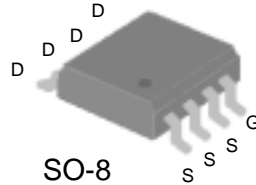


## N-CHANNEL ENHANCEMENT-MODE POWER MOSFET

Low on-resistance  
Fast switching, planar construction  
Simple drive requirement

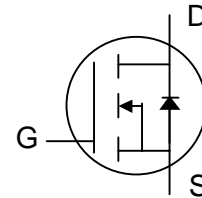


$BV_{DSS}$  30V  
 $R_{DS(ON)}$  9m $\Omega$   
 $I_D$  13A

### Description

Power MOSFETs from Silicon Standard provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SO-8 package is widely preferred for commercial and industrial surface mount applications and the SSM4880AGM is well suited for for low-voltage applications such as DC/DC converters.



 **Pb-free lead finish (second-level interconnect)**

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_A=25^\circ\text{C}$	Continuous Drain Current <sup>3</sup>	13	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Drain Current <sup>3</sup>	10	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	50	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/ $^\circ\text{C}$
$E_{AS}$	Single Pulse Avalanche Energy <sup>4</sup>	266	mJ
$I_{AR}$	Avalanche Current	7.3	A
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### Thermal Data

Symbol	Parameter	Value	Unit
Rthj-a	Thermal Resistance Junction-ambient <sup>3</sup> Max.	50	$^\circ\text{C}/\text{W}$

**Electrical Characteristics @  $T_j=25^\circ\text{C}$  (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	-	0.037	-	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=13A$	-	-	9	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=10A$	-	-	15	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=15V, I_D=10A$	-	20	-	S
$I_{DSS}$	Drain-Source Leakage Current ( $T_j=25^\circ\text{C}$ )	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
	Drain-Source Leakage Current ( $T_j=55^\circ\text{C}$ )	$V_{DS}=24V, V_{GS}=0V$	-	-	25	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>2</sup>	$I_D=13A$	-	22.5	-	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=15V$	-	3.3	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=5V$	-	15.4	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=15V$	-	9	-	ns
$t_r$	Rise Time	$I_D=1A$	-	16	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=6.2\Omega, V_{GS}=10V$	-	25	-	ns
$t_f$	Fall Time	$R_D=15\Omega$	-	50	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	813	-	pF
$C_{oss}$	Output Capacitance	$V_{DS}=25V$	-	516	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	224	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_S$	Continuous Source Current ( Body Diode )	$V_D=V_G=0V, V_S=1.3V$	-	-	2.3	A
$I_{SM}$	Pulsed Source Current ( Body Diode ) <sup>1</sup>		-	-	50	A
$V_{SD}$	Forward On Voltage <sup>2</sup>	$T_j=25^\circ\text{C}, I_S=2.3A, V_{GS}=0V$	-	-	1.3	V

**Notes:**

1. Pulse width limited by safe operating area.
2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board ;  $125^\circ\text{C/W}$  when mounted on min. copper pad.
4. Starting  $T_j=25^\circ\text{C}$ ,  $V_{DD}=25V$ ,  $L=10\text{mH}$ ,  $R_G=25\Omega$

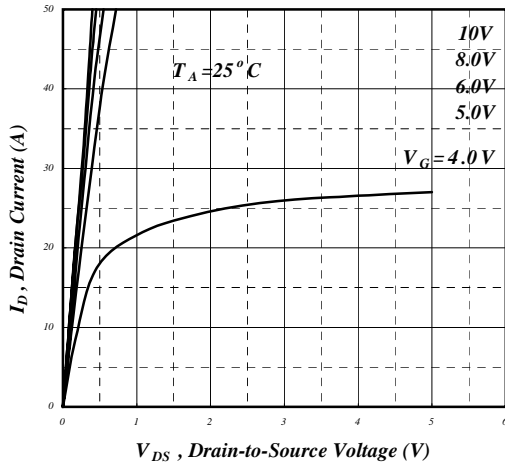


Fig 1. Typical Output Characteristics

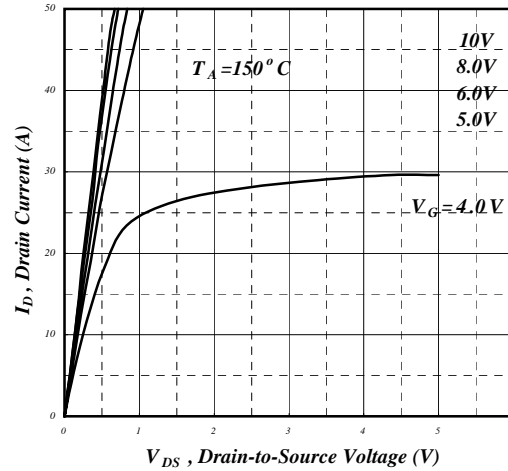


Fig 2. Typical Output Characteristics

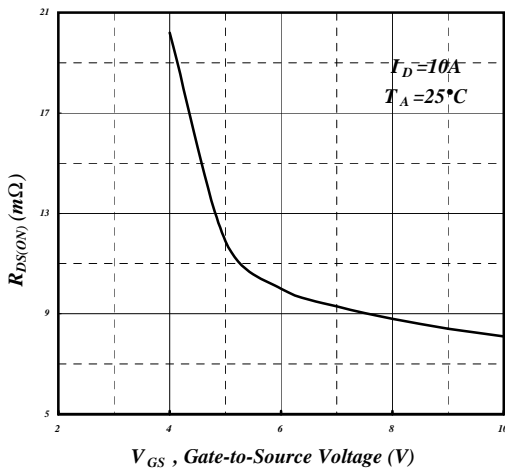


Fig 3. On-Resistance vs. Gate Voltage

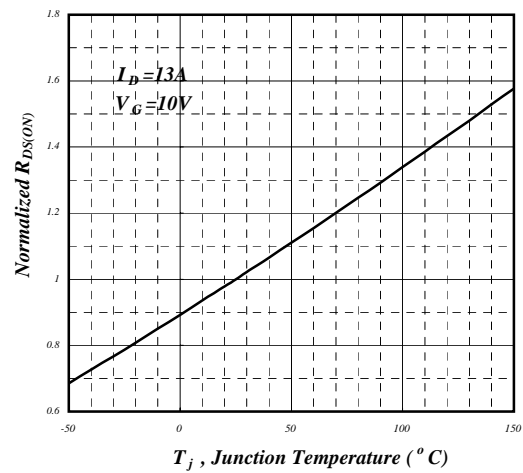


Fig 4. Normalized On-Resistance vs. Junction Temperature

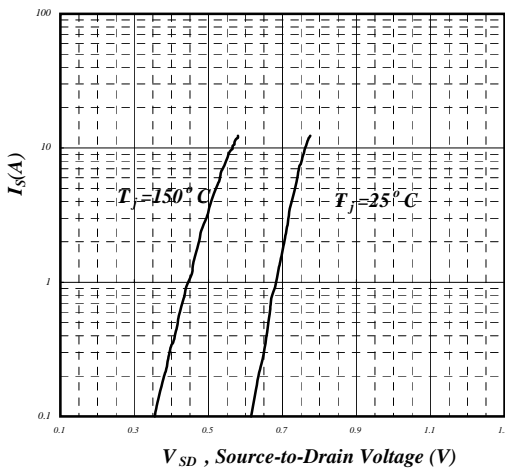


Fig 5. Forward Characteristic of Reverse Diode

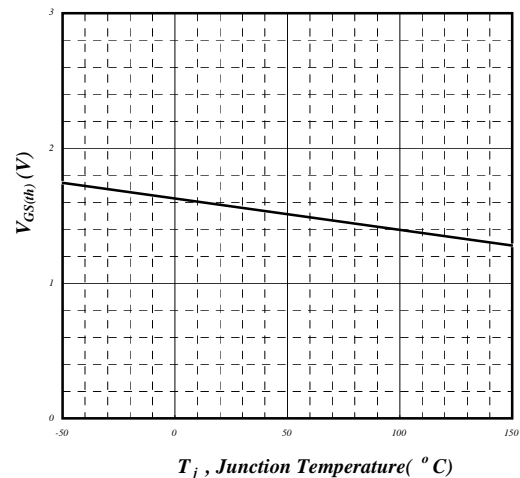


Fig 6. Gate Threshold Voltage vs. Junction Temperature

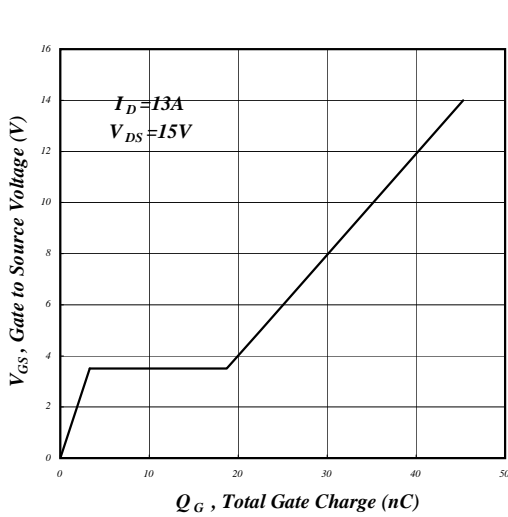


Fig 7. Gate Charge Characteristics

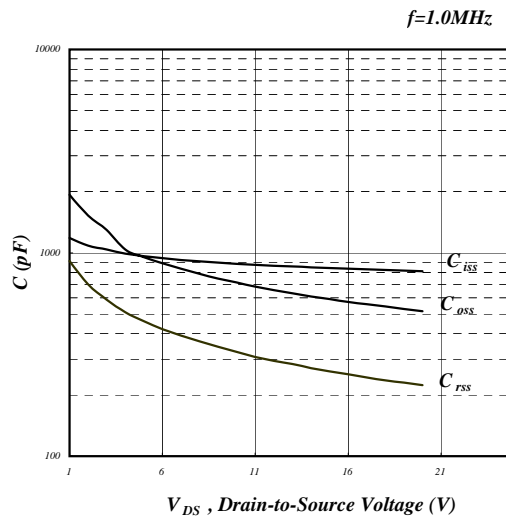


Fig 8. Typical Capacitance Characteristics

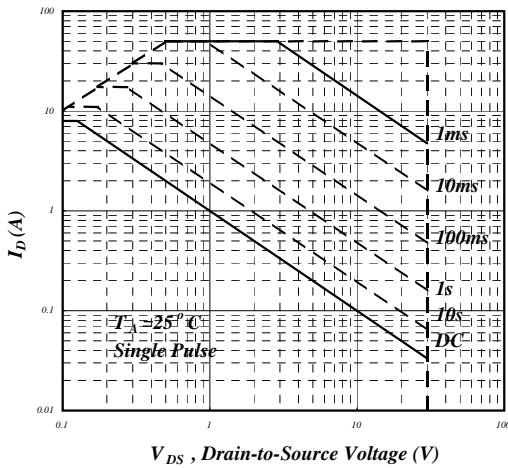


Fig 9. Maximum Safe Operating Area

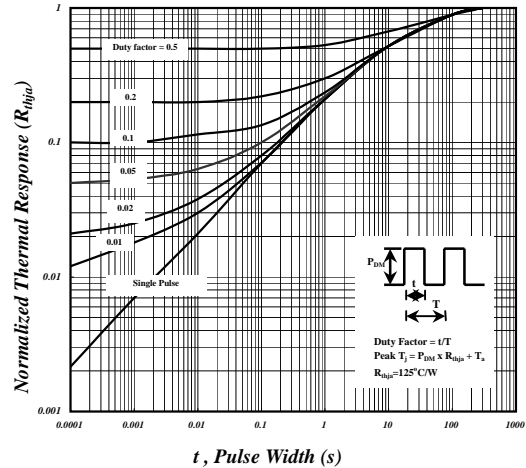


Fig 10. Effective Transient Thermal Impedance

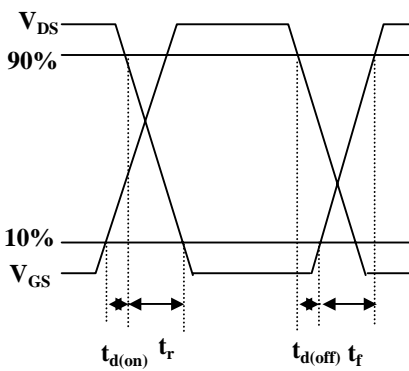


Fig 11. Switching Time Waveform

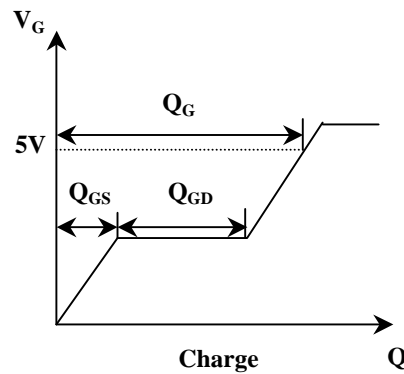


Fig 12. Gate Charge Waveform

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