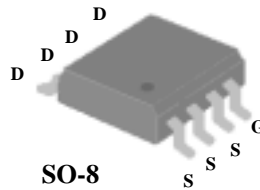


## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

Low on-resistance  
Fast switching  
Simple drive requirement

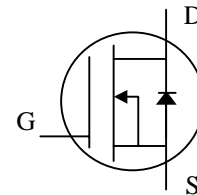


$BV_{DSS}$  30V  
 $R_{DS(ON)}$  13.5mΩ  
 $I_D$  10A

### 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 well suited for low voltage applications such as DC/DC converters.



### 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>	10	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Drain Current <sup>3</sup>	8	A
$I_{DM}$	Pulsed Drain Current <sup>1,2</sup>	50	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Data

Symbol	Parameter	Value	Unit
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max. 50	°C/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	$V_{GS}=10V, I_D=10A$	-	-	13.5	$m\Omega$
		$V_{GS}=4.5V, I_D=5A$	-	-	22	$m\Omega$
$V_{GS(th)}$	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>	$I_D=10A$	-	16.6	-	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=15V$	-	2.7	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=5V$	-	10.6	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=25V$	-	9.6	-	ns
$t_r$	Rise Time	$I_D=1A$	-	12.4	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega, V_{GS}=5V$	-	25.4	-	ns
$t_f$	Fall Time	$R_D=25\Omega$	-	33	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	745	-	pF
$C_{oss}$	Output Capacitance	$V_{DS}=15V$	-	510	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	210	-	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 Max. junction temperature.
- 2.Pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
- 3.Surface mounted on FR4 board,  $t \leq 10$  sec.

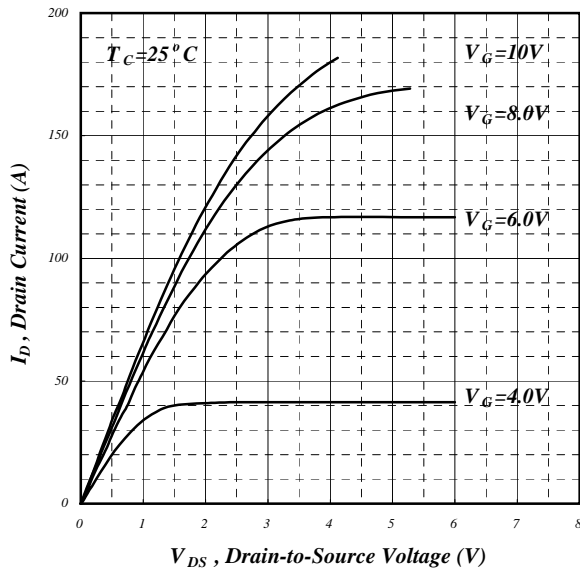


Fig 1. Typical Output Characteristics

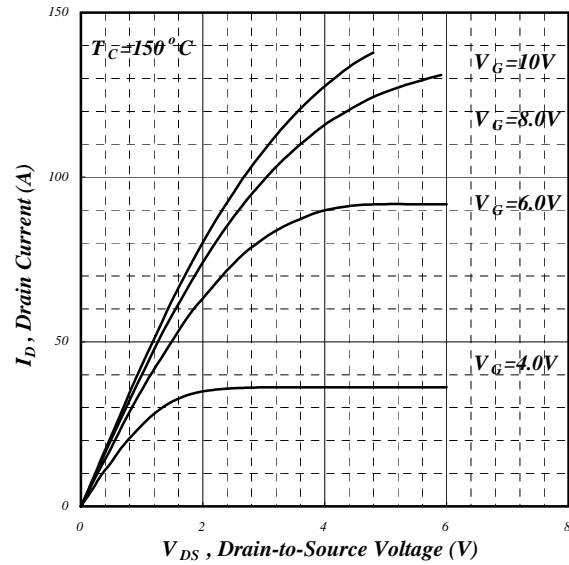


Fig 2. Typical Output Characteristics

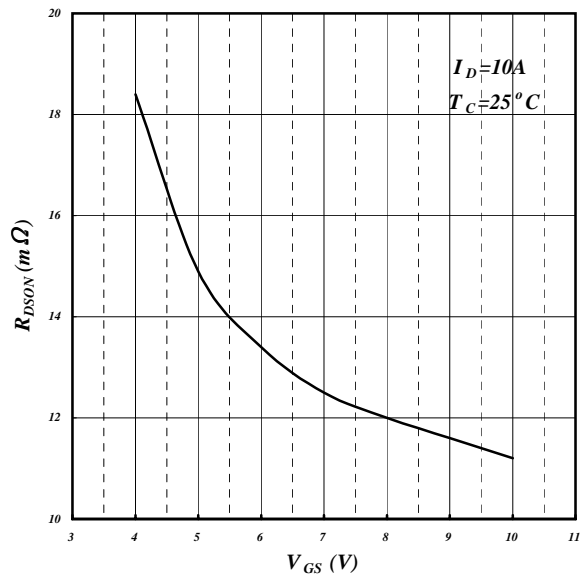


Fig 3. On-Resistance v.s. Gate Voltage

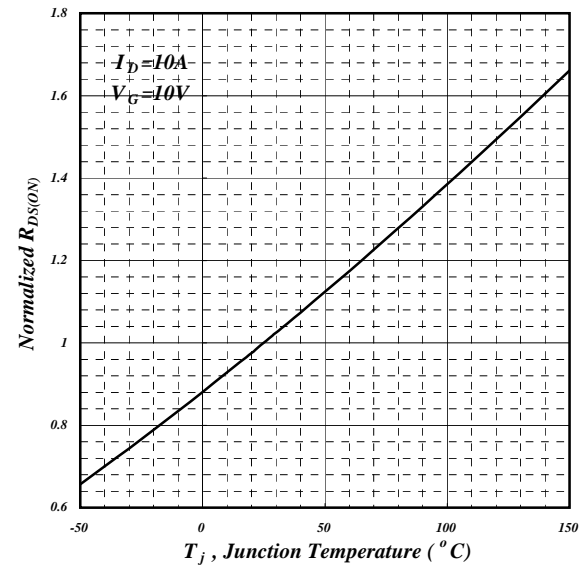


Fig 4. Normalized On-Resistance vs. Junction Temperature

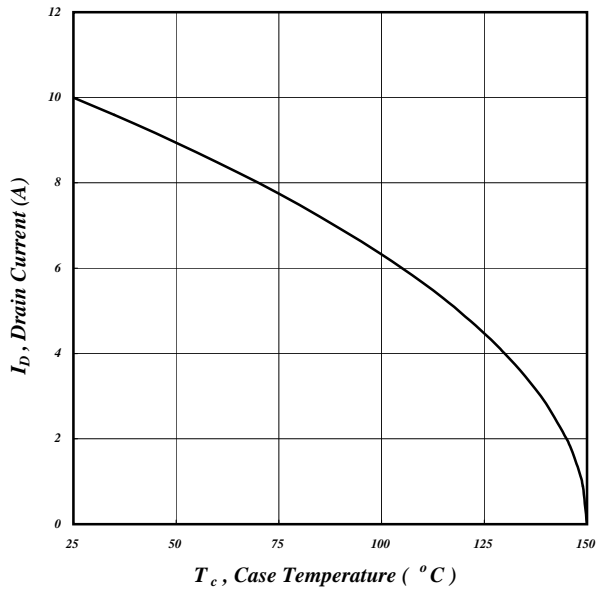


Fig 5. Maximum Drain Current v.s. Case Temperature

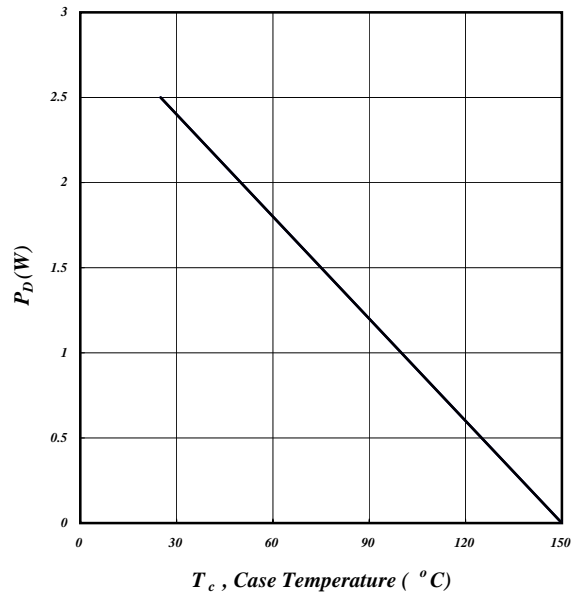


Fig 6. Typical Power Dissipation

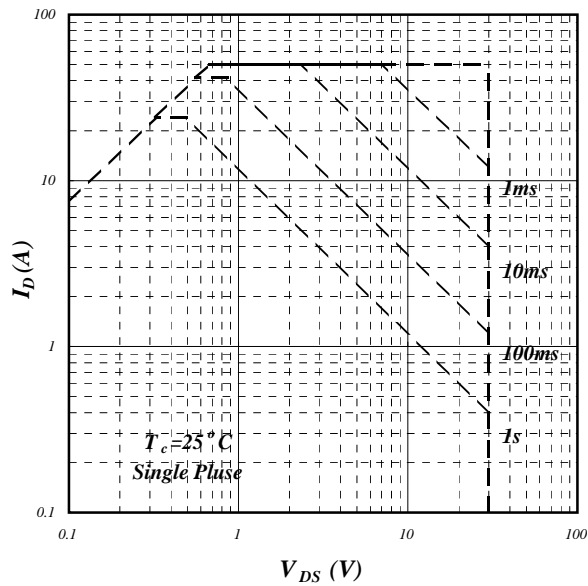


Fig 7. Maximum Safe Operating Area

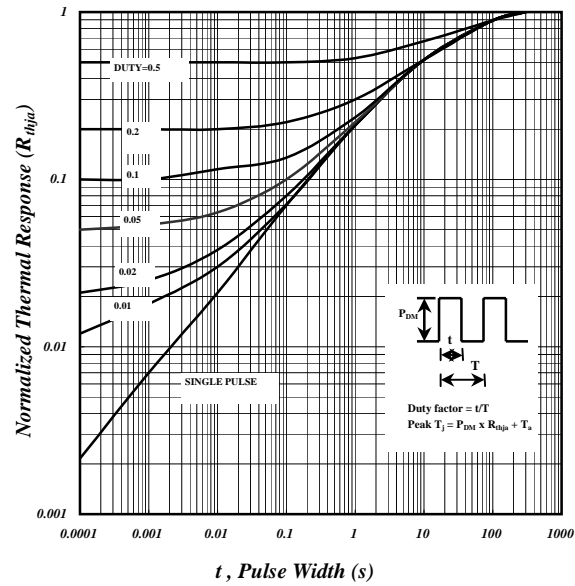


Fig 8. Effective Transient Thermal Impedance

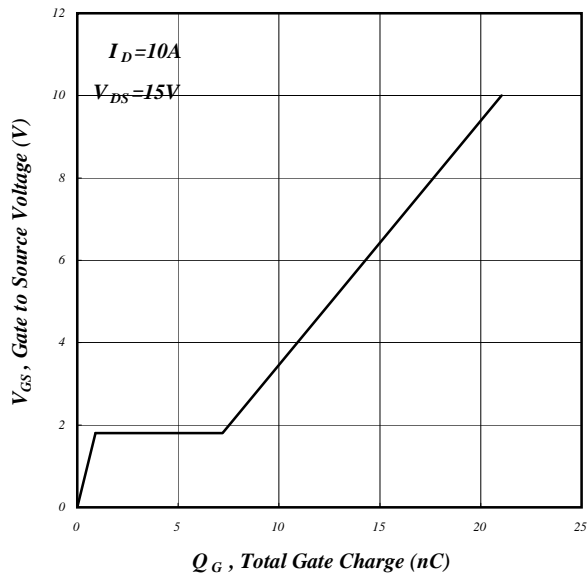


Fig 9. Gate Charge Characteristics

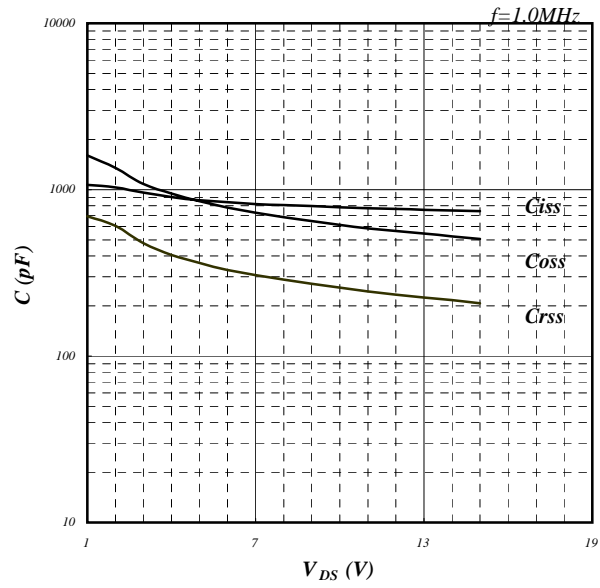


Fig 10. Typical Capacitance Characteristics

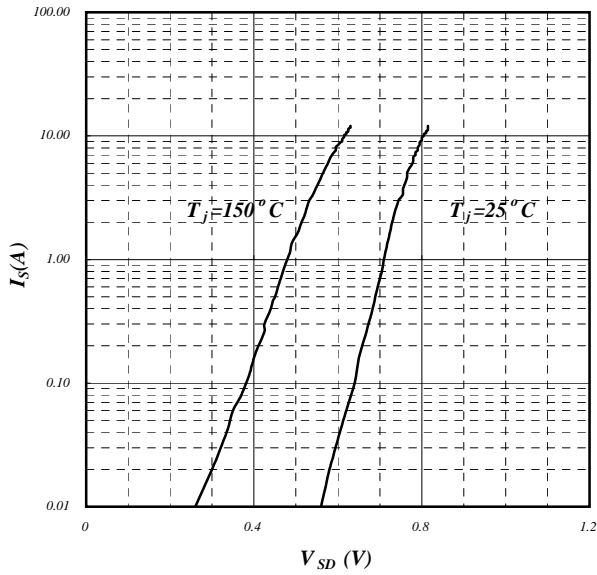


Fig 11. Forward Characteristic of Reverse Diode

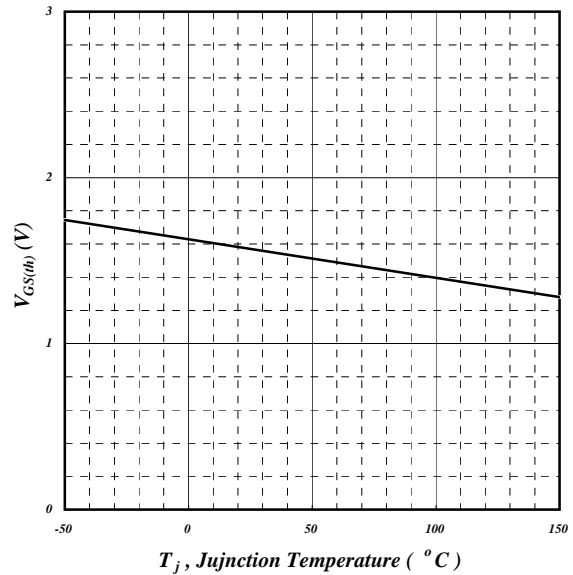


Fig 12. Gate Threshold Voltage vs. Junction Temperature

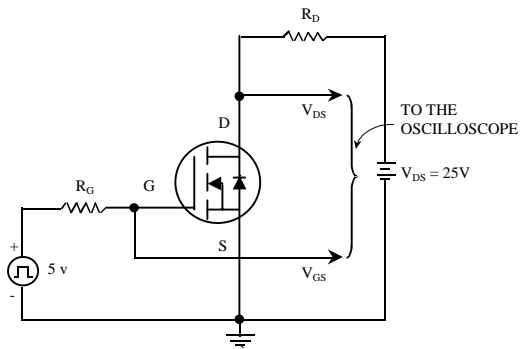


Fig 13. Switching Time Circuit

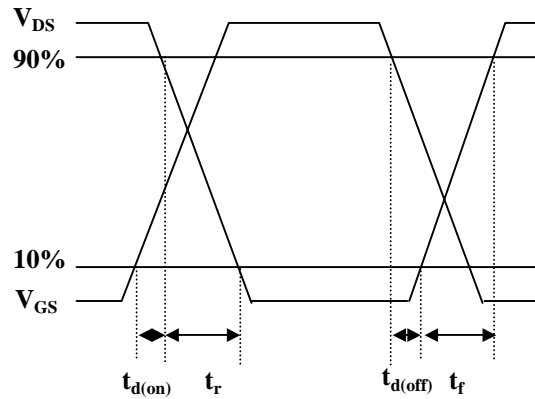


Fig 14. Switching Time Waveform

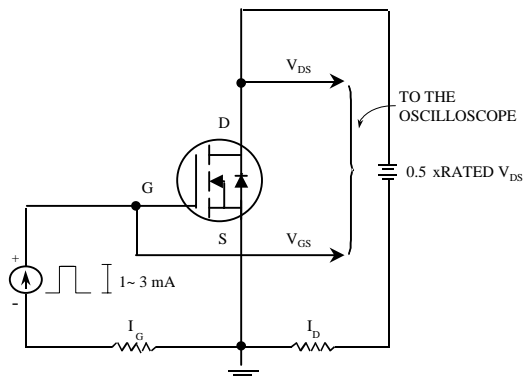


Fig 15. Gate Charge Circuit

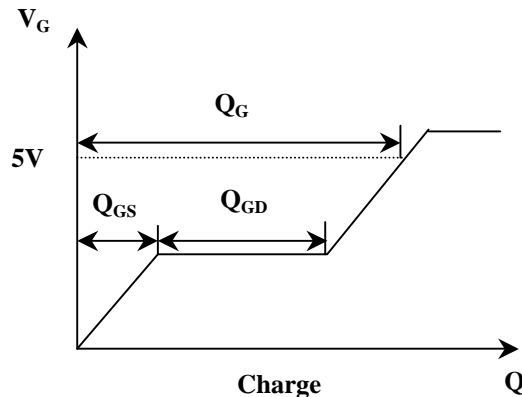


Fig 16. Gate Charge Waveform

Information furnished by Silicon Standard Corporation is believed to be accurate and reliable. However, Silicon Standard Corporation makes no guarantee or warranty, express or implied, as to the reliability, accuracy, timeliness or completeness of such information and assumes no responsibility for its use, or for infringement of any patent or other intellectual property rights of third parties that may result from its use. Silicon Standard reserves the right to make changes as it deems necessary to any products described herein for any reason, including without limitation enhancement in reliability, functionality or design. No license is granted, whether expressly or by implication, in relation to the use of any products described herein or to the use of any information provided herein, under any patent or other intellectual property rights of Silicon Standard Corporation or any third parties.