

# GSM4539S

## 30V N & P Pair Enhancement Mode MOSFET

### Product Description

GSM4539S, N & P Pair enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

### Features

N-Channel

- 30V/5.8A,  $R_{DS(ON)}=40m\Omega@V_{GS}=10V$
- 30V/5.5A,  $R_{DS(ON)}=50m\Omega@V_{GS}=4.5V$

P-Channel

- -30V/-5.4A,  $R_{DS(ON)}=65m\Omega@V_{GS}=-10V$
- -30V/-4.2A,  $R_{DS(ON)}=92m\Omega@V_{GS}=-4.5V$

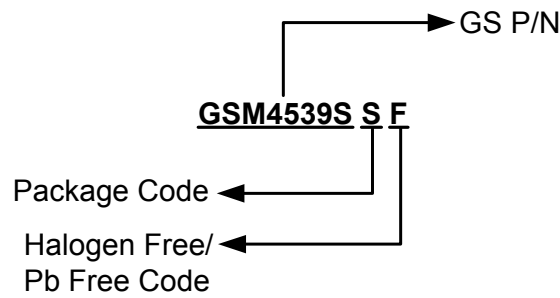
### Applications

- Low Current DC/DC Conversion
- Load Switch
- CCFL Inverter
- Power Management in Notebook Computer

### Packages & Pin Assignments

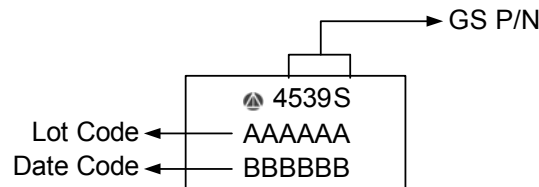
GSM4539SSF(SOP-8P)			
D1 8	D1 7	D2 6	D2 5
1	2	3	4
S1	G1	S2	G2
Pin	Description	Pin	Description
1	N-Source1	5	P-Drain2
2	N-Gate1	6	P-Drain2
3	P-Source2	7	N-Drain1
4	P-Gate2	8	N-Drain1

## Ordering Information



Part Number	Package	Quantity Reel
GSM4539SSF	SOP-8P	3000 PCS

## Marking Information



## Absolute Maximum Ratings (N-Channel)

(T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Typical	Unit
V <sub>DSS</sub>	Drain-Source Voltage	30	V
V <sub>GSS</sub>	Gate –Source Voltage	±20	V
I <sub>D</sub>	Continuous Drain Current(T <sub>J</sub> =150°C)	T <sub>A</sub> =25°C	5.4
		T <sub>A</sub> =70°C	4.0
I <sub>DM</sub>	Pulsed Drain Current	20	A
I <sub>S</sub>	Continuous Source Current(Diode Conduction)	1.5	A
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	2.8
		T <sub>A</sub> =70°C	1.8
T <sub>J</sub>	Operating Junction Temperature	150	°C
T <sub>STG</sub>	Storage Temperature Range	-55/150	°C
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	62.5	°C/ W

## Electrical Characteristics (N-Channel)

(T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.3		2.1	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V			1	uA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C			30	
I <sub>D(on)</sub>	On-State Drain Current	V <sub>DS</sub> ≥5V, V <sub>GS</sub> =4.5V	10			A
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A		32	40	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.7A		42	50	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =15V, I <sub>D</sub> =5.2A		13		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1.6A, V <sub>GS</sub> =0V		0.8	1.3	V
<b>Dynamic</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz		700		pF
C <sub>oss</sub>	Output Capacitance			75		
C <sub>rss</sub>	Reverse Transfer Capacitance			45		
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.2A		8	12	nC
Q <sub>gs</sub>	Gate-Source Charge			1.6		
Q <sub>gd</sub>	Gate-Drain Charge			2.4		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =15V, R <sub>L</sub> =15Ω, I <sub>D</sub> =1.0A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω		8	12	ns
T <sub>r</sub>				12	18	
t <sub>d(off)</sub>	Turn-Off Time			28	40	
T <sub>f</sub>				10	18	

## Absolute Maximum Ratings (P-Channel)

(T<sub>A</sub>=25°C unless otherwise noted)

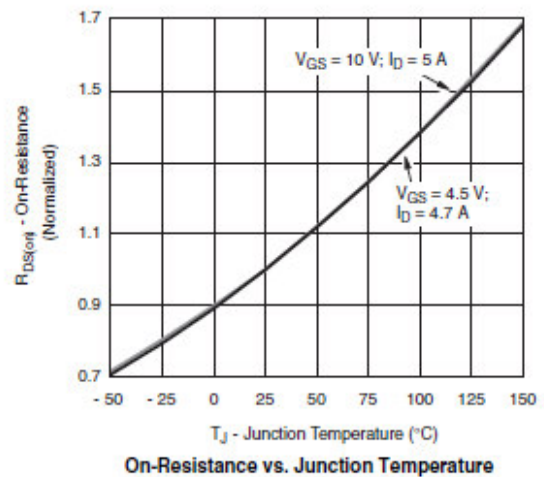
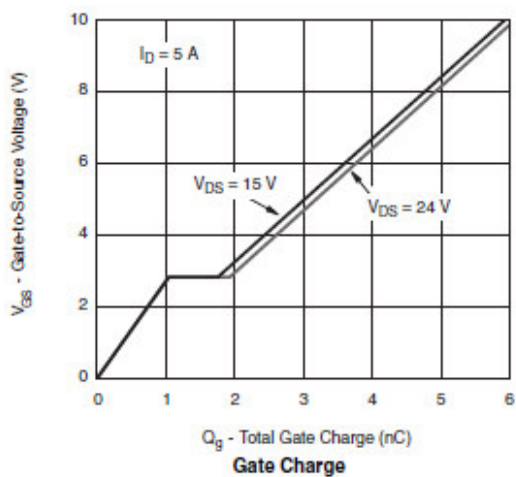
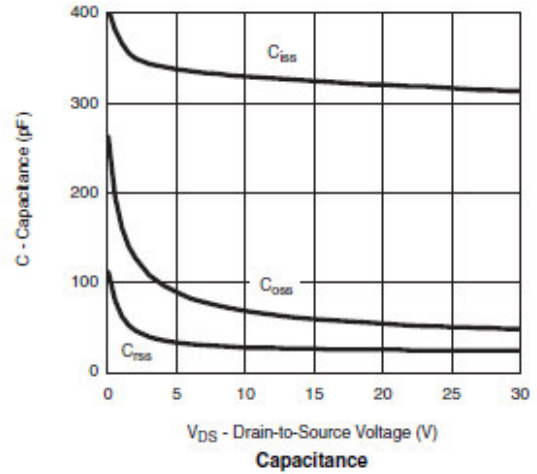
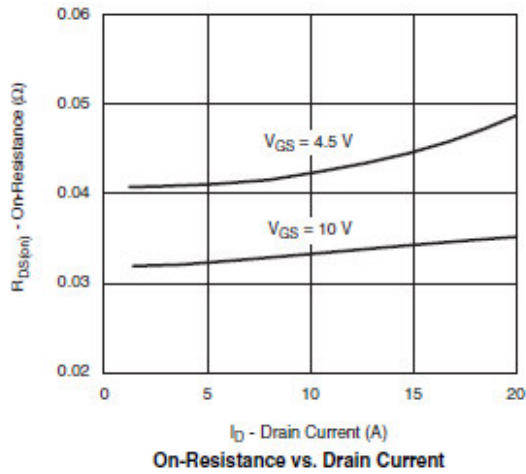
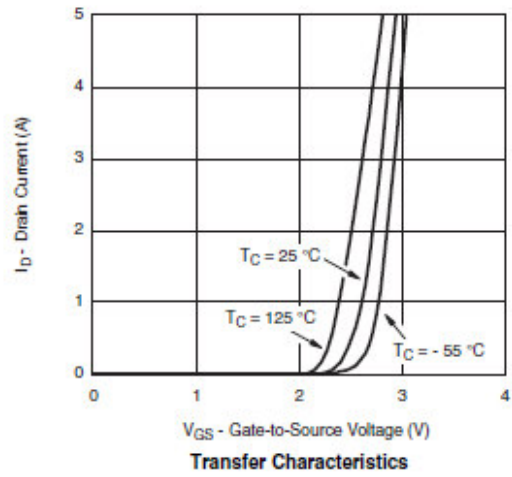
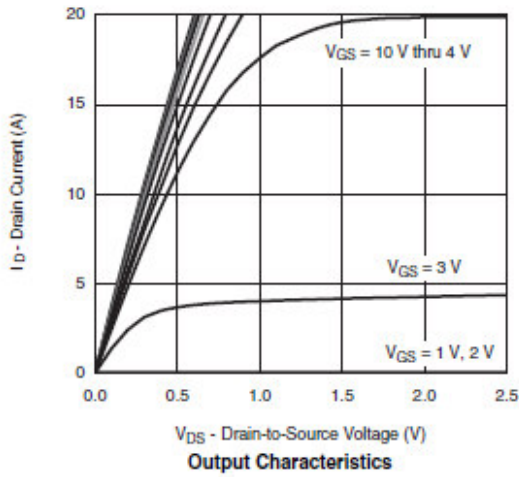
Symbol	Parameter	Typical	Unit	
V <sub>DSS</sub>	Drain-Source Voltage	-30	V	
V <sub>GSS</sub>	Gate –Source Voltage	±20	V	
I <sub>D</sub>	Continuous Drain Current (T <sub>J</sub> =150°C)	T <sub>A</sub> =25°C	-5.4	A
		T <sub>A</sub> =70°C	-4.2	
I <sub>DM</sub>	Pulsed Drain Current	-30	A	
I <sub>S</sub>	Continuous Source Current (Diode Conduction)	-1.7	A	
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	2.8	W
		T <sub>A</sub> =70°C	1.8	
T <sub>J</sub>	Operating Junction Temperature	150	°C	
T <sub>STG</sub>	Storage Temperature Range	-55/150	°C	
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	62.5	°C/ W	

## Electrical Characteristics (P-Channel)

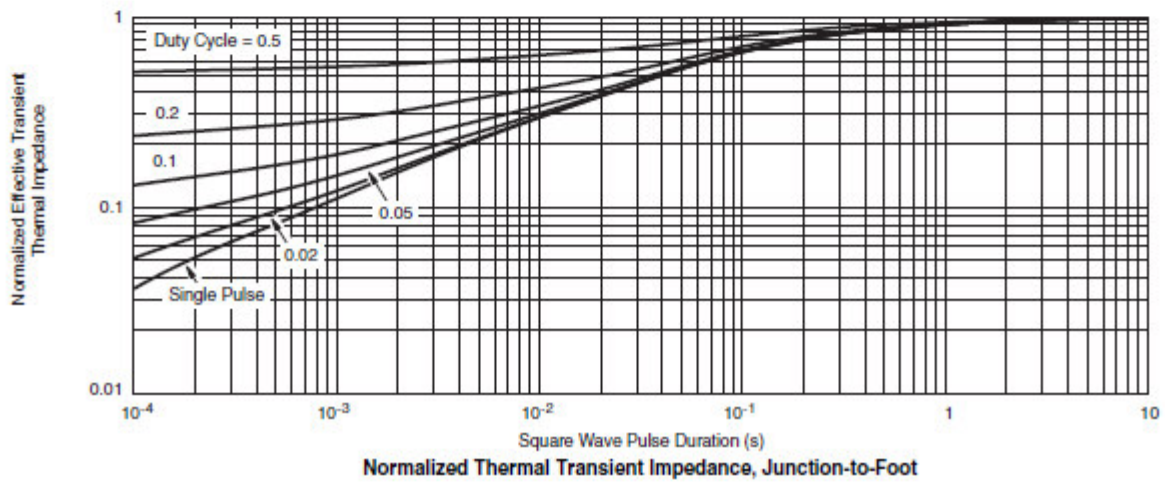
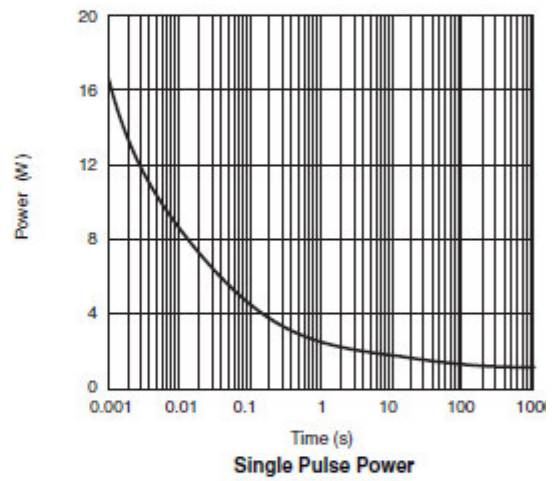
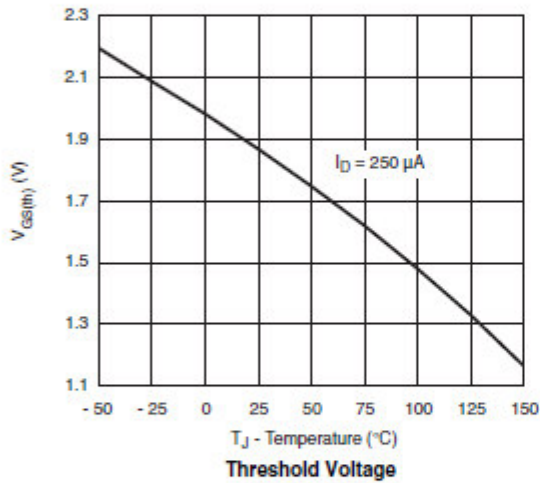
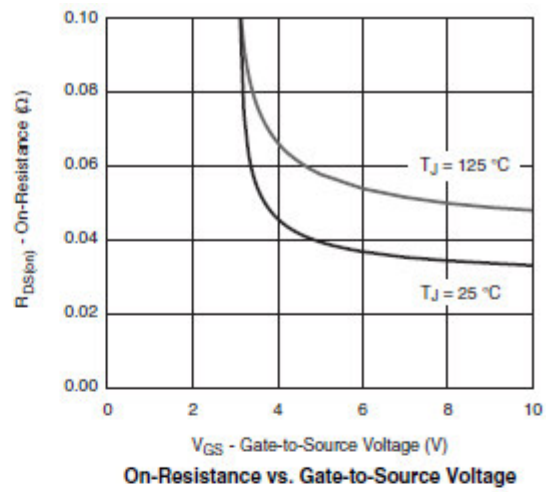
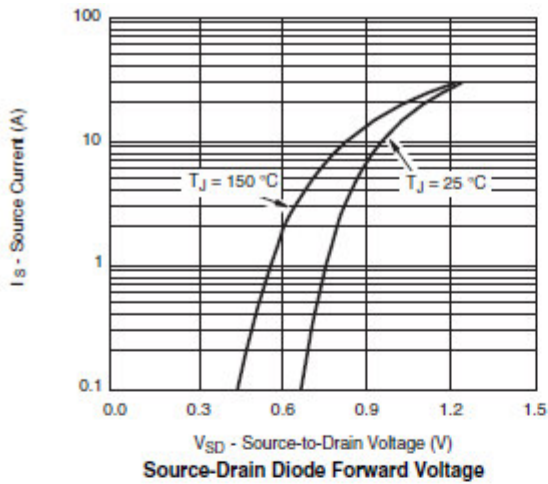
(T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-30			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1.0		-2.5	
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V			-1	uA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C			-30	
I <sub>D(on)</sub>	On-State Drain Current	V <sub>DS</sub> ≤ -5V, V <sub>GS</sub> =-10V	-25			A
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-5.4A		56	65	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4.2A		72	92	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-4.9A		10		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1.7A, V <sub>GS</sub> =0V		-0.8	-1.3	V
<b>Dynamic</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz		500		pF
C <sub>oss</sub>	Output Capacitance			100		
C <sub>rss</sub>	Reverse Transfer Capacitance			55		
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-5.0A		10	18	nC
Q <sub>gs</sub>	Gate-Source Charge			1.6		
Q <sub>gd</sub>	Gate-Drain Charge			3.0		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =-15V, R <sub>L</sub> =15Ω, I <sub>D</sub> =-1.0A, V <sub>GEN</sub> =-10V, R <sub>G</sub> =6Ω		8	18	ns
T <sub>r</sub>				8	18	
t <sub>d(off)</sub>	Turn-Off Time			25	50	
T <sub>f</sub>				25	35	

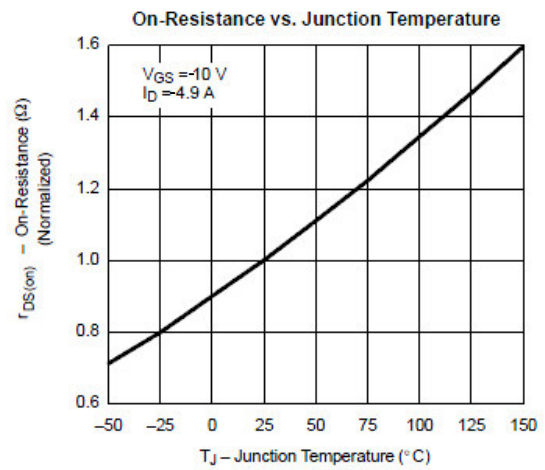
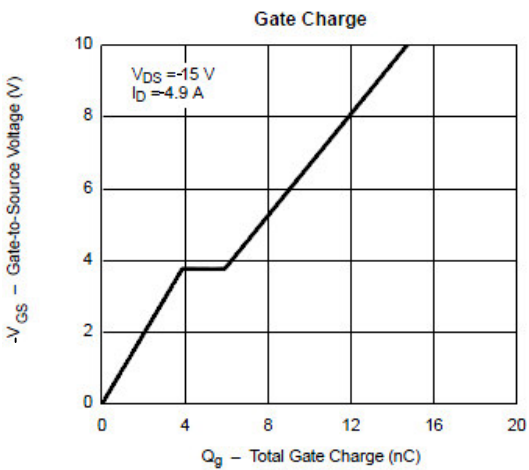
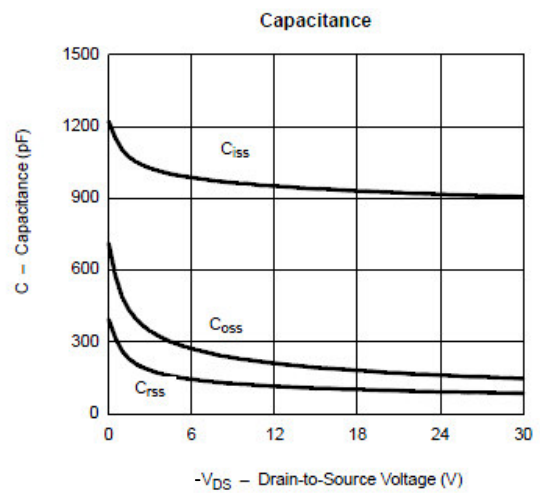
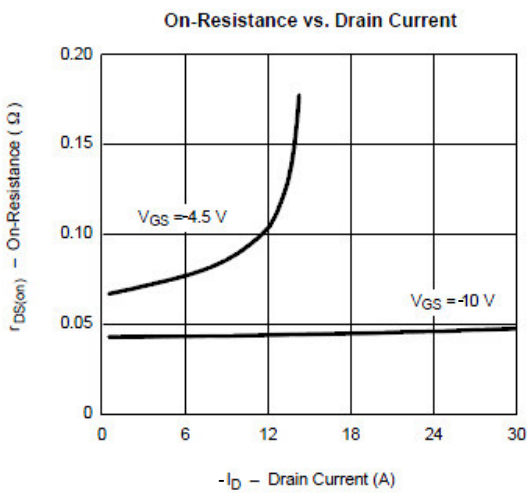
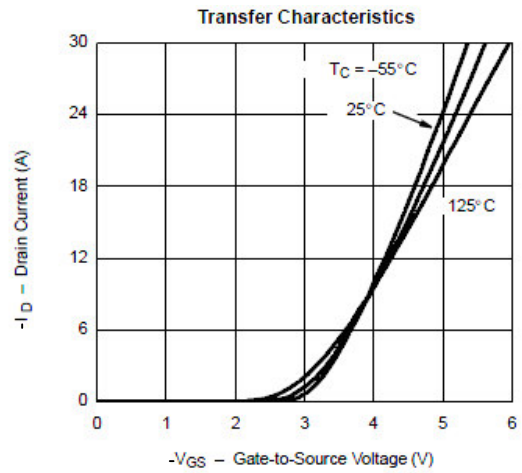
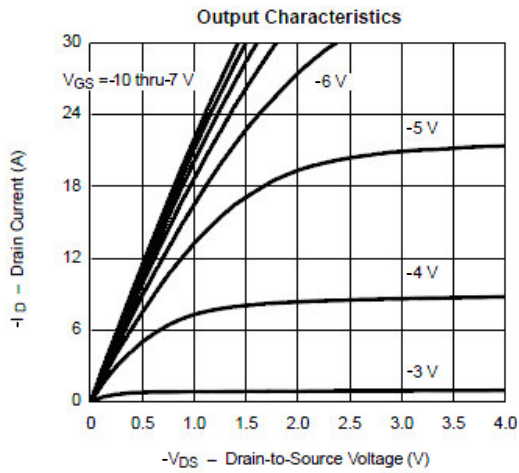
## Typical Performance Characteristics (N-Channel)



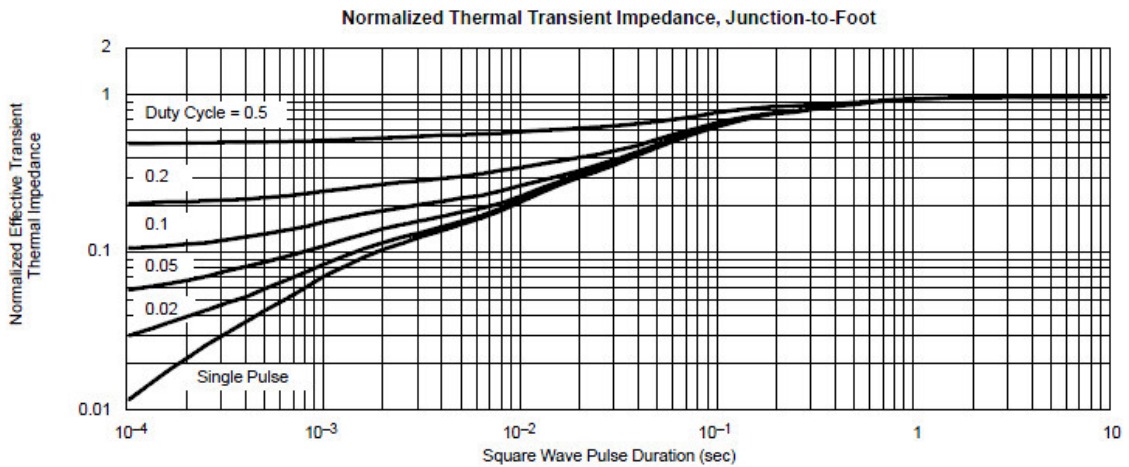
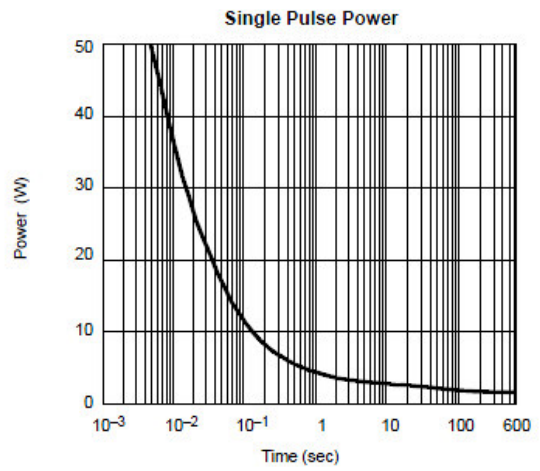
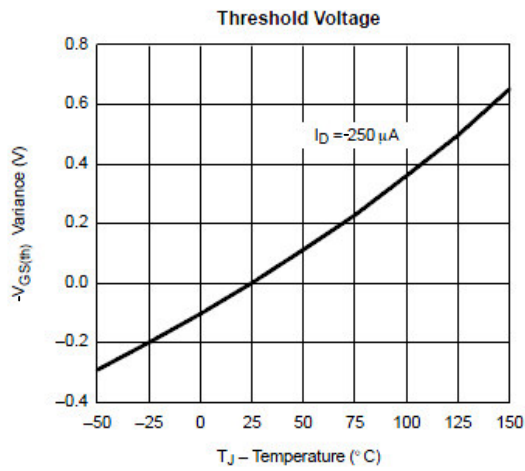
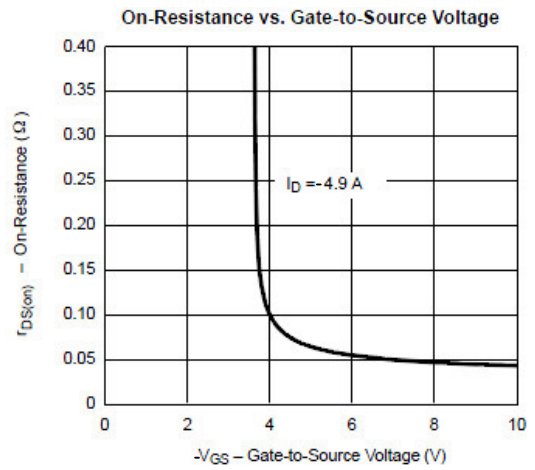
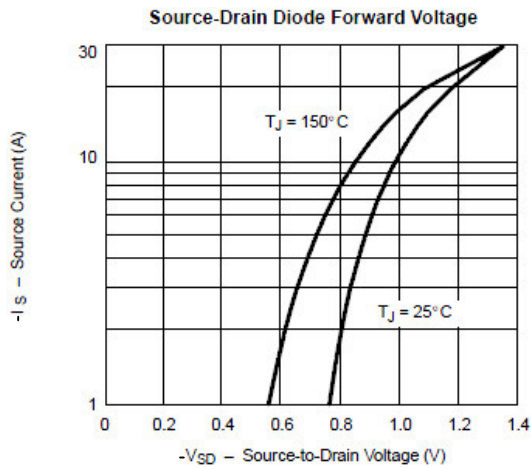
## Typical Performance Characteristics (N-Channel)



## Typical Performance Characteristics (P-Channel)



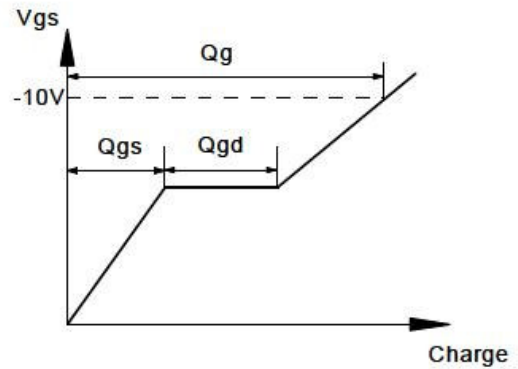
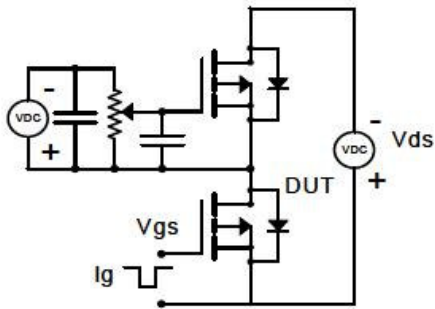
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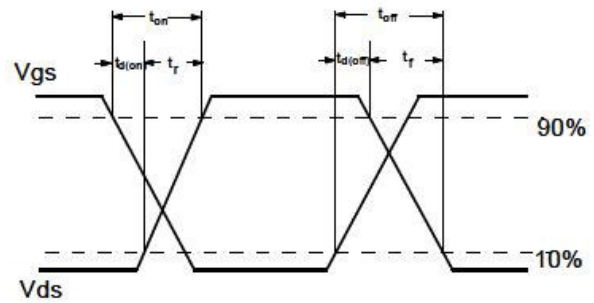
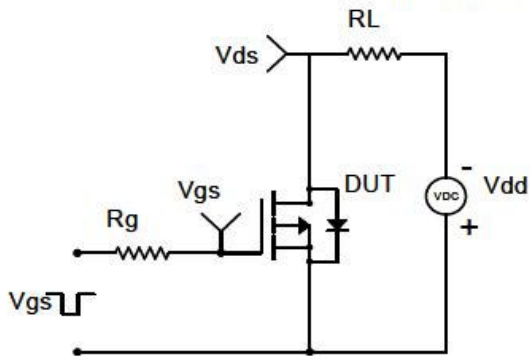


## Typical Performance Characteristics

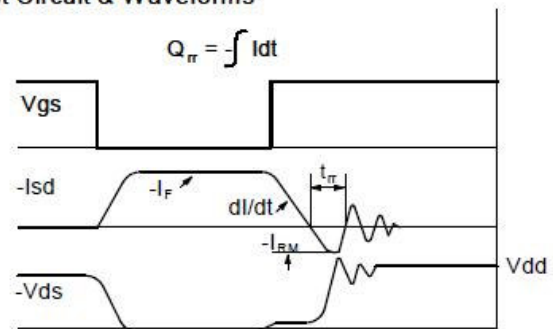
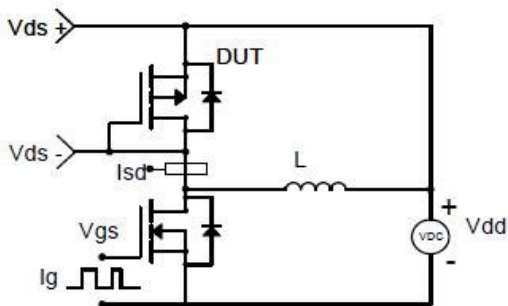
### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms

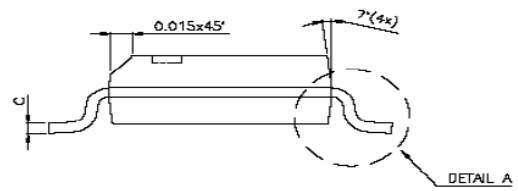
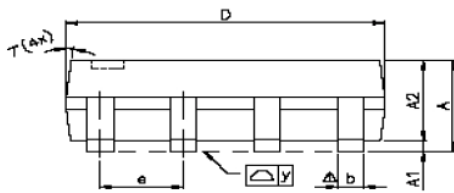
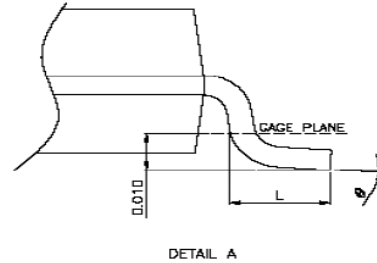
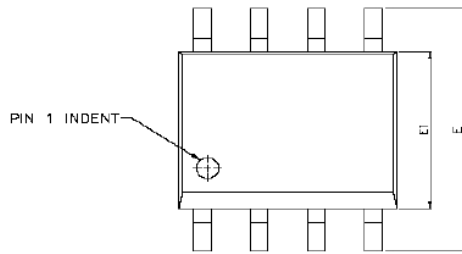


### Diode Recovery Test Circuit & Waveforms



## Package Dimension

# SOP-8P PLASTIC PACKAGE






Dimensions						
SYMBOL	Millimeters			Inches		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.47	1.60	1.73	0.058	0.063	0.068
A1	0.10	-	0.25	0.004	-	0.010
A2	-	1.45	-	-	0.057	-
b	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.0098
D	4.80	4.85	4.95	0.189	0.191	0.195
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	-	1.27	-	-	0.050	-
L	0.38	0.71	1.27	0.015	0.028	0.050
$\Delta y$	-	-	0.076	-	-	0.003
$\theta$	0°	-	8°	0°	-	8°




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