

# N-Channel Enhancement Mode MOSFET

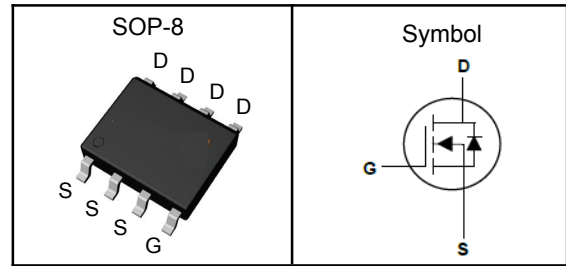
## Features

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant
- 100% UIS and Rg Tested

## Applications

- Power Management in Desktop Computer
- DC/DC Converters

## Pin Description



$V_{DSS}$	60	V
$R_{DS(ON)-Typ}$	35	m $\Omega$
$I_D$	5	A

## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	N-Channel	Unit
$V_{DSS}$	Drain-Source Voltage	60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_{DM}^{①}$	Pulse Drain Current Tested	20	A
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	A
$P_D$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	W

## Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>①</sup> (Steady State)	73	$^\circ\text{C}/\text{W}$
$R_{\theta JL}$	Thermal Resistance-Junction to Lead (Steady State)	31	$^\circ\text{C}/\text{W}$

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$ .

Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.

**N-Channel Enhancement Mode MOSFET****Electrical Characteristics** ( $T_J=25^\circ\text{C}$ , Unless Otherwise Noted)

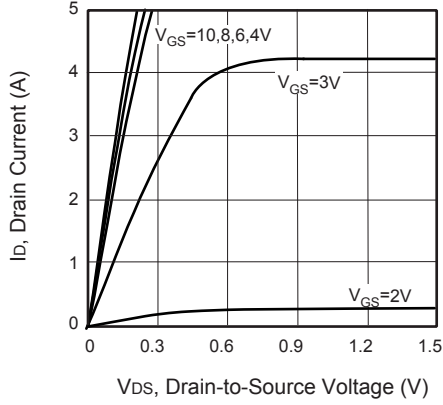
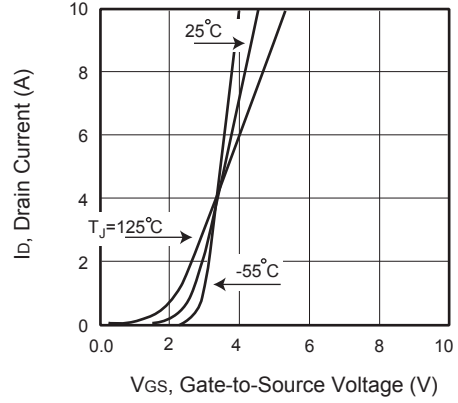
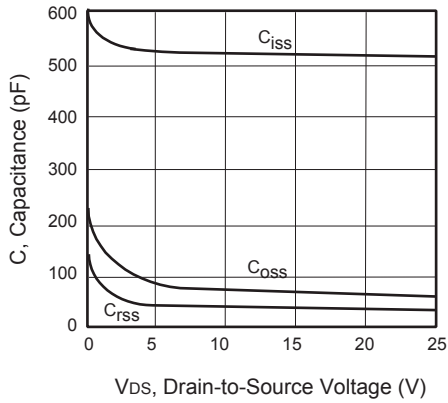
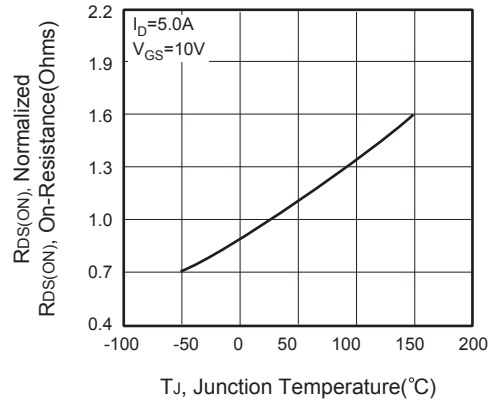
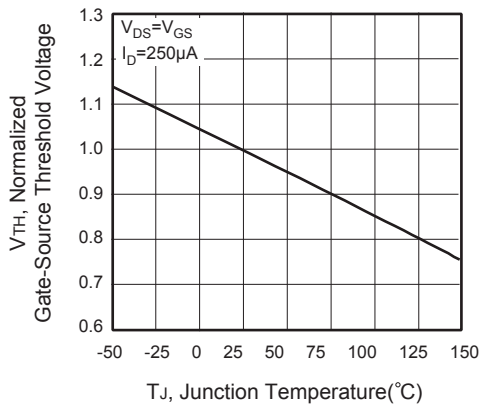
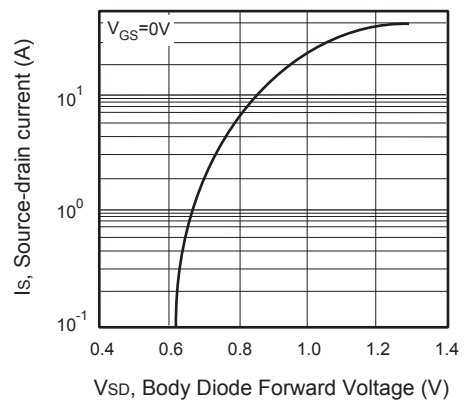
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=48V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	---	3.0	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=5A$	---	35	45	m $\Omega$
		$V_{GS}=4.5V, I_D=4A$	---	40	55	
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Freq.=1MHz	---	520	---	pF
$C_{oss}$	Output Capacitance		---	105	---	
$C_{rss}$	Reverse Transfer Capacitance		---	60	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=30V,$ $V_{GEN}=10V,$ $R_G=6\Omega, I_D=1A,$	---	8	---	nS
$T_r$	Turn-on Rise Time		---	6	---	
$T_{d(off)}$	Turn-off Delay Time		---	25	---	
$T_f$	Turn-off Fall Time		---	4	---	
$Q_g$	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V,$ $I_D=5A$	---	15.6	---	nC
$Q_{gs}$	Gate-Source Charge		---	1.3	---	
$Q_{gd}$	Gate-Drain Charge		---	4.5	---	
<b>Source-Drain Characteristics</b> ( $T_J=25^\circ\text{C}$ )						
$V_{SD}$	Diode Forward Voltage <sub>z</sub>	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	0.8	1.3	V

Note ④ : Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

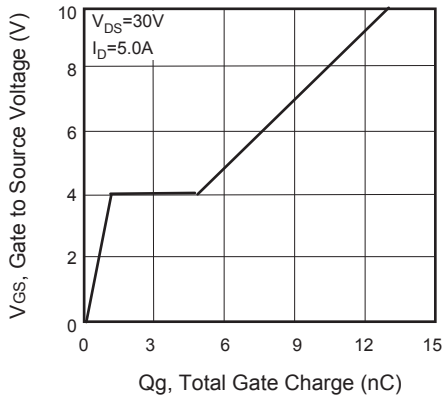
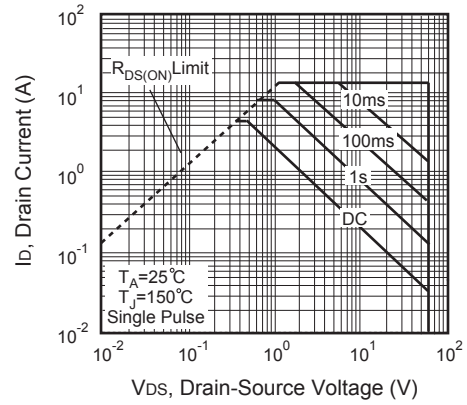
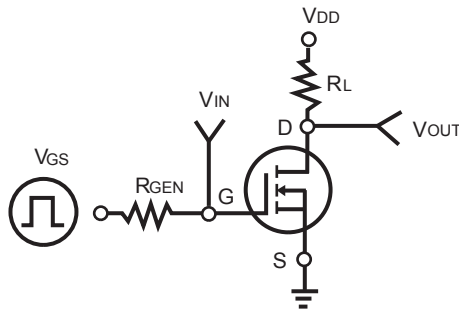
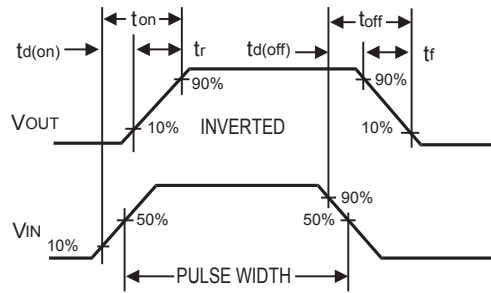
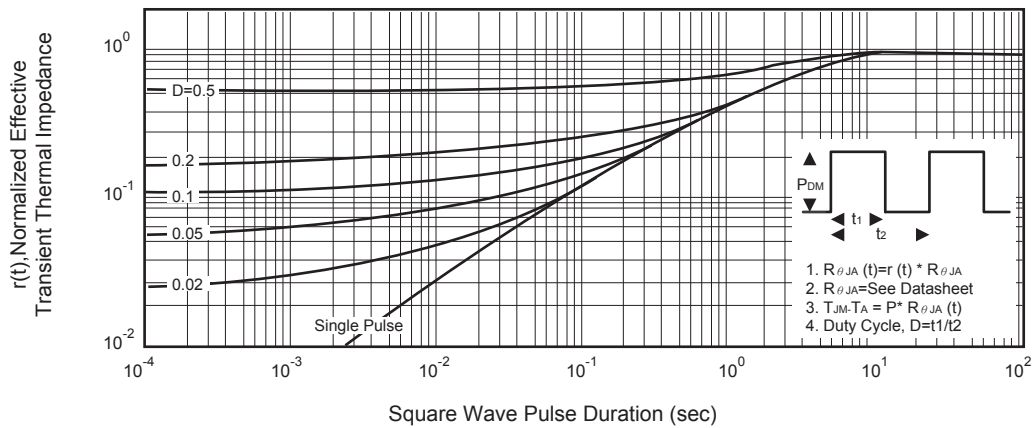
Note ⑤ : Guaranteed by design, not subject to production testing.

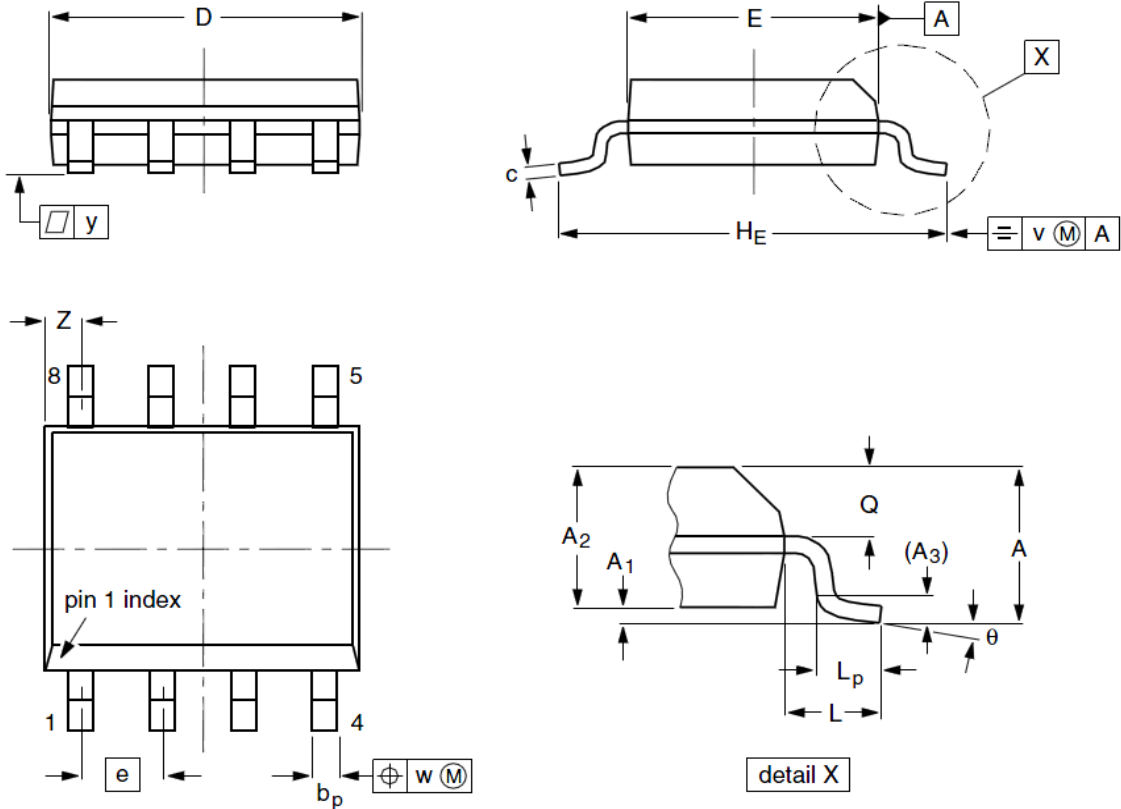
# N-Channel Enhancement Mode MOSFET

## Typical Characteristics


**Figure 1. Output Characteristics**

**Figure 2. Transfer Characteristics**

**Figure 3. Capacitance**

**Figure 4. On-Resistance Variation with Temperature**

**Figure 5. Gate Threshold Variation with Temperature**

**Figure 6. Body Diode Forward Voltage Variation with Source Current**

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**Figure 7. Gate Charge**

**Figure 8. Maximum Safe Operating Area**

**Figure 9. Switching Test Circuit**

**Figure 10. Switching Waveforms**

**Figure 11. Normalized Thermal Transient Impedance Curve**

**N-Channel Enhancement Mode MOSFET**
**SOP-8 Package Outline Data**


Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
<b>A</b>	1.35	1.55	1.75	<b>A<sub>1</sub></b>	0.10	0.18	0.25
<b>A<sub>2</sub></b>	1.25	1.45	1.65	<b>A<sub>3</sub></b>	--	0.25	--
<b>b<sub>p</sub></b>	0.36	0.42	0.51	<b>c</b>	0.19	0.22	0.25
<b>D</b>	4.70	4.92	5.10	<b>E</b>	3.80	3.90	4.00
<b>e</b>	--	1.27	--	<b>H<sub>E</sub></b>	5.80	6.00	6.20
<b>L</b>	--	1.05	--	<b>L<sub>p</sub></b>	0.40	0.68	1.00
<b>Q</b>	0.60	0.65	0.73	<b>v</b>	--	0.25	--
<b>w</b>	--	0.25	--	<b>y</b>	--	0.10	--
<b>Z</b>	0.30	0.50	0.70	<b>θ</b>	0°		8°