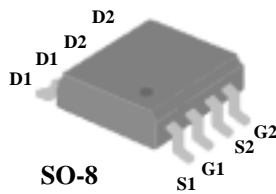


## N-CHANNEL ENHANCEMENT-MODE POWER MOSFET

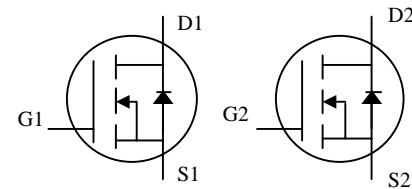
- Simple Drive Requirement
- Low On-resistance
- Fast Switching



$BV_{DSS}$	25V
$R_{DS(ON)}$	25m $\Omega$
$I_D$	7A

### 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 all commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	25	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current <sup>3</sup>	7	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current <sup>3</sup>	5.7	A
$I_{DM}$	Pulsed Drain Current <sup>1,4</sup>	20	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation	2	W
	Linear Derating Factor	0.016	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

### Thermal Data

Symbol	Parameter	Value	Unit
Rthj-amb	Thermal Resistance Junction-ambient	Max. 62.5	$^\circ C/W$

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

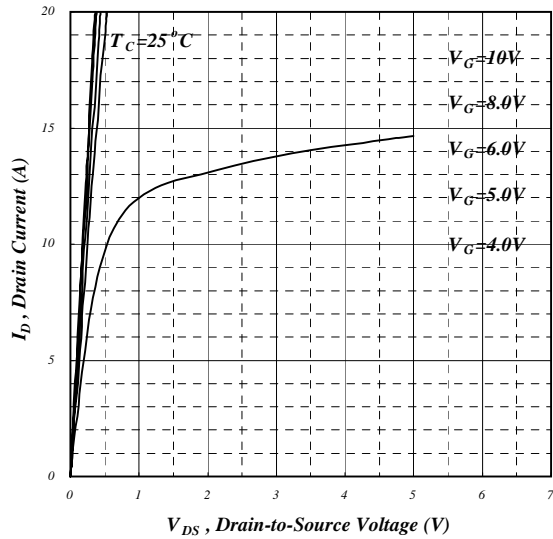
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	25	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	-	0.037	-	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=7A$	-	-	25	m $\Omega$
		$V_{GS}=4.5V, I_D=5.2A$	-	-	35	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=7A$	-	14	-	S
$I_{DSS}$	Drain-Source Leakage Current ( $T_j=25^\circ\text{C}$ )	$V_{DS}=25V, V_{GS}=0V$	-	-	1	$\mu A$
	Drain-Source Leakage Current ( $T_j=55^\circ\text{C}$ )	$V_{DS}=20V, V_{GS}=0V$	-	-	25	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>2</sup>	$I_D=7A$	-	10.5	-	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=15V$	-	1.9	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=4.5V$	-	7.5	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=15V$	-	8	-	ns
$t_r$	Rise Time	$I_D=1A$	-	9.5	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=6\Omega, V_{GS}=10V$	-	25	-	ns
$t_f$	Fall Time	$R_D=15\Omega$	-	13.5	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	395	-	pF
$C_{oss}$	Output Capacitance	$V_{DS}=25V$	-	260	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	105	-	pF

**Source-Drain Diode**

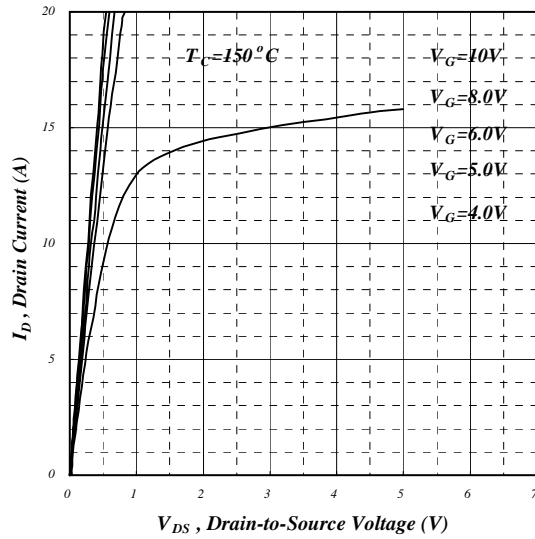
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_S$	Continuous Source Current ( Body Diode )	$V_D=V_G=0V, V_S=1.2V$	-	-	2.1	A
$I_{SM}$	Pulsed Source Current ( Body Diode ) <sup>1</sup>		-	-	20	A
$V_{SD}$	Forward On Voltage <sup>2</sup>	$T_j=25^\circ\text{C}, I_S=2.1A, V_{GS}=0V$	-	0.8	1.2	V

**Notes:**

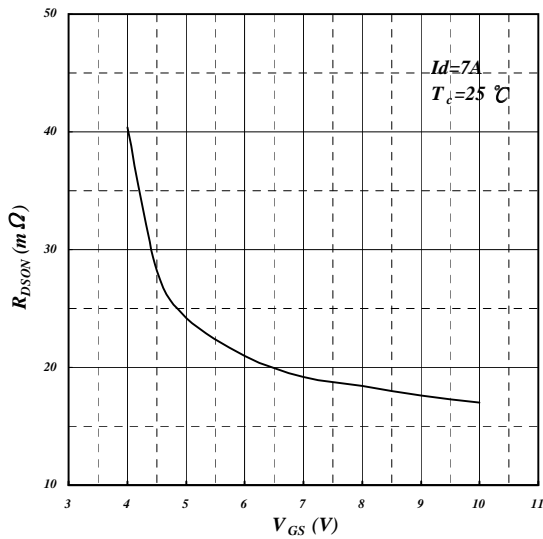
1. Pulse width limited by Max. junction temperature.
2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. Surface mounted on FR4 board,  $t \leq 10\text{sec}$ .
4. Pulse width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .



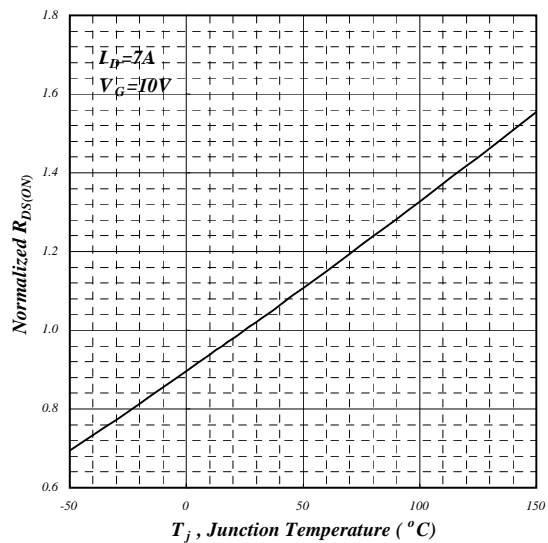
**Fig 1. Typical Output Characteristics**



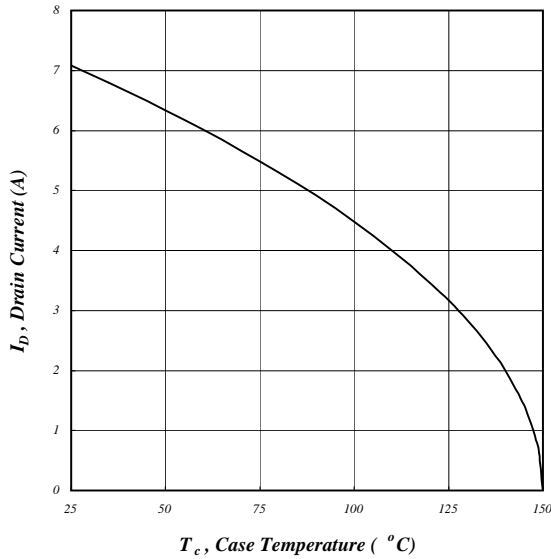
**Fig 2. Typical Output Characteristics**



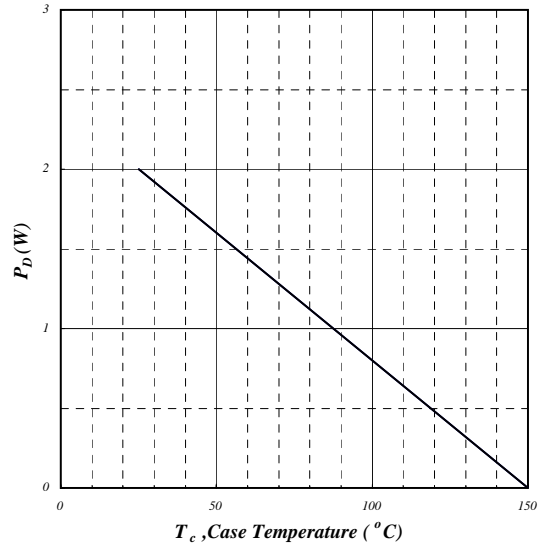
**Fig 3. On-Resistance v.s. Gate Voltage**



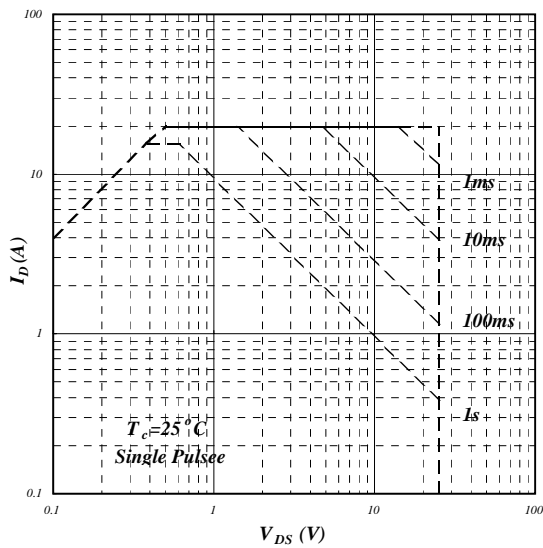
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



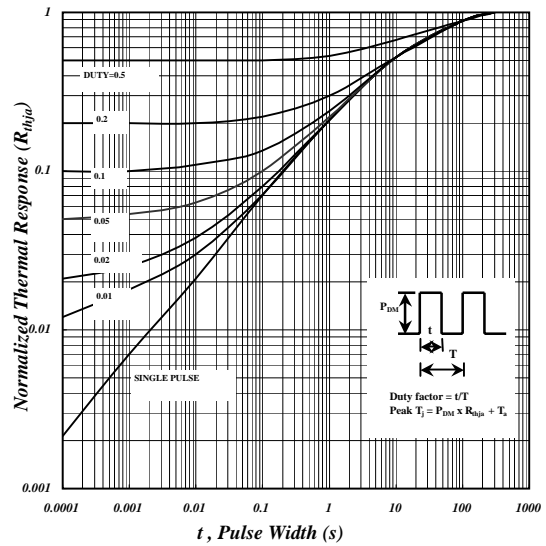
**Fig 5. Maximum Drain Current v.s. Case Temperature**



**Fig 6. Typical Power Dissipation**



**Fig 7. Maximum Safe Operating Area**



**Fig 8. Effective Transient Thermal Impedance**

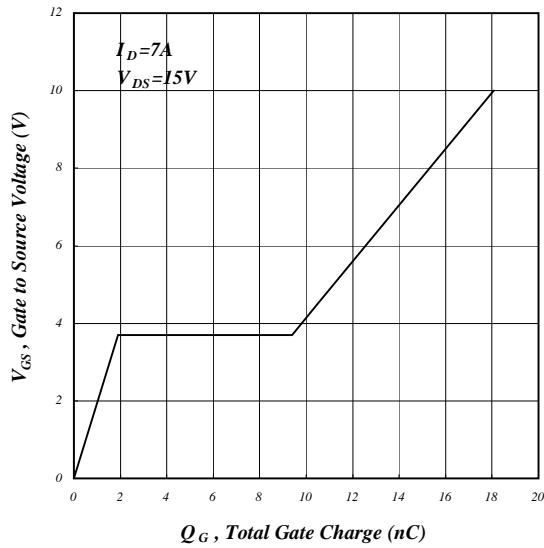


Fig 9. Gate Charge Characteristics

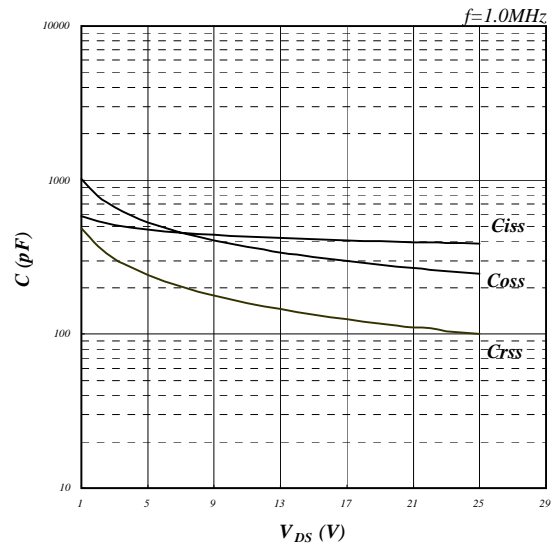


Fig 10. Typical Capacitance Characteristics

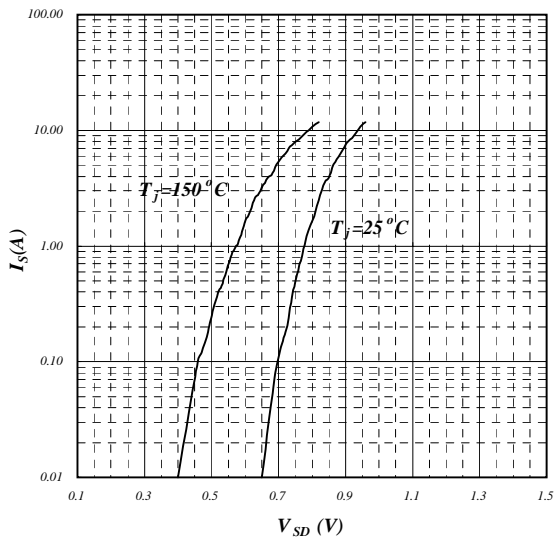


Fig 11. Forward Characteristic of Reverse Diode

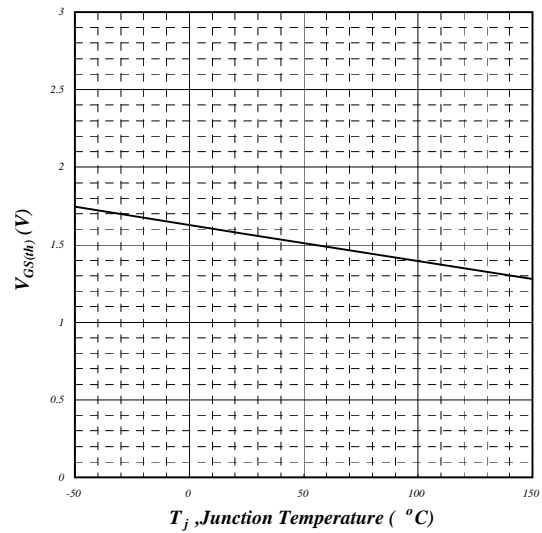
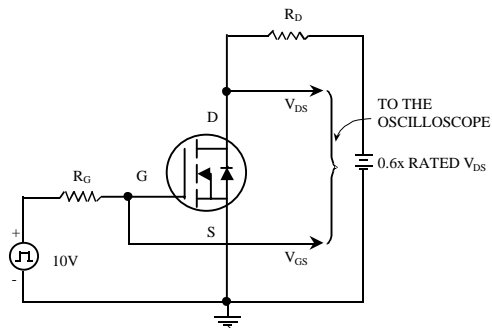
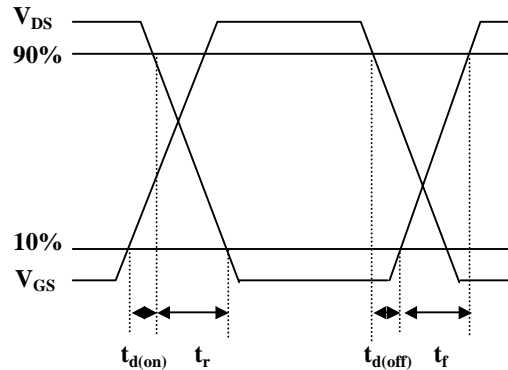
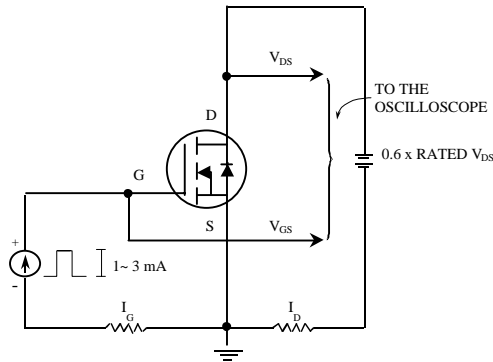
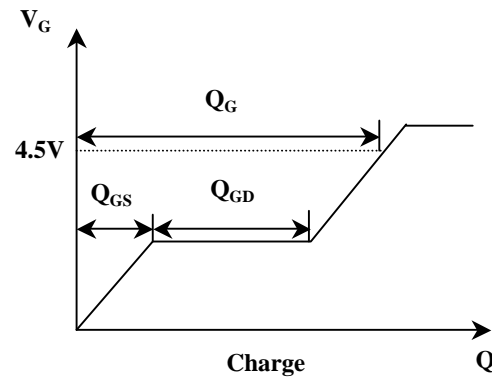


Fig 12. Gate Threshold Voltage v.s. Junction Temperature


**Fig 13. Switching Time Circuit**

**Fig 14. Switching Time Waveform**

**Fig 15. Gate Charge Circuit**

**Fig 16. Gate Charge Waveform**

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