美浦森半导体
M s e m i t e k

Halogen Free

RoHS LEAD FREE

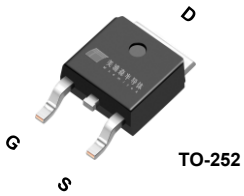
SLD3091T
30V N-Channel MOSFET

General Description

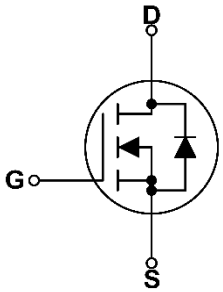
This Power MOSFET is produced using Msemitek's advanced TRENCH technology.
This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- 89A, 30V, $R_{DS(on)typ}$ = 3.5mΩ@V_{GS} = 10 V
  $R_{DS(on)typ}$ = 5.5mΩ@V_{GS} = 4.5V
- Low gate charge
- Low Crss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



TO-252



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter	SLD3091T	Units
V_{DSS}	Drain-Source Voltage	30	V
I_D	Drain Current [1] - Continuous (T_C = 25℃)	89	A
	- Continuous (T_C = 100℃)	56	A
I_{DM}	Drain Current [1] - Pulsed	356	A
V_{GSS}	Gate-Source Voltage	±20	V
E_{AS}	Single Pulsed Avalanche Energy [2]	110	mJ
P_D	Power Dissipation (T_C = 25℃)	60	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	260	℃

Thermal Characteristics

R_{thJC}	Thermal Resistance, Junction to Case	2.1	℃/W
R_{thJA}	Thermal Resistance, Junction to ambient	62.5	℃/W

Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLD3091T	SLD3091T	TO-252	Tape & Reel	2500	25000

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30 V, V_{GS} = 0 V	--	--	1	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	1.0	1.5	2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 20 A	--	3.45	4.5	mΩ
		V_{GS} = 4.5 V, I_D = 15 A	--	5.45	7.5	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	--	2858	-	pF
C_{oss}	Output Capacitance		--	290	-	pF
C_{rss}	Reverse Transfer Capacitance		--	282	-	pF
R_g	Internal Gate Resistance	f = 1MHz, open drain	--	2.8	--	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 24 V, V_{GS} = 10 V, R_G = 5 Ω, I_D = 24 A	--	11	--	ns
t_r	Turn-On Rise Time		--	50	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	62	--	ns
t_f	Turn-Off Fall Time		--	45	--	ns
Q_g	Total Gate Charge	V_{DS} = 24 V, I_D = 40 A, V_{GS} = 10 V	--	62	--	nC
Q_{gs}	Gate-Source Charge		--	9	--	nC
Q_{gd}	Gate-Drain Charge		--	18	--	nC
Drain-Source Diode Characteristics						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	89	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	356	A
V_{SD}	Drain to Source Diode Forward Voltage, V_{GS} = 0V, I_{SD} = 20 A, T_J = 25℃		--	0.85	1.1	V
t_{rr}	Reverse Recovery Time	VDD = 24V, IF = 24A, di/dt = 100A/μs	--	19	--	nS
Q_{rr}	Reverse Recovery Charge		--	0.01	--	uC
I_{rrm}	Peak Reverse Recovery Current		--	1.25	--	A

Notes:

1. Repetitive Rating : Drain current limited by maximum junction temperature.
2. EAS condition: T_J =25℃, V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, I_{AS} = 21A.
3. These curves are based on the junction-to-case thermal impedance R_{thjc}, assuming maximum junction temperature is 150℃.These curves provide a single pulse rating.

Typical Characteristics

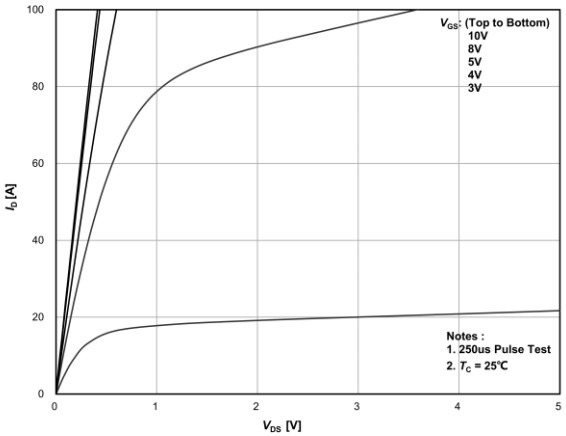


Figure 1. On-Region Characteristics

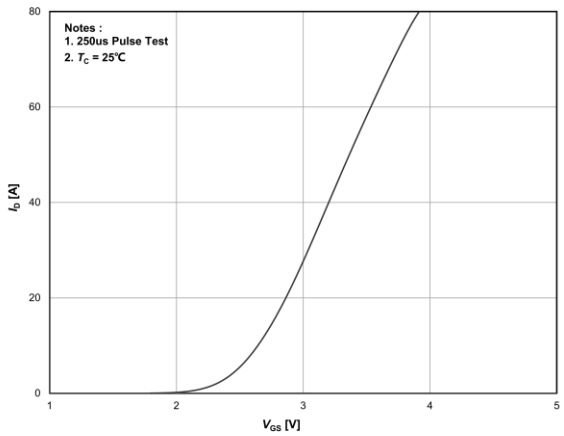


Figure 2. Transfer Characteristics

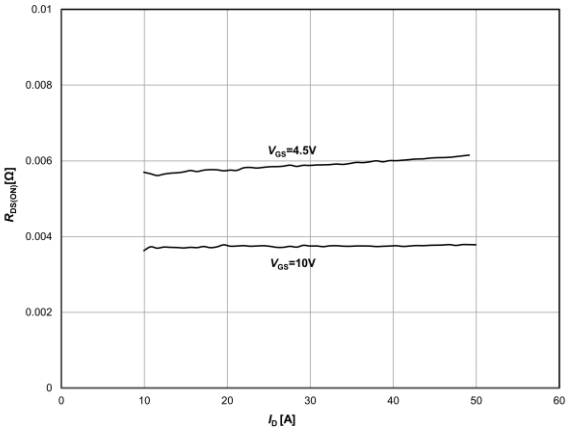


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

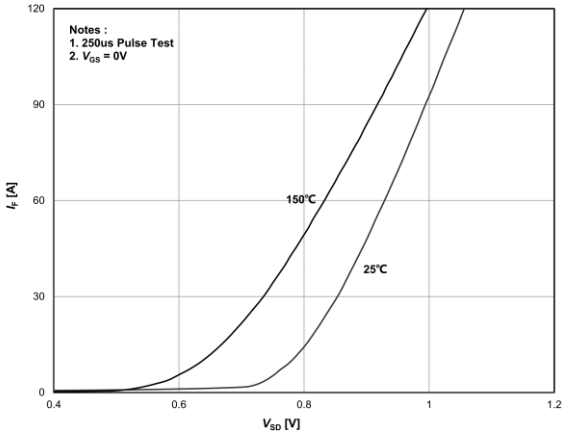


Figure 4. Body Diode Forward Voltage Variation with Current

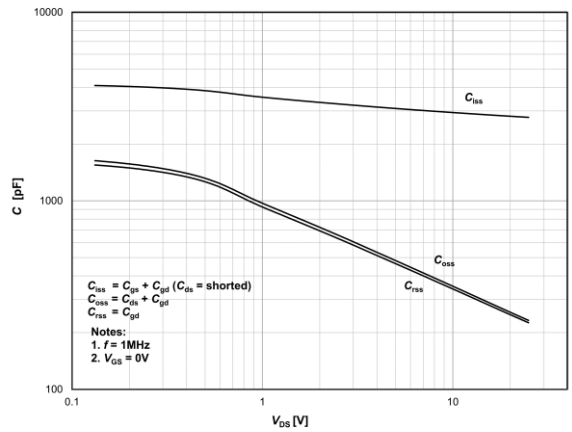


Figure 5. Capacitance Characteristics

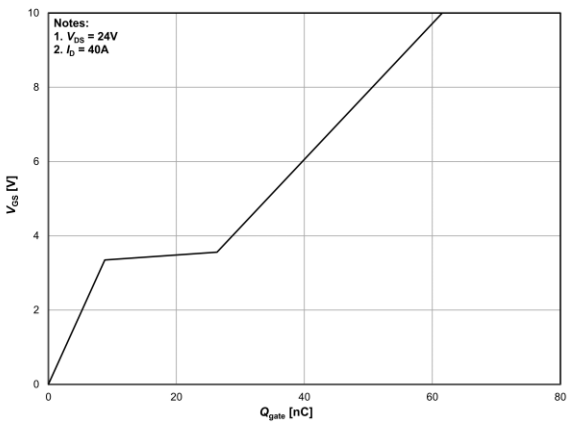


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

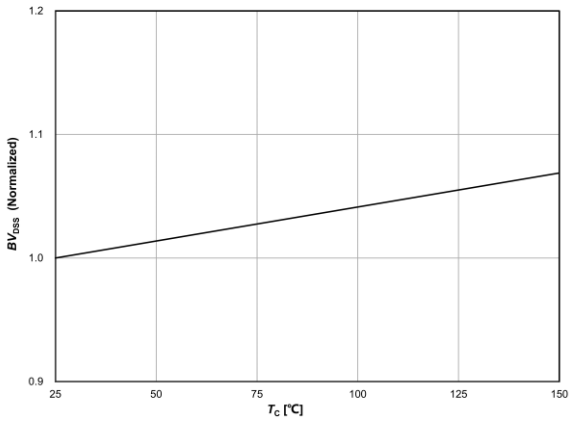


Figure 7. Breakdown Voltage Variation vs Temperature

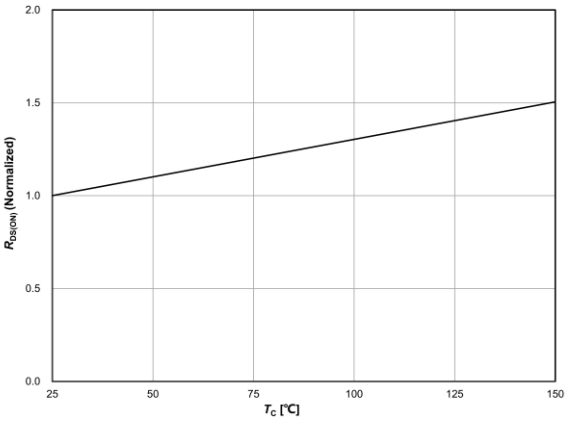


Figure 8. On-Resistance Variation vs Temperature

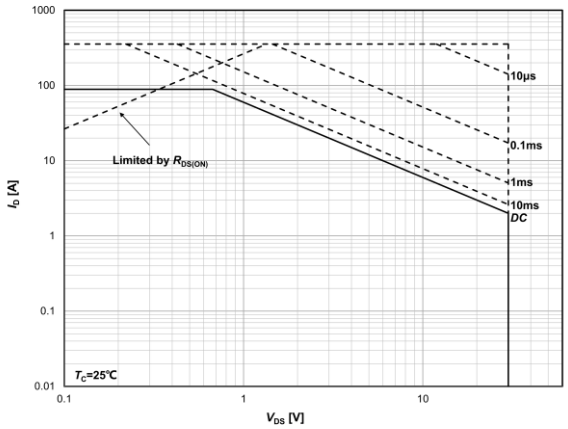


Figure 9. Maximum Safe Operating Area[3)]

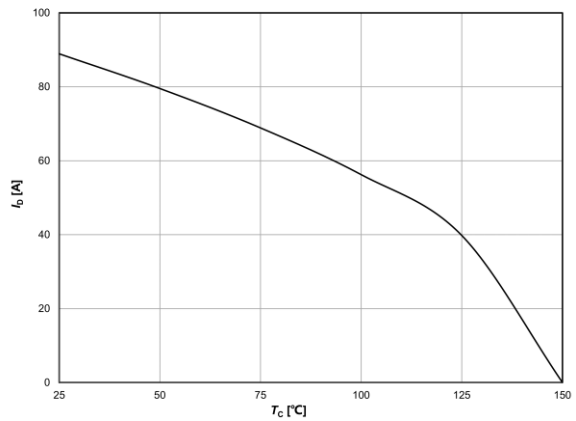


Figure 10. Maximum Drain Current vs Case Temperature

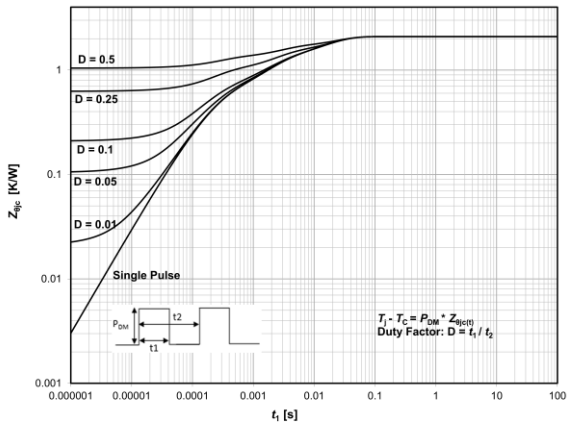
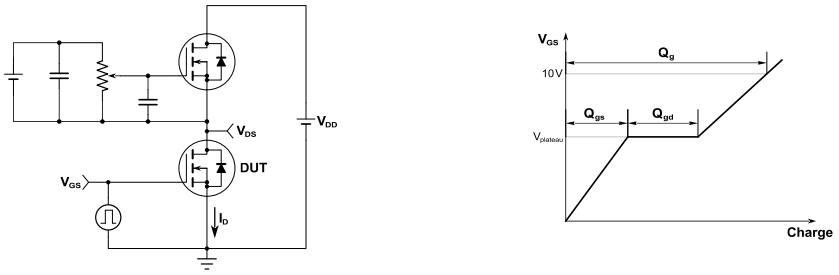
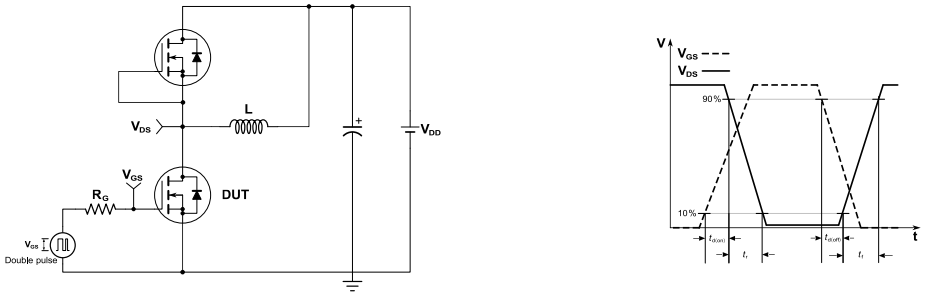


Figure 11. Transient Thermal Response Curve

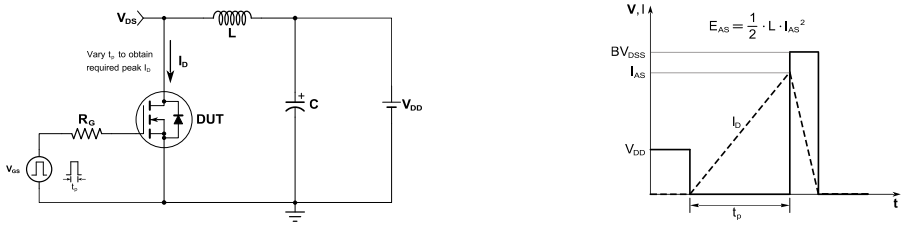
Test Circuits and waveforms



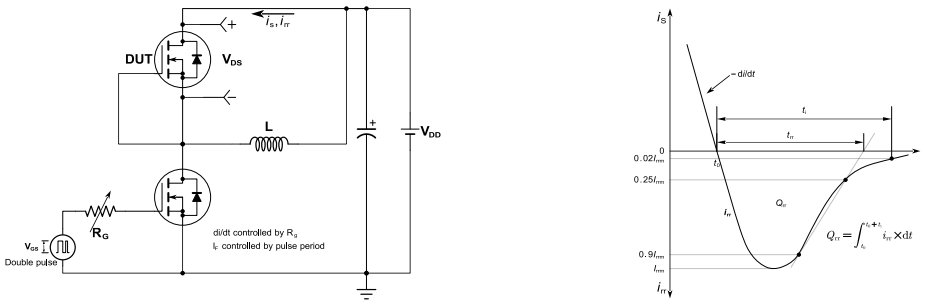
Gate charge test circuit & waveform



Switching times for inductive load test circuit & waveform

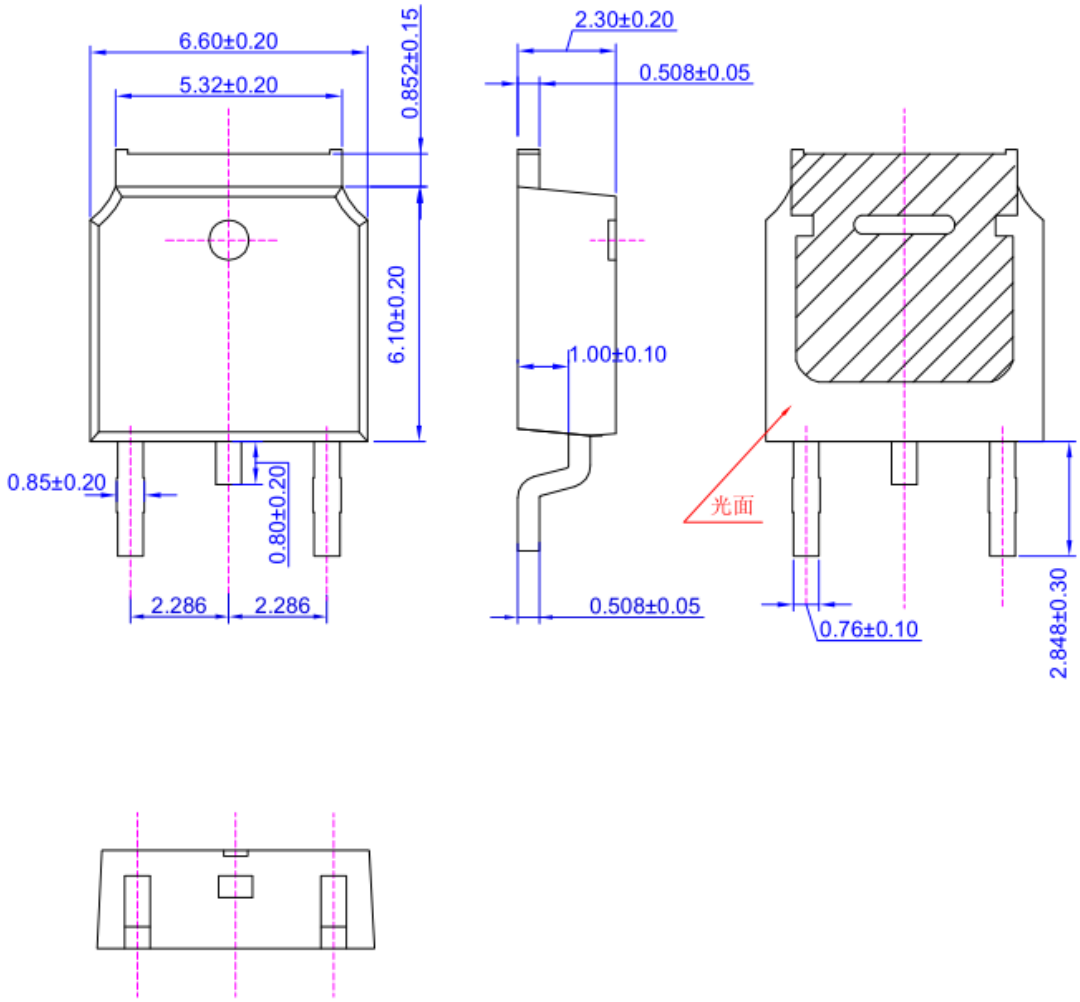


Unclamped inductive load test circuit & waveform



Diode characteristics test circuit & waveform

TO-252 OUTLINE



NOTE：
1The plastic package is not marked as smooth surfaceRa=0.1;Subglossy surfaceRa=0.8
2.Undeclared tolerance±0.25,Unmarked filletRmax=0.25

Disclaimer

The content specified herein is for the purpose of introducing Msemitek's products (here in after "Products"). The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Msemitek does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of the Products or technical information described in this document.

The products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). Msemitek shall bear no responsibility in any way for use of any of the Products for the above special purposes.

Although, Msemitek endeavors to improve the quality and reliability of it's products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions . Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Msemitek's product.

The content specified herein is subject to change for improvement without notice. When using a Msemitek's product, be sure to obtain the latest specifications.