

## N-Channel Enhancement Mode Power MOSFET

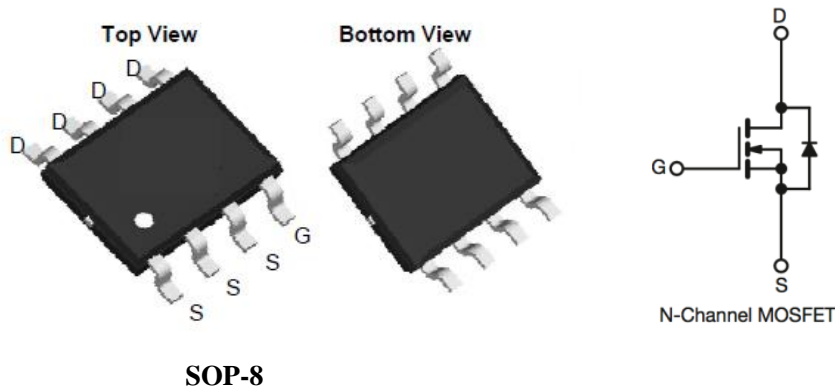
### ● Features

$V_{DS}$	$R_{DS(ON)TYP}$	$I_D$
30V	8 m $\Omega$ @10V	12A
	10 m $\Omega$ @4.5V	

### ● General Description

- load switch
- PWM applications

### ● Pin Configurations



### ● Absolute Maximum Ratings @ $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		$V_{DSS}$	30	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current (Continuous) *AC	$T_A=25^\circ\text{C}$	$I_D$	12	A
	$T_A=70^\circ\text{C}$		9	
Drain Current (Pulse) *B		$I_{DM}$	50	A
Power Dissipation	$T_A=25^\circ\text{C}$	$P_D$	2.5	W
Operating Temperature/ Storage Temperature		$T_J/T_{STG}$	-55~150	$^\circ\text{C}$

### ● Thermal Resistance Ratings

Parameter		Symbol	Maximum	Unit
Maximum Junction-to-Ambient	$t \leq 10\text{s}$	$R_{thJA}$	50	$^\circ\text{C/W}$

## Electrical Characteristics

$T_A=25^{\circ}\text{C}$  unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$	--	--	1	$\mu A$
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	1	1.6	2.5	V
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	--	--	$\pm 100$	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$	--	8	12	m $\Omega$
	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 8A$	--	10	14	m $\Omega$
Diode Forward Voltage	$V_{SD}$	$I_{SD} = 1A, V_{GS} = 0V$	--	--	1.2	V
Diode Forward Current *AC	$I_S$	$T_C = 25^{\circ}\text{C}$	--	--	12	A
<b>Switching</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 15V, I_D = 14A,$ $V_{GS} = 5V$	--	16	--	nC
Gate-Source Charge	$Q_{gs}$		--	5	--	nC
Gate-Drain Charge	$Q_{gd}$		--	3	--	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 1A,$ $V_{GS} = 10V, R_{GEN} = 6\Omega$	--	17	--	ns
Turn-on Rise Time	$t_r$		--	5	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	50	--	ns
Turn-Off Fall Time	$t_f$		--	10	--	ns
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1.0\text{MHz}$	--	2470	--	pF
Output Capacitance	$C_{oss}$		--	325	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	185	--	pF

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the  $t_s \leq 10\text{s}$  junction to ambient thermal resistance rating.

# Typical Electrical and Thermal Characteristics

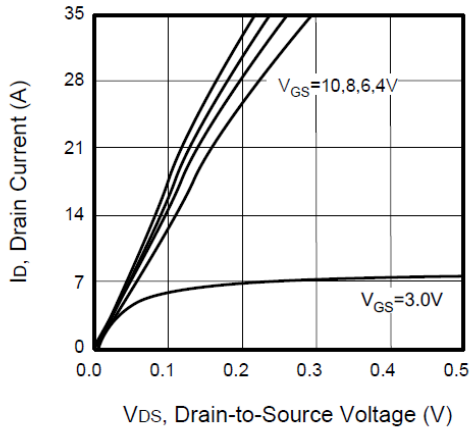


Figure 1. Output Characteristics

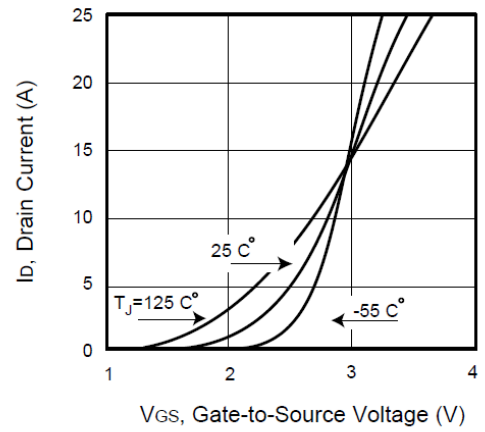


Figure 2. Transfer Characteristics

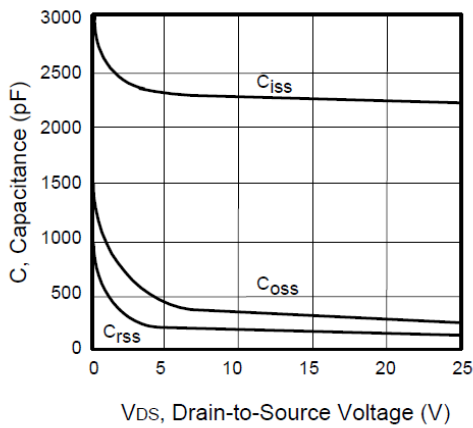


Figure 3. Capacitance

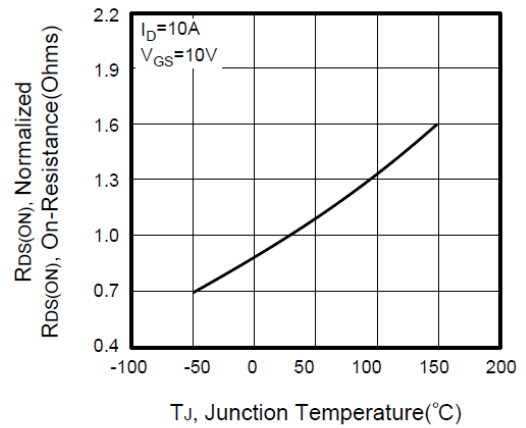


Figure 4. On-Resistance Variation with Temperature

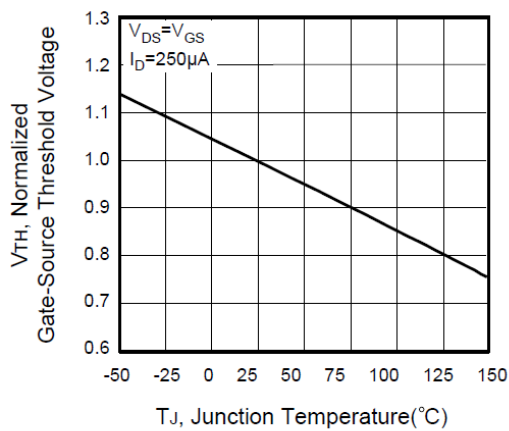


Figure 5. Gate Threshold Variation with Temperature

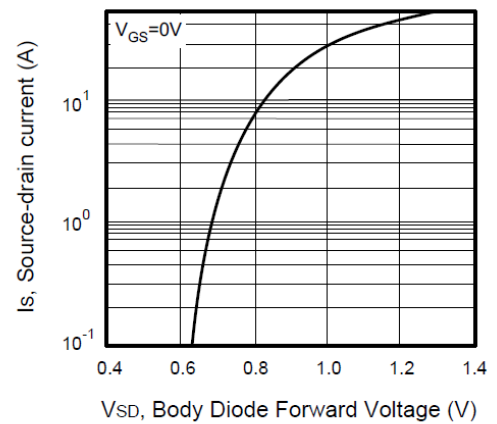


Figure 6. Body Diode Forward Voltage Variation with Source Current

# Typical Electrical and Thermal Characteristics

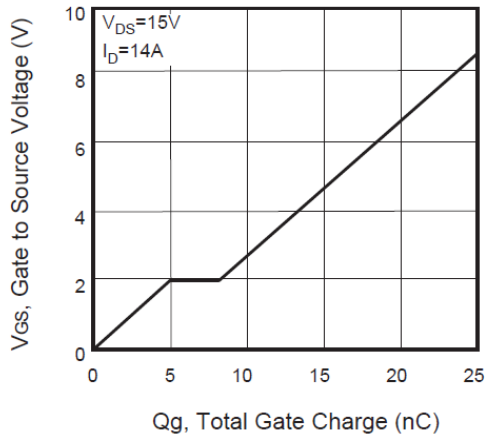


Figure 7. Gate Charge

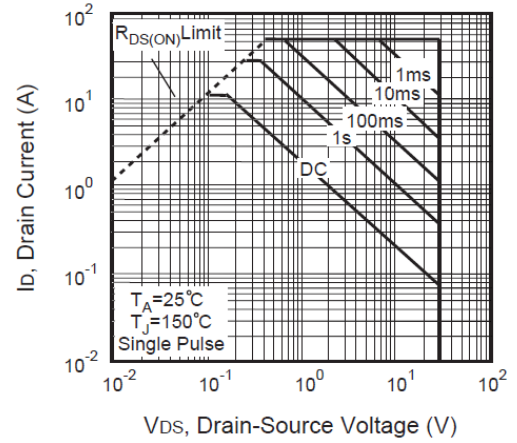


Figure 8. Maximum Safe Operating Area

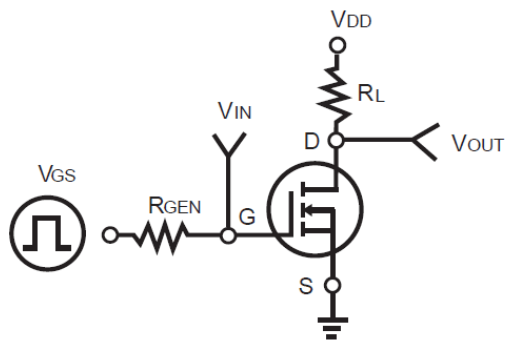


Figure 9. Switching Test Circuit

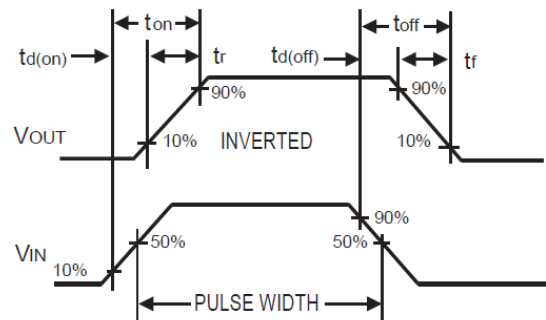


Figure 10. Switching Waveforms

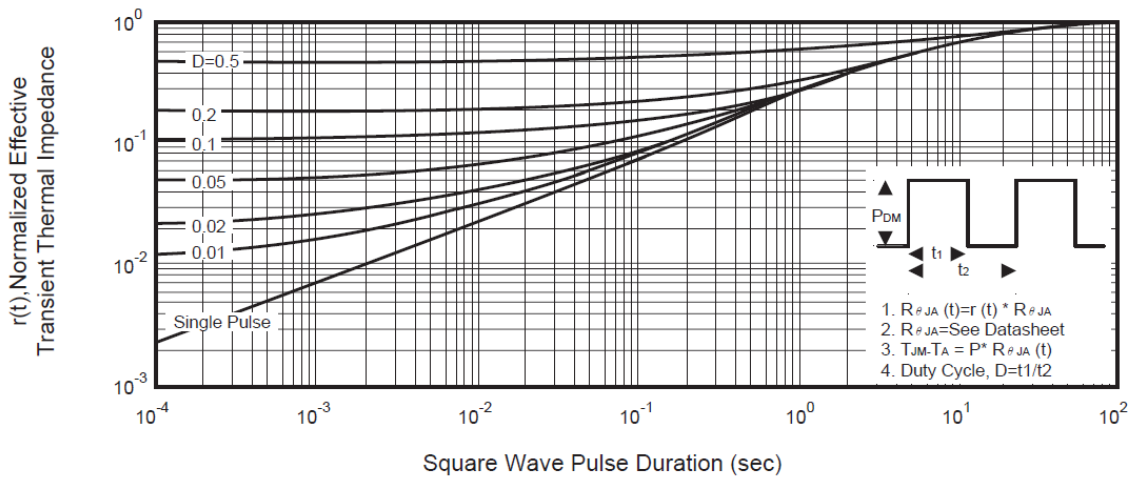
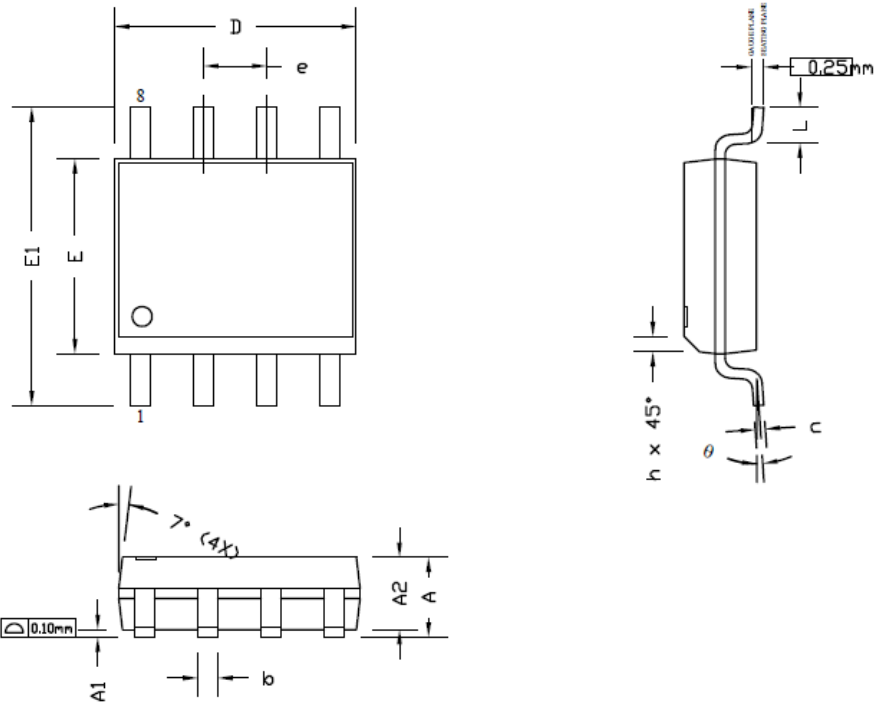


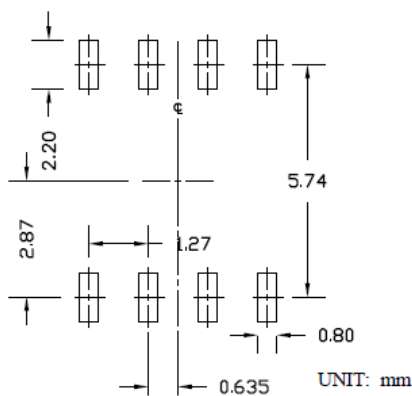
Figure 11. Normalized Thermal Transient Impedance Curve

# Package Information

## S08 PACKAGE OUTLINE



### RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	1.65	1.75	0.053	0.065	0.069
A1	0.10	0.15	0.25	0.004	0.006	0.010
A2	1.25	1.50	1.65	0.049	0.059	0.065
b	0.31	0.41	0.51	0.012	0.016	0.020
c	0.17	0.20	0.25	0.007	0.008	0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27 BSC			0.050 BSC		
E1	5.80	6.00	6.20	0.228	0.236	0.244
h	0.25	0.30	0.50	0.010	0.012	0.020
L	0.40	0.69	1.27	0.016	0.027	0.050
θ	0°	4°	8°	0°	4°	8°

#### NOTE

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.  
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
4. DIMENSION L IS MEASURED IN GAUGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER.  
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.