn-Off Fall Time	$t_f$			7.4		

**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-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 10$	$\mu A$
		$V_{DS}=0V, V_{GS}=\pm 4.5V$			$\pm 1$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
Gate-Threshold Voltage <sup>(Note 3)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.35	-0.60	-1.1	V
Drain-Source On-Resistance <sup>(Note 3)</sup>	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-1A$		450	520	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.8A$		650	780	
		$V_{GS}=-1.8V, I_D=-0.5A$		950		
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-0.5A$			-1.2	V
Forward Transconductance <sup>(Note 3)</sup>	$g_{FS}$	$V_{DS}=-10V, I_D=-0.54A$		1.2		S
<b>Dynamic Characteristics<sup>(Note 5)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-16V, V_{GS}=0V, f=1MHz$		175		
Output Capacitance	$C_{oss}$			21		
Reverse Transfer Capacitance	$C_{rss}$			8.7		
<b>Switching Characteristics<sup>(Note 4,5)</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=-10V, V_{GS}=-4.5V$ $I_D=-200mA, R_{GEN}=10\Omega$		9		ns
Turn-On Rise Time	$t_r$			5.8		
Turn-Off Delay Time	$t_{d(off)}$			32.6		
Turn-Off Fall Time	$t_f$			20.3		

Note 3. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

4. Switching characteristics are independent of operating junction temperature.

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

**Curve Characteristics(N-Channel)**

Fig. 1 - Output Characteristics

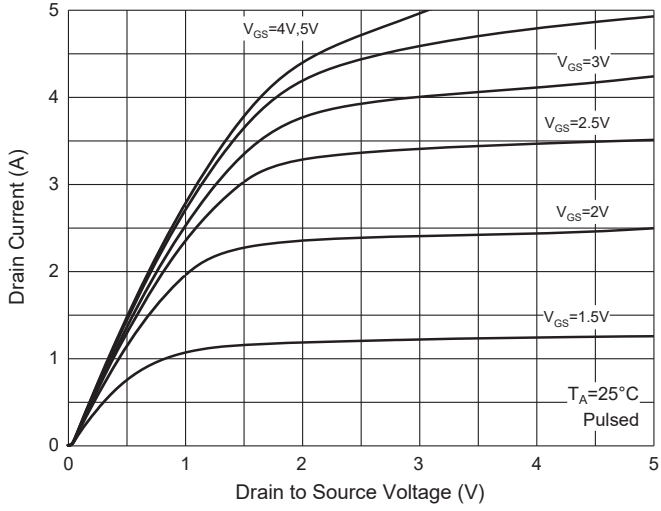


Fig. 2 - Transfer Characteristics

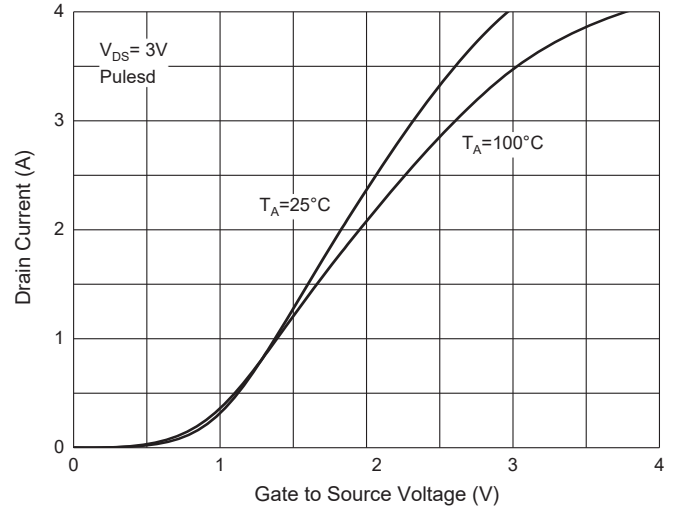


Fig. 3 -  $R_{DS(ON)} - I_D$

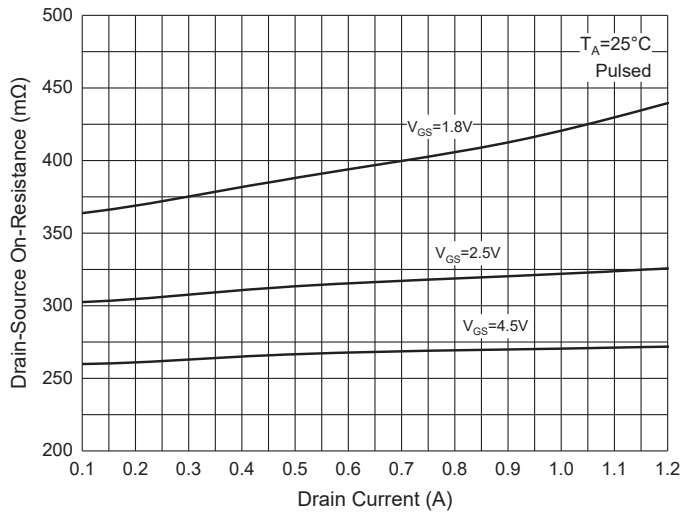


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

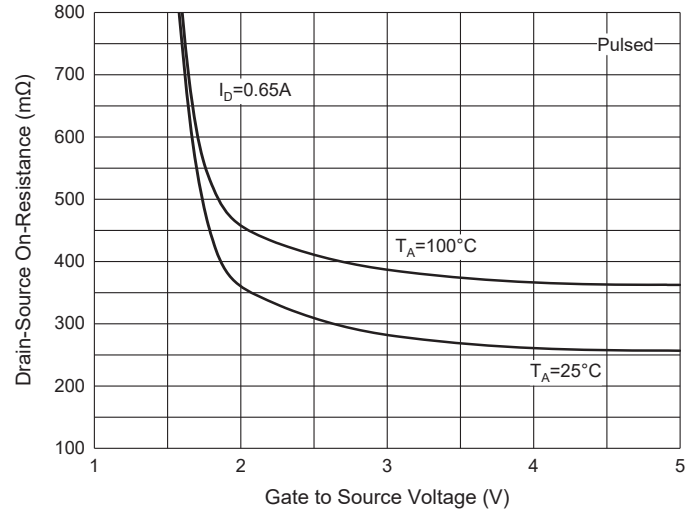


Fig. 5 -  $I_S - V_{SD}$

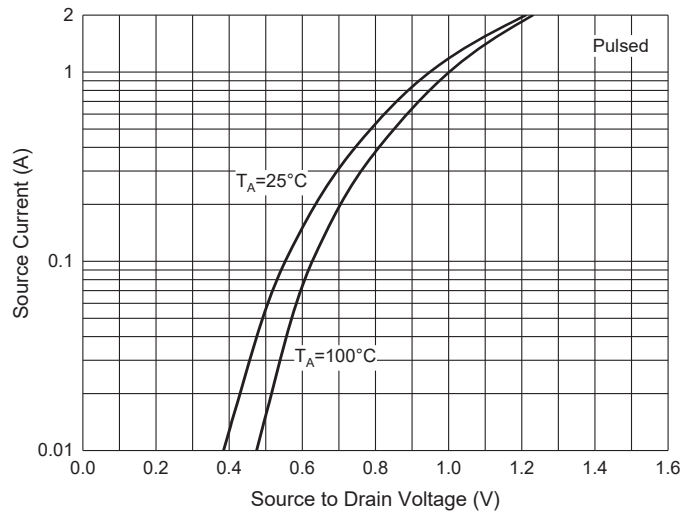
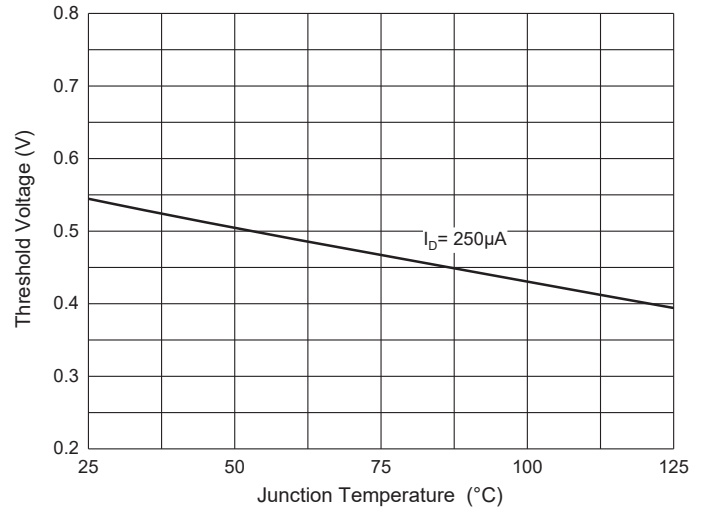
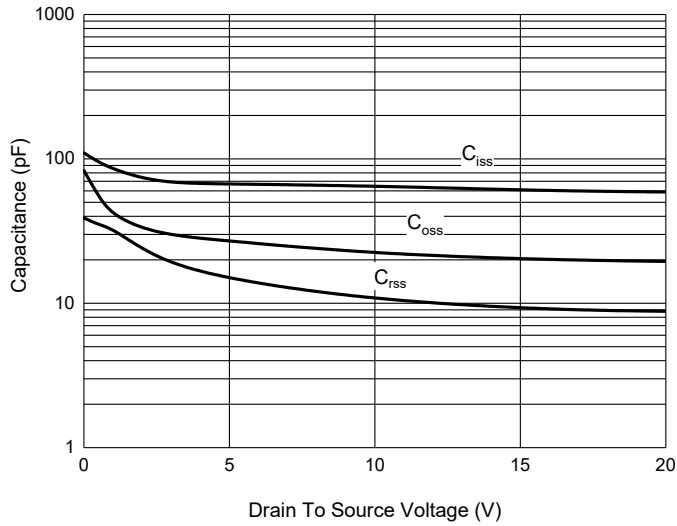


Fig. 6 - Threshold Voltage



### Curve Characteristics(N-Channel)

Fig. 7 - Capacitance Characteristics



### Curve Characteristics(P-Channel)

Fig. 8 - Output Characteristics

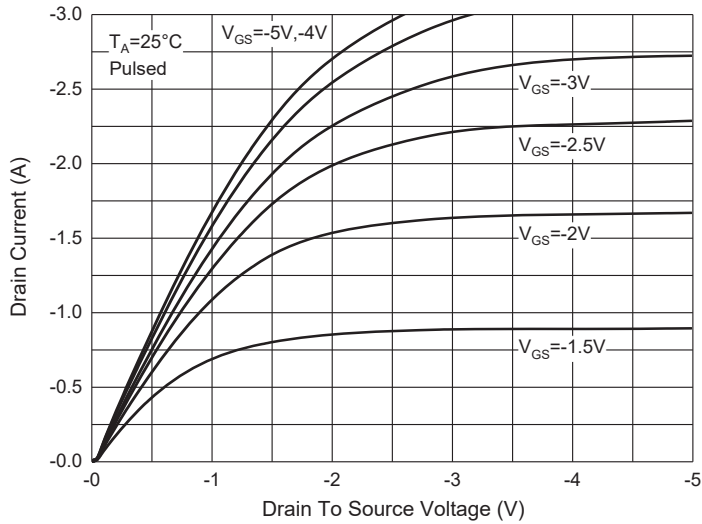
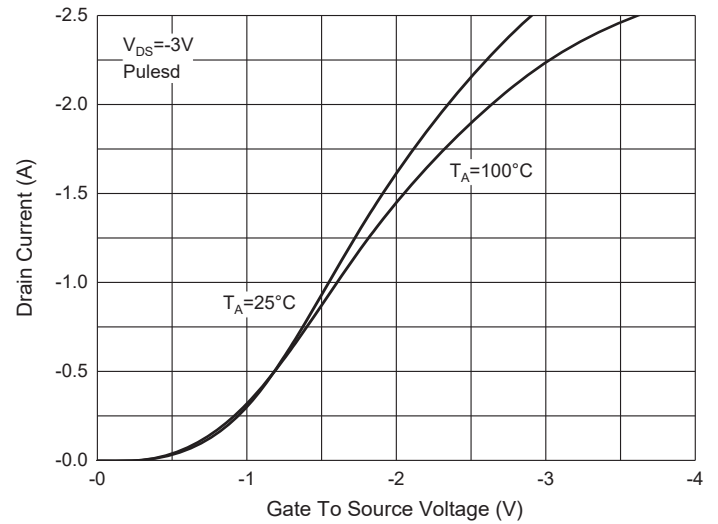


Fig. 9 - Transfer Characteristics



### Curve Characteristics(P-Channel)

Fig. 10 -  $R_{DS(ON)} - I_D$

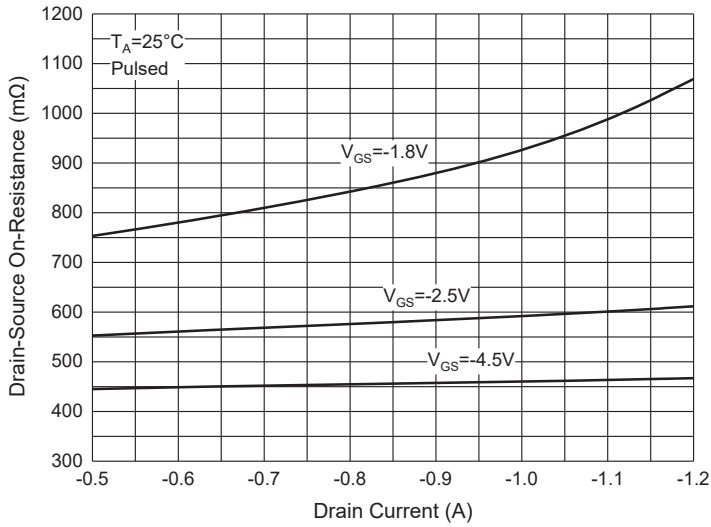


Fig. 11 -  $R_{DS(ON)} - V_{GS}$

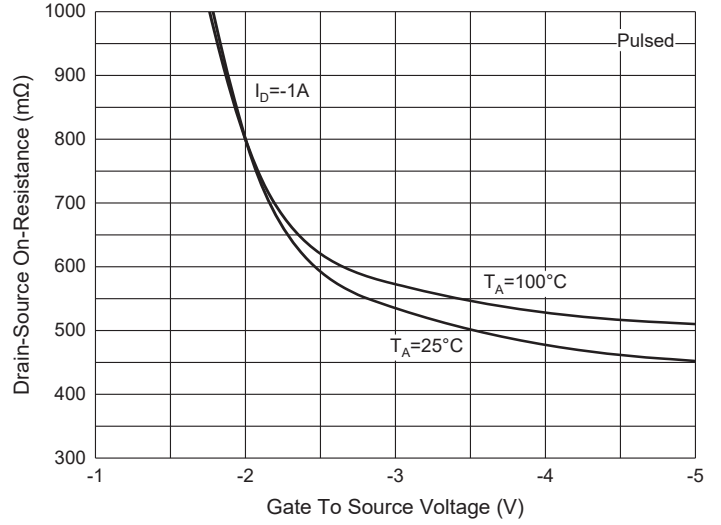


Fig. 12 -  $I_S - V_{SD}$

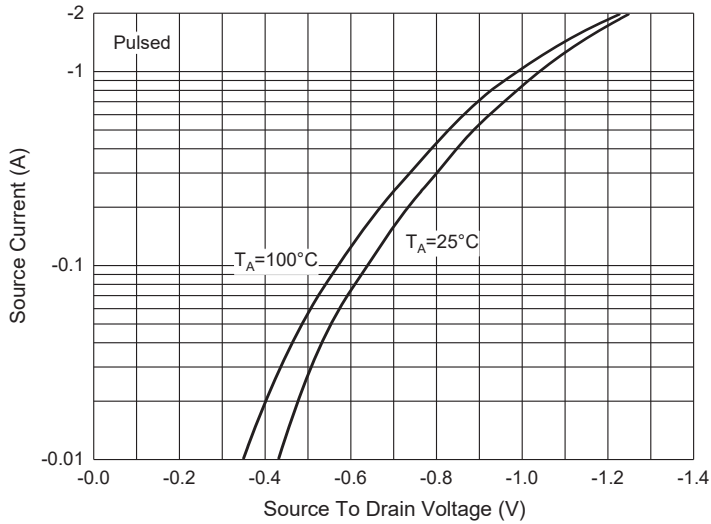


Fig. 13 - Threshold Voltage

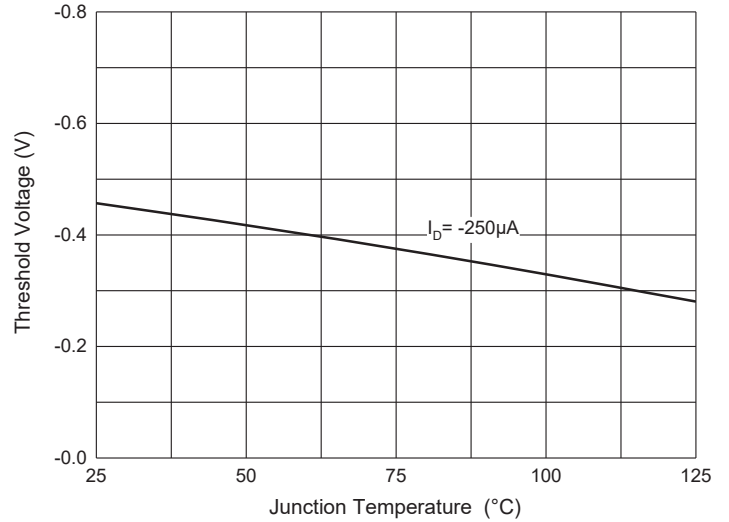
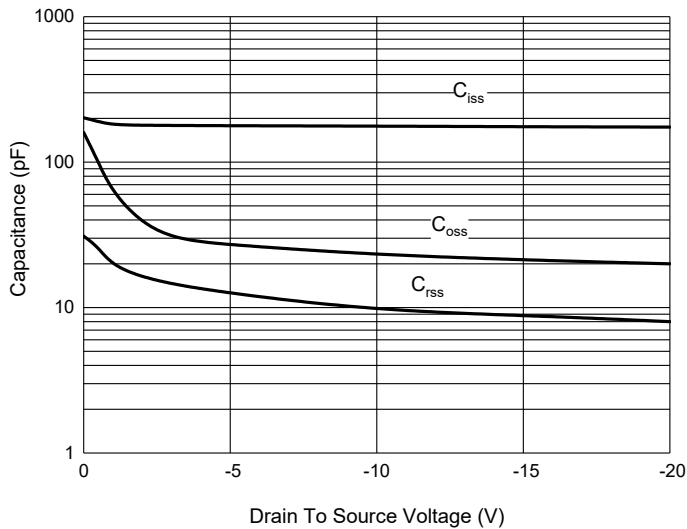


Fig. 14 - Capacitance Characteristics



## Ordering Information

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

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-TP-HF

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