

**Features**

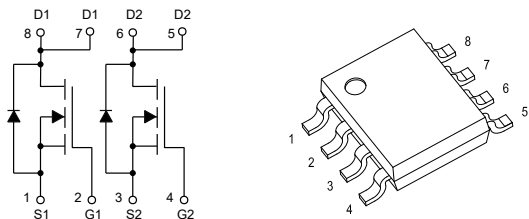
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"

**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

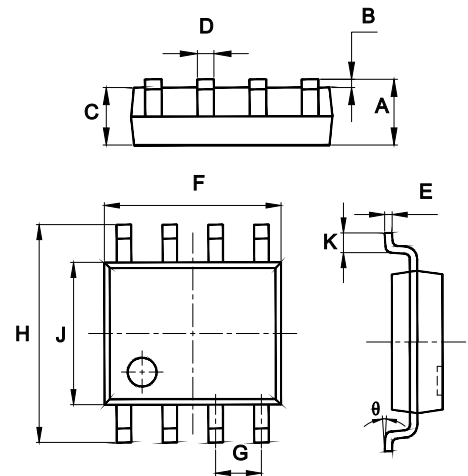
Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current ( $t \leq 10s$ ) <sup>(Note1)</sup>	$I_D$	4.5	A
Pulsed Drain Current <sup>(Note2)</sup>	$I_{DM}$	20	A
Repetitive Avalanche Energy 0.1mH <sup>(Note2)</sup>	$E_{AR}, E_{AS}$	18	mJ
Total Power Dissipation	$P_D$	1.25	W

**Internal Structure:**



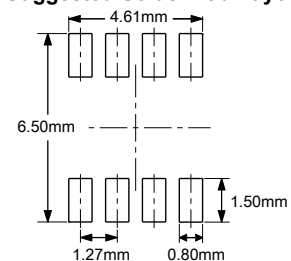
**Dual  
N-Channel  
Power MOSFET**

**SOP-8**



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.053	0.069	1.35	1.75	
B	0.004	0.010	0.10	0.25	
C	0.053	0.061	1.35	1.55	
D	0.013	0.020	0.33	0.51	
E	0.007	0.010	0.17	0.25	
F	0.185	0.200	4.70	5.10	
G	0.050		1.270		TYP.
H	0.228	0.244	5.80	6.20	
J	0.150	0.157	3.80	4.00	
K	0.016	0.050	0.40	1.27	
θ	0°	8°	0°	8°	

**Suggested Solder Pad Layout**



**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
<b>Static Characteristics</b>							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V	
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1	$\mu A$	
Gate-Threshold Voltage <sup>(Note 3)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2.1	3	V	
Drain-Source On-Resistance <sup>(Note 3)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=4.5A$		40	56	m $\Omega$	
		$V_{GS}=4.5V, I_D=3A$		55	77		
Forward Transconductance <sup>(Note 3)</sup>	$g_{FS}$	$V_{DS}=5V, I_D=4.5A$	6			S	
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=1A$			1	V	
<b>Dynamic Characteristics<sup>(Note 4)</sup></b>							
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$			540	pF	
Output Capacitance	$C_{oss}$			60			
Reverse Transfer Capacitance	$C_{rss}$			25			
<b>Switching Characteristics<sup>(Note 4)</sup></b>							
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=30V$ $R_{GEN}=3\Omega, R_L=6.7\Omega$		4.7		ns	
Turn-On Rise Time	$t_r$			2.3			
Turn-Off Delay Time	$t_{d(off)}$			15.7			
Turn-Off Fall Time	$t_f$			1.9			
Total Gate Charge (10V)	$Q_g$	$V_{GS}=10V, V_{DS}=30V$ $I_D=4.5A$			10.5	nC	
Total Gate Charge (4.5V)					5.5		
Gate-Source Charge			$Q_{gs}$		1.6		
Gate-Drain Charge			$Q_{gd}$		2.2		

Notes :

1. The Value In Any Given Application Depends On The User's Specific Board Design.
2. Repetitive Rating : Pulse Width Limited by Junction Temperature.
3. Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$ .
4. These Parameters Have No Way to Verify.

**Curve Characteristics**

Fig. 1 - Output Characteristics

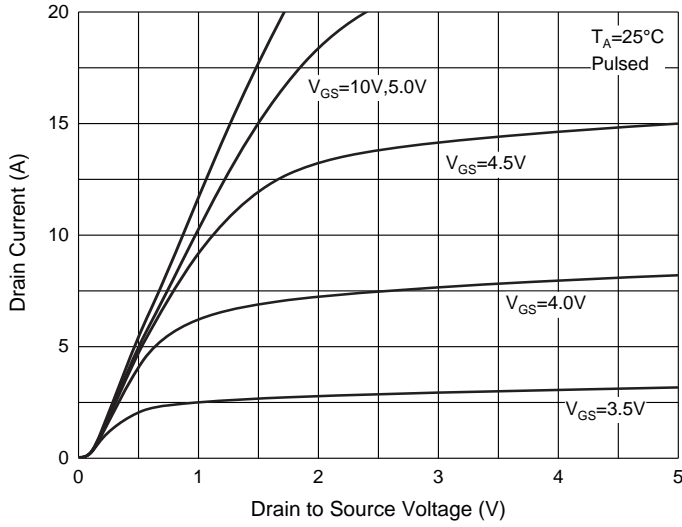


Fig. 2 - Transfer Characteristics

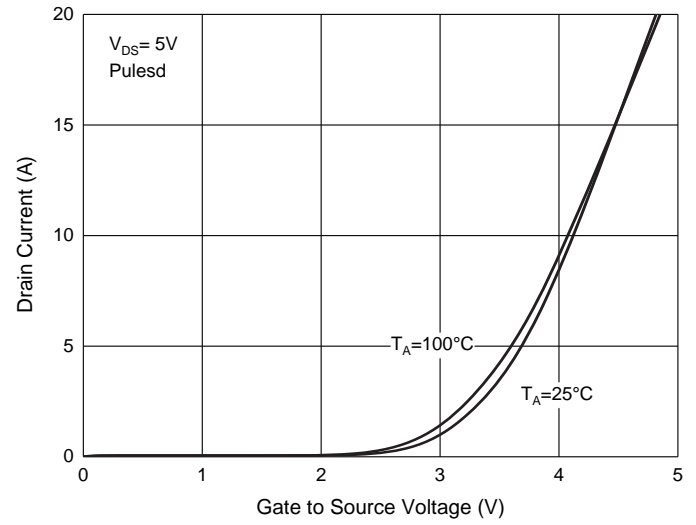


Fig. 3 -  $R_{DS(ON)} - I_D$

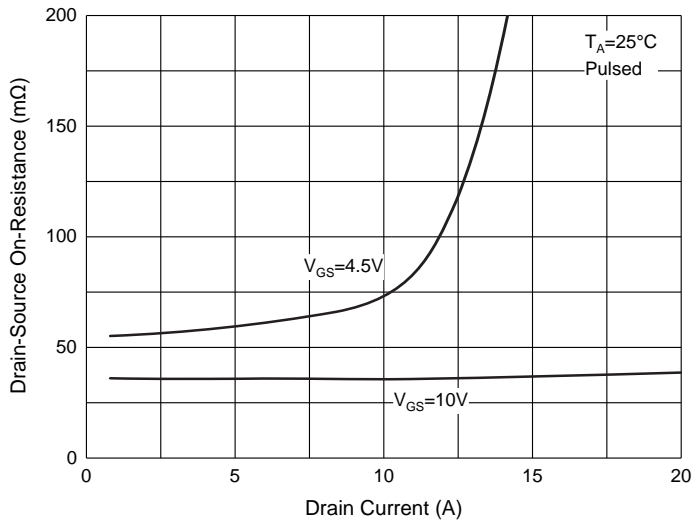


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

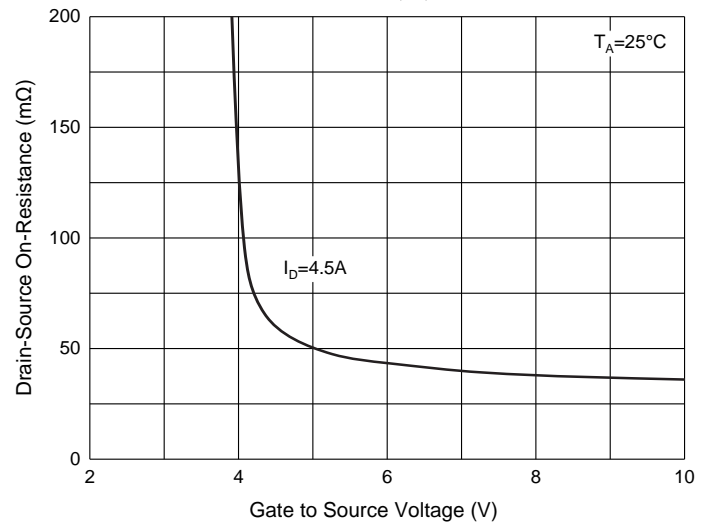


Fig. 5 -  $I_S - V_{SD}$

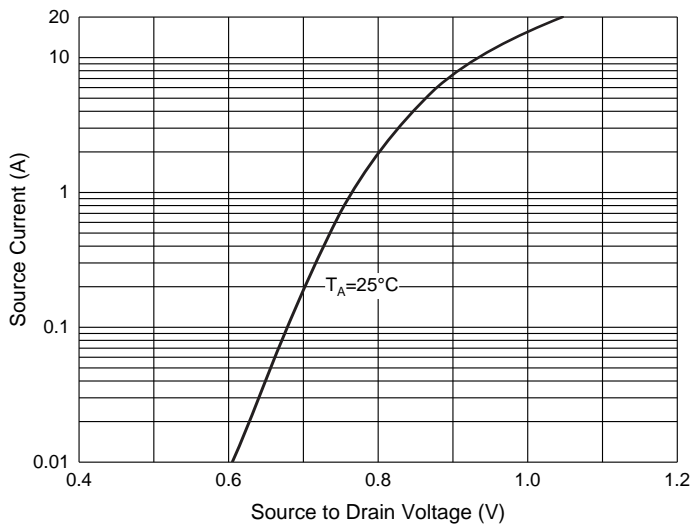
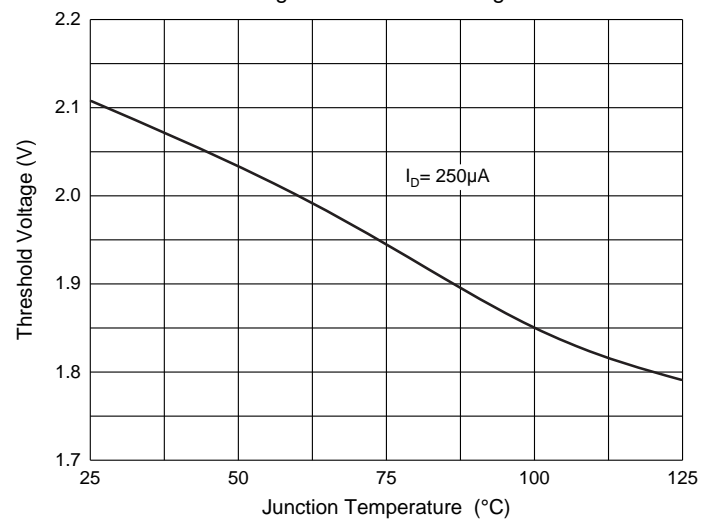


Fig. 6 - Threshold Voltage



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 4Kpcs/Reel

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

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