

## 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>
- Thermal Resistance: 277°C/W Junction to Lead<sup>(Note 2)</sup>

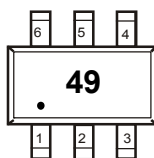
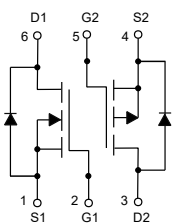
Parameter	Symbol	Rating	Unit
Total Power Dissipation	$P_D$	450	mW
<b>N-Channel MOSFET</b>			
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	±10	V
Continuous Drain Current	$I_D$	1.5	A
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	6	A
<b>P-Channel MOSFET</b>			
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	±10	V
Continuous Drain Current	$I_D$	-1	A
Pulsed Drain Current <sup>(Note 3)</sup>	$I_{DM}$	-4	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.

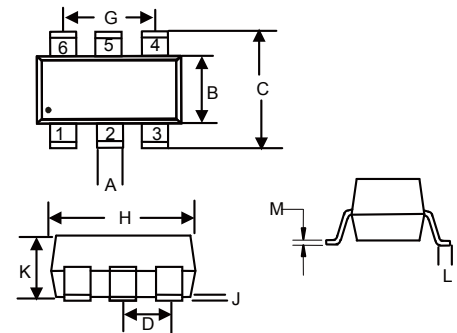
3. Pulse Width Limited by Maximum Junction Temperature.

## Internal Structure and Marking Code



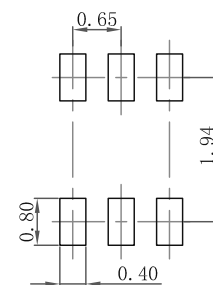
# Dual N&P-Channel MOSFET

## SOT-363



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	0.006	0.014	0.15	0.35	
B	0.045	0.053	1.15	1.35	
C	0.079	0.096	2.00	2.45	
D	0.026		0.65		TYP.
G	0.047	0.055	1.20	1.40	
H	0.071	0.087	1.80	2.20	
J	----	0.004	----	0.10	
K	0.031	0.043	0.80	1.10	
L	0.010	0.018	0.26	0.46	
M	0.003	0.006	0.08	0.15	

### Suggested Solder Pad Layout



**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	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage <sup>(Note4)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.55		1.1	V
Drain-Source On-Resistance <sup>(Note4)</sup>	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=1.0A$			90	m $\Omega$
		$V_{GS}=2.5V, I_D=0.6A$			105	m $\Omega$
		$V_{GS}=1.8V, I_D=0.3A$			154	m $\Omega$
Diode Forward Voltage <sup>(Note4)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=1.5A$			1.2	V
<b>Dynamic Characteristics<sup>(Note5,6)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, f=1MHz$		202		pF
Output Capacitance	$C_{oss}$			37		
Reverse Transfer Capacitance	$C_{rss}$			29		
Total Gate Charge	$Q_g$	$V_{DS}=4.5V, V_{GS}=10V, I_D=1.5A$		2.98		nC
Gate-Source Charge	$Q_{gs}$			0.72		
Gate-Drain Charge	$Q_{gd}$			0.59		
Reverse Recovery Charge	$Q_{rr}$	$I_{SD}=1.5A, di/dt=100A/us$		0.9		ns
Reverse Recovery Time	$T_{rr}$			9		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=4.5V, V_{DS}=10V, I_{DS}=1.5A, R_G=3\Omega,$		3		
Turn-On Rise Time	$t_r$			22		
Turn-Off Delay Time	$t_{d(off)}$			13.2		
Turn-Off Fall Time	$t_f$			22		

**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	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
Gate-Threshold Voltage <sup>(Note4)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4		-1.0	V
Drain-Source On-Resistance <sup>(Note4)</sup>	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-1.0A$			150	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.6A$			180	m $\Omega$
		$V_{GS}=-1.8V, I_D=-0.3A$			260	m $\Omega$
Diode Forward Voltage <sup>(Note4)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-0.5A$			-1.2	V
<b>Dynamic Characteristics<sup>(Note5,6)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		223		pF
Output Capacitance	$C_{oss}$			35		
Reverse Transfer Capacitance	$C_{rss}$			33		
Total Gate Charge	$Q_g$	$V_{DS}=-4.5V, V_{GS}=-10V, I_D=-1A$		3		nC
Gate-Source Charge	$Q_{gs}$			0.75		
Gate-Drain Charge	$Q_{gd}$			0.55		
Reverse Recovery Charge	$Q_{rr}$	$I_{SD}=-1A, di/dt=100A/us$		0.9		
Reverse Recovery Time	$T_{rr}$			5.9		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=-4.5V, V_{DS}=-10V, I_{DS}=-1A, R_G=3\Omega,$		6		ns
Turn-On Rise Time	$t_r$			9		
Turn-Off Delay Time	$t_{d(off)}$			22		
Turn-Off Fall Time	$t_f$			17.2		

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

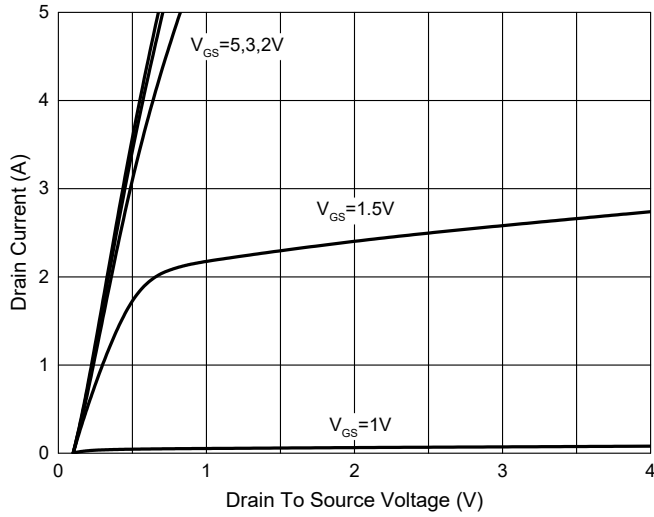


Fig. 2 - Transfer Characteristics

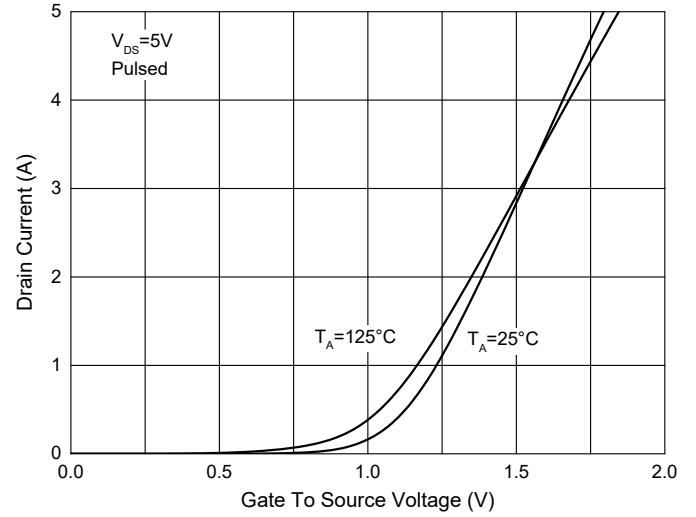


Fig. 3 -  $R_{DS(ON)} - I_D$

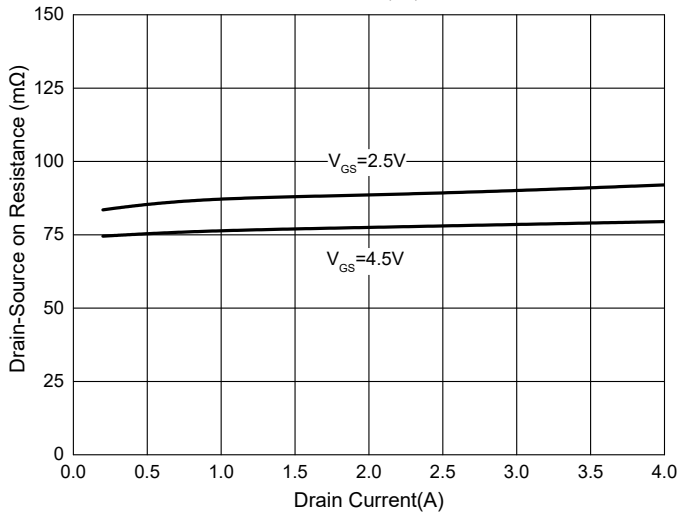


Fig. 4 - Normalized On Resistance Characteristics

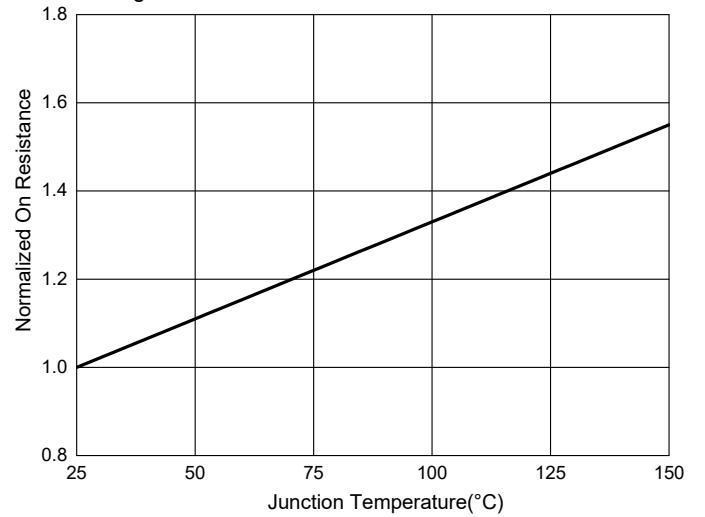


Fig. 5 - Gate Charge

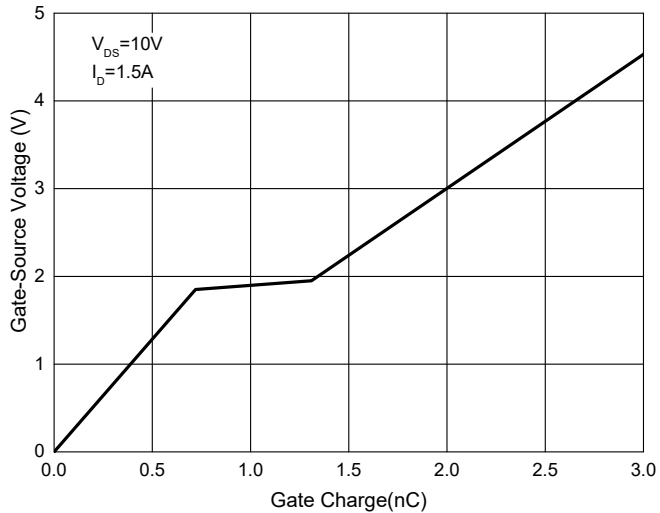
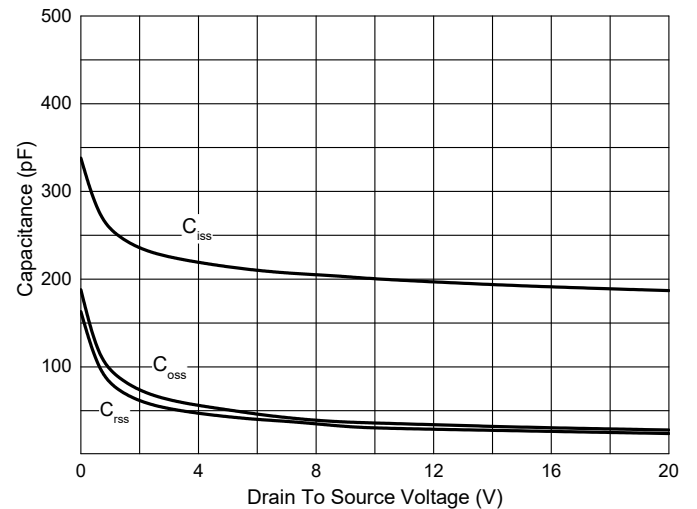


Fig. 6 - Capacitance Characteristics



**Curve Characteristics(P-Channel)**

Fig. 7 - Output Characteristics

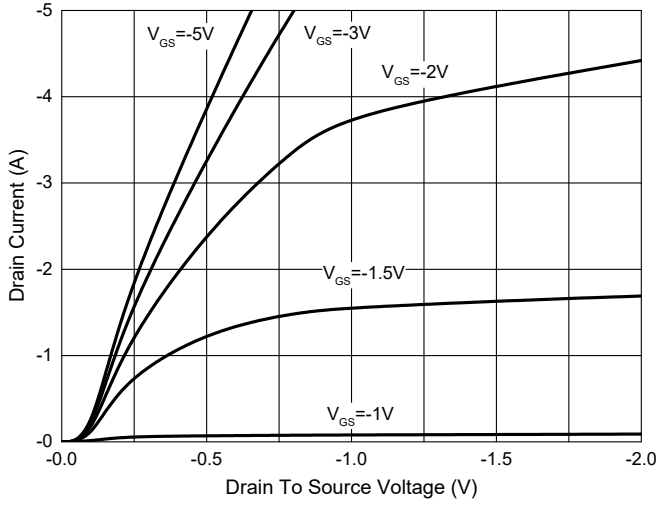


Fig. 8 - Transfer Characteristics

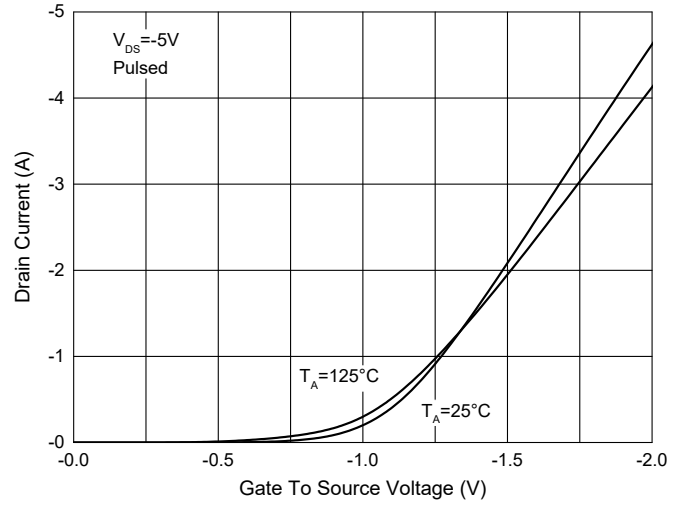


Fig. 9 -  $R_{DS(ON)} - I_D$

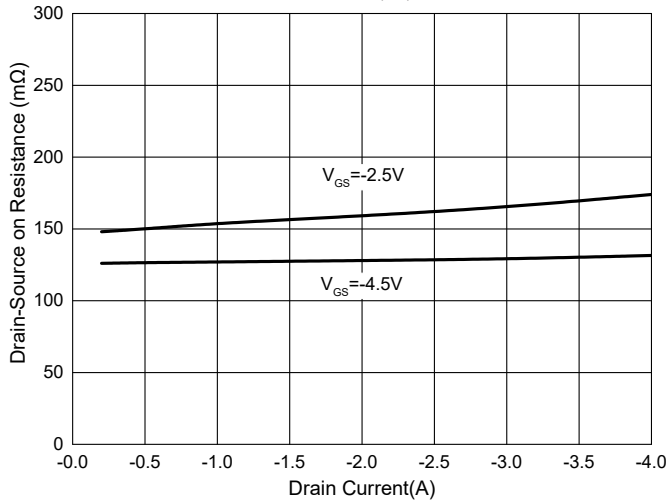


Fig. 10 - Normalized On Resistance Characteristics

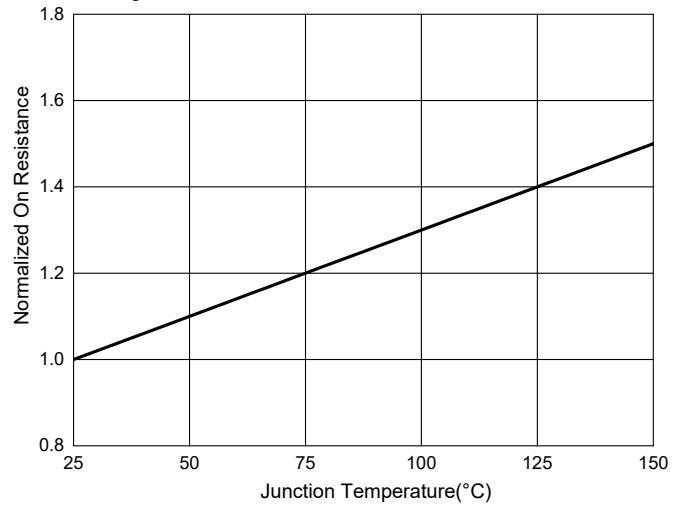


Fig. 11 - Gate Charge

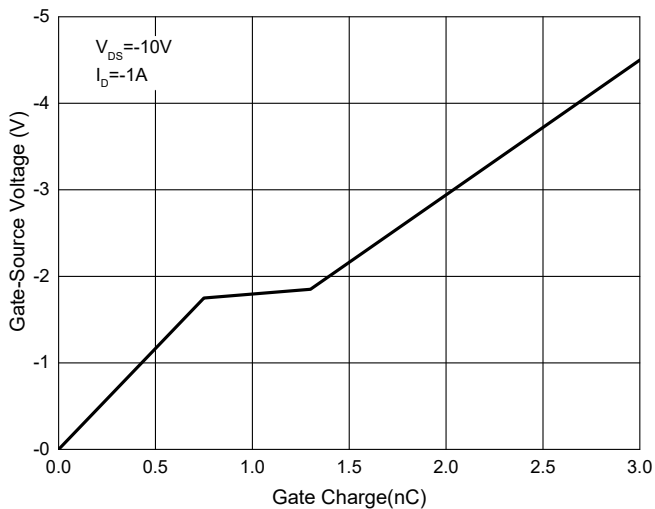
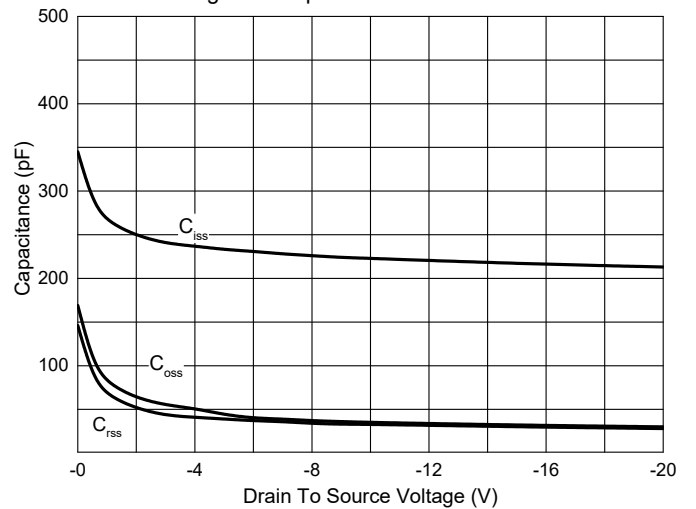


Fig. 12 - Capacitance Characteristics



## Ordering Information

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

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