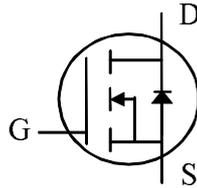


## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

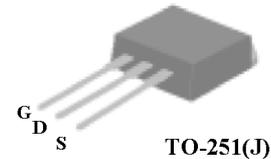
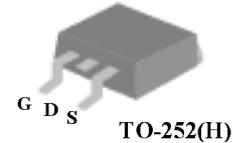
Low Gate Charge  
Simple Drive Requirement  
Fast Switching



$BV_{DSS}$  25V  
 $R_{DS(ON)}$  6m $\Omega$   
 $I_D$  85A

### Description

The SSM85L02H is in the TO-252 package, which is widely preferred for commercial and industrial surface mount applications, and is well suited for low-voltage applications such as DC/DC converters. The TO-251 through-hole version (SSM85L02J) is available for low-footprint applications.



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	25	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	85	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	53	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	310	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	96	W
	Linear Derating Factor	0.77	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-case	Thermal Resistance Junction-case	Max. 1.3	$^\circ C/W$
Rthj-amb	Thermal Resistance Junction-ambient	Max. 110	$^\circ C/W$

**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	-	$\text{V}/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=40A$	-	-	6	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=20A$	-	-	10	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	3	V
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=40A$	-	45	-	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 ( $T_j=150^\circ\text{C}$ )	$V_{DS}=20V, V_{GS}=0V$	-	-	25	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>2</sup>	$I_D=40A$	-	49		nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=20V$	-	5		nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=5V$	-	36.5		nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=15V$	-	12	-	ns
$t_r$	Rise Time	$I_D=25A$	-	85	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega, V_{GS}=10V$	-	35	-	ns
$t_f$	Fall Time	$R_D=0.6\Omega$	-	110	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	1510	-	pF
$C_{oss}$	Output Capacitance	$V_{DS}=25V$	-	950	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	450	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_S$	Continuous Source Current ( Body Diode )	$V_D=V_G=0V, V_S=1.26V$	-	-	85	A
$I_{SM}$	Pulsed Source Current ( Body Diode ) <sup>1</sup>		-	-	310	A
$V_{SD}$	Forward On Voltage <sup>2</sup>	$T_j=25^\circ\text{C}, I_S=85A, V_{GS}=0V$	-	-	1.26	V

**Notes:**

1. Pulse width limited by safe operating area.

2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

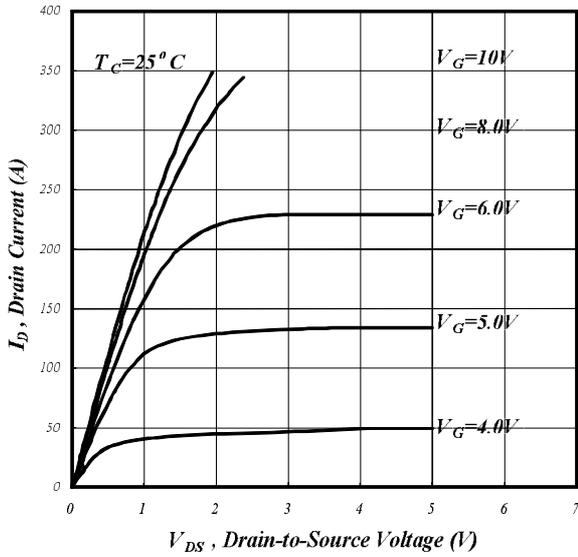


Fig 1. Typical Output Characteristics

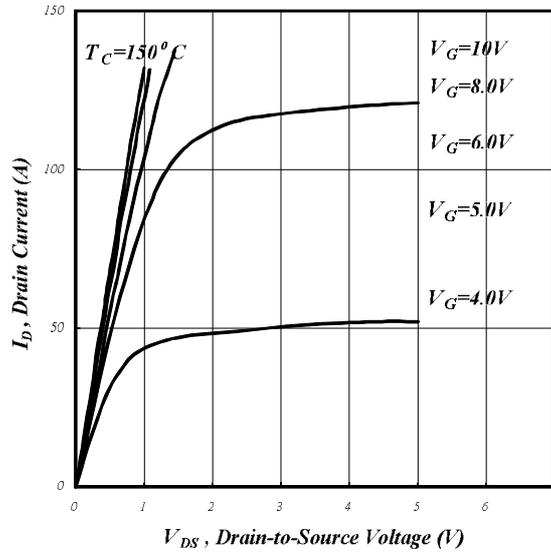


Fig 2. Typical Output Characteristics

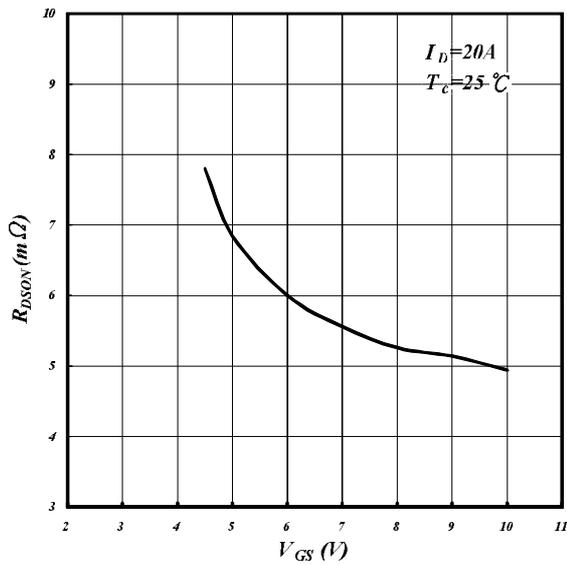


Fig 3. On-Resistance v.s. Gate Voltage

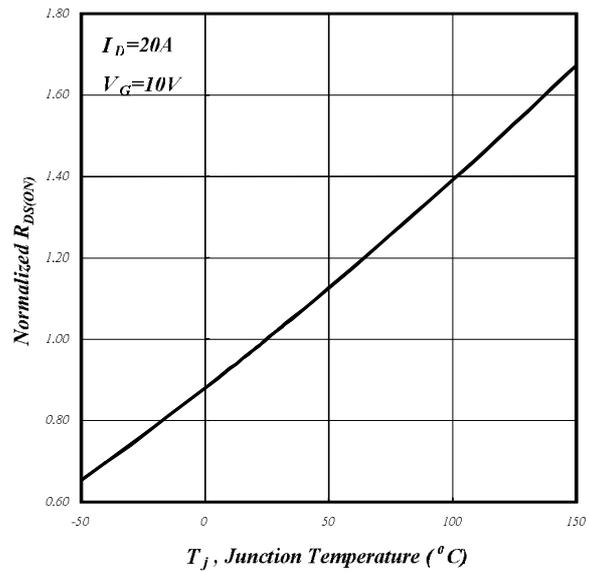


Fig 4. Normalized On-Resistance v.s. Junction Temperature

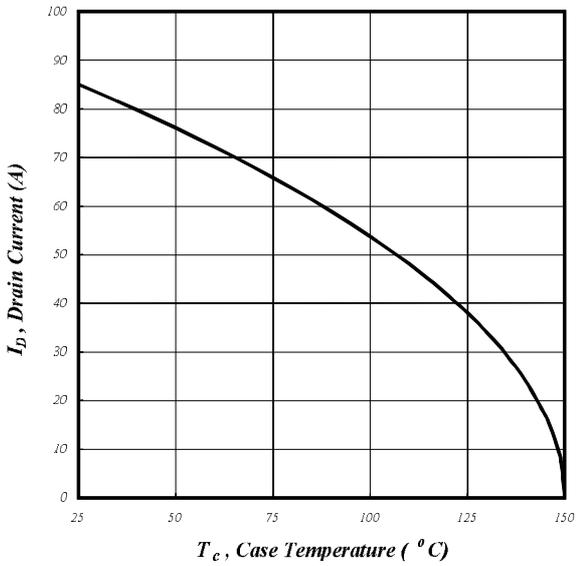


Fig 5. Maximum Drain Current v.s. Case Temperature

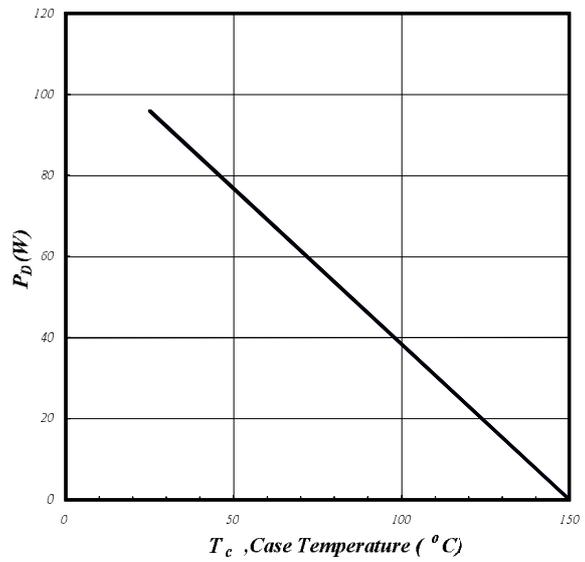


Fig 6. Typical Power Dissipation

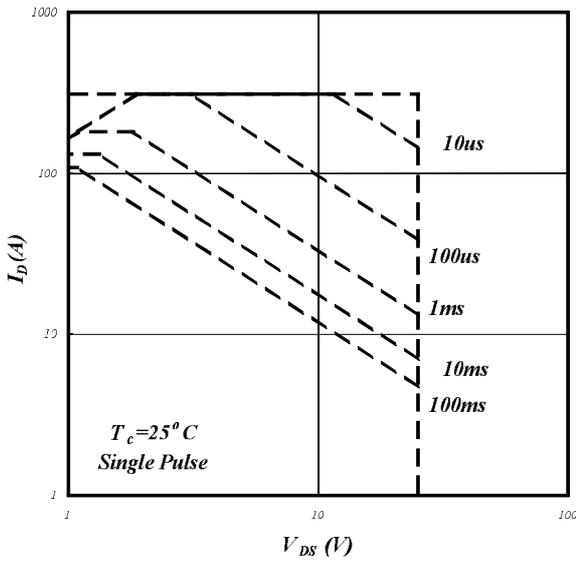


Fig 7. Maximum Safe Operating Area

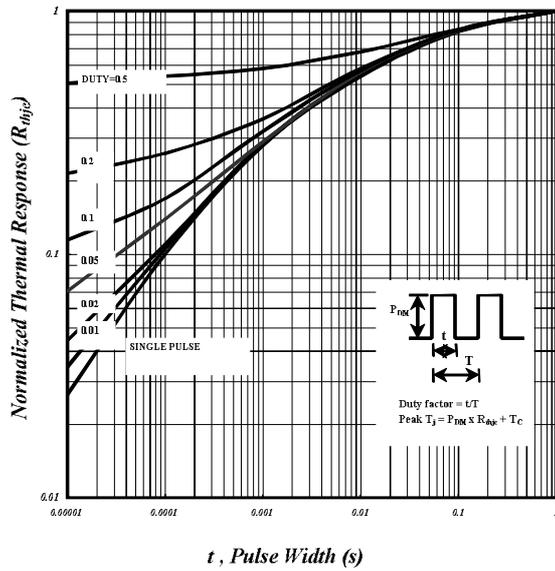


Fig 8. Effective Transient Thermal Impedance

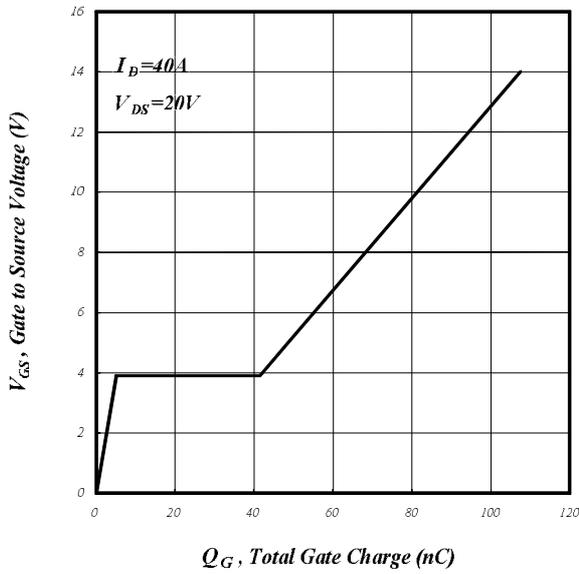


Fig 9. Gate Charge Characteristics

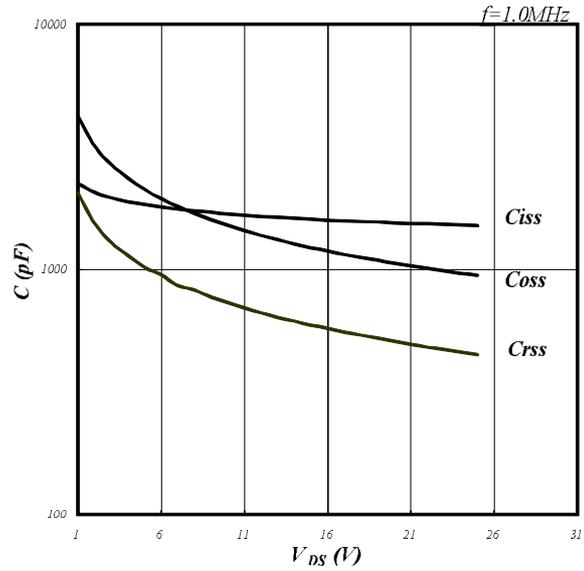


Fig 10. Typical Capacitance Characteristics

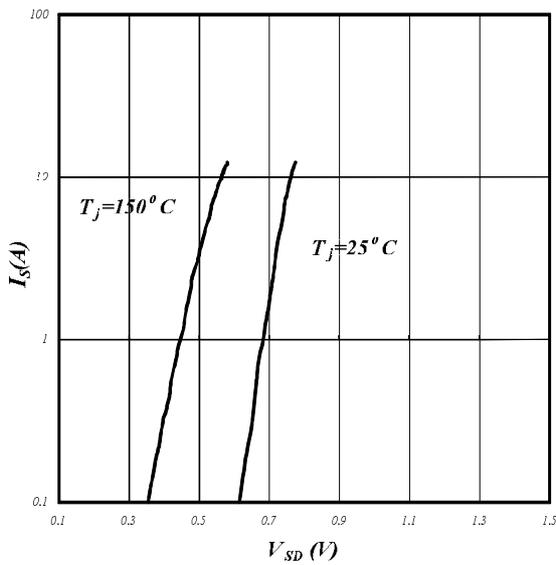


Fig 11. Forward Characteristic of Reverse Diode

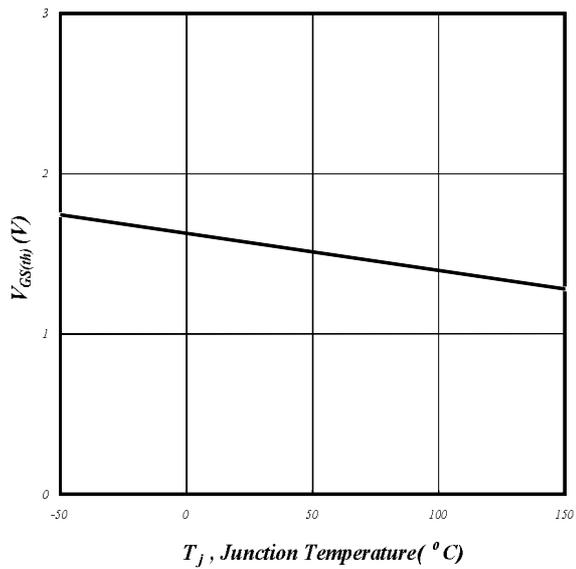
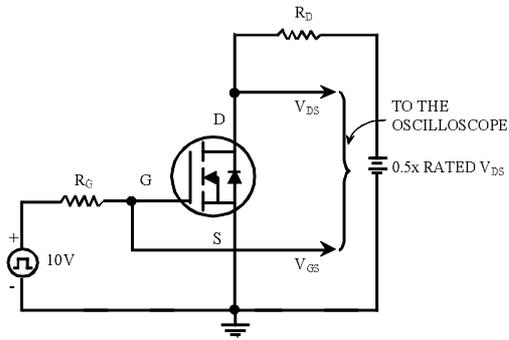
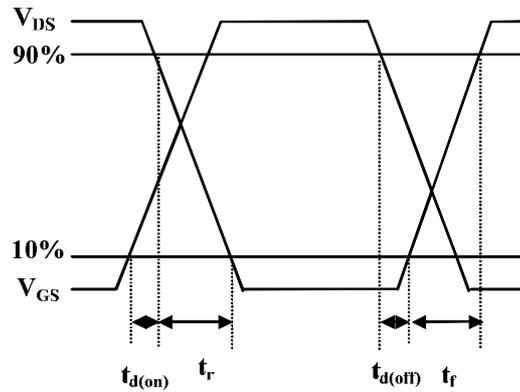
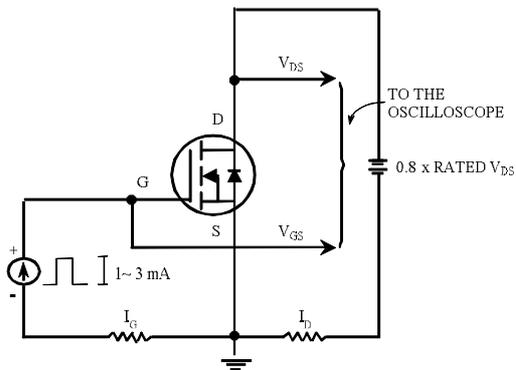
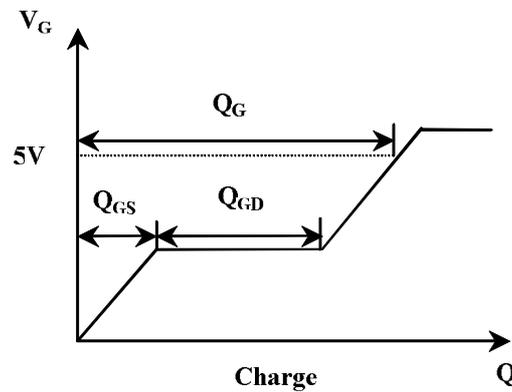


Fig 12. Gate Threshold Voltage v.s. Junction Temperature


**Fig 13. Switching Time Circuit**

**Fig 14. Switching Time Waveform**

**Fig 15. Gate Charge Circuit**

**Fig 16. Gate Charge Waveform**

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