MOSFETs Silicon 500V N-Channel MOS

■ Applications

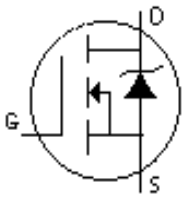
- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）

■ Features

- Multi-Epi process SJ-FET
- Low $R_{DS(ON)}$
- Ultra Low Gate Charge
- RoHS and Halogen-Free Compliant
- 100% UIS and RG Tested

■ Product Summary

V_{DS} @ Tj,max	550	V
I_D	18	A
$R_{DS(ON)}$,Typ@10V	0.2	Ω
Q_g	20	nC



Gate： 1

Drain： 2

Source： 3

TO-247L

Marking	Package	Packaging	Min. package quantity
MSL240R50C	TO-247L	Tube	450

■ Absolute Maximum Ratings（Tc=25℃ unless otherwise noted)

Parameter			Symbol	Ratings	Unit
Drain-Source Voltage			V_{DS}	500	V
Gate-Source Voltage			V_{GS}	±30	V
Continuous Drain Current	Tc=25℃	(Note 1)	I_D	18	A
Continuous Drain Current	Tc=100℃	(Note 1)		11	
Drain Current-Pulsed		(Note 1)	I_{DM}	43	A
Total Dissipation			P_D	138	W
Junction Temperature			T_j	150	℃
Storage Temperature			T_{stg}	-55-150	℃
Single Pulse Avalanche Energy		(Note 2)	E_{AS}	284	mJ

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

■ Thermal Characteristics

Parameter	Symbol	Max	Unit
Maximum Junction-to-Case	$R_{\theta JC}$	0.9	℃/W
Maximum Junction-to-Ambient	$R_{\theta JA}$	60	℃/W

Note 1：Ensure that the channel temperature does not exceed 150℃.

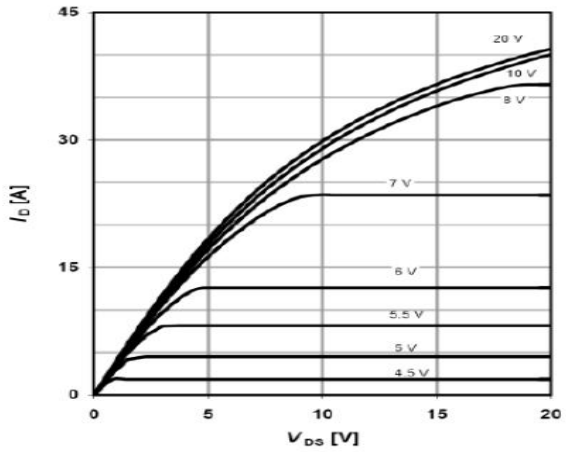
Note 2：V_{DD}=50V, T_{ch}= 25℃(initial), I_{AS}=18A, R_g=25Ω.

Note：This transistor is sensitive to electrostatic discharge and should be handled with care.

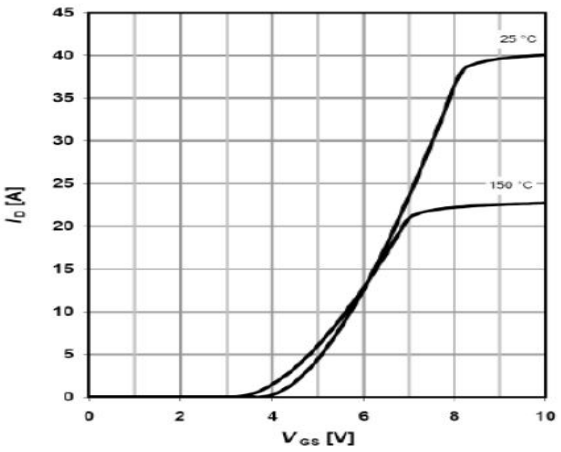
■ Electrical Characteristics（Tc=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	500	-	-	V
		Tj=150°C	550	-	-	
Drain-Source Leakage Current	I_{DSS}	V_{DS}=500V,V_{GS}=0V	-	-	1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS},I_D=250uA	2.5	3.5	4.5	V
Drain-Source On Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=9A	-	0.2	0.24	Ω
		Tj=150°C	-	0.54	-	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz	-	815	-	pF
Output Capacitance	C_{oss}		-	350	-	pF
Reverse Transfer Capacitance	C_{rss}		-	10	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V, f=1.0MHz	-	3.8	-	Ω
Switching Paramters						
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V,I_D=9A, V_{GS}=10V,R_G=25Ω	-	13	-	ns
Turn-On Rise Time	t_r		-	12	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	100	-	ns
Turn-Off Fall Time	t_f		-	12	-	ns
Total Gate Charge	Q_g	V_{DS}=400V,I_D=9A, V_{GS}=10V	-	20	-	nC
Gate-Source Charge	Q_{gs}		-	5	-	nC
Gate-Drain Charge	Q_{gd}		-	7.5	-	nC
Source-Drain Characteristics						
Max. Diode Forward Cuurent	I_S		-	-	18	A
Max. Pulsed Forward Cuurent	I_{SM}		-	-	43	A
Diode Forward Voltage	V_{sd}	V_{GS}=0V,I_S=9A	-	0.9	1.5	V
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=9A, di/dt=100A/us	-	340	-	ns
Reverse Recovery Charge	Q_{rr}		-	4.5	-	μC

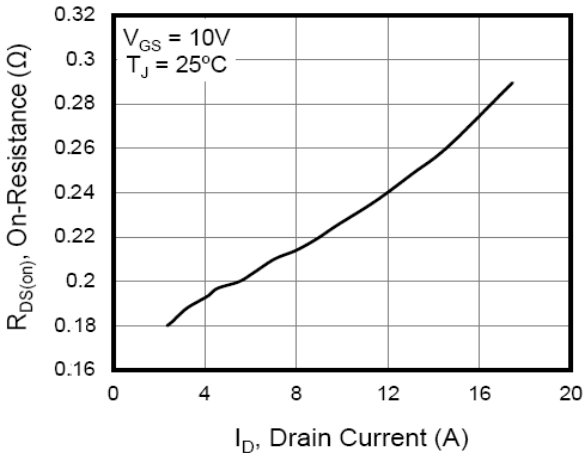
■ Characteristics Curves



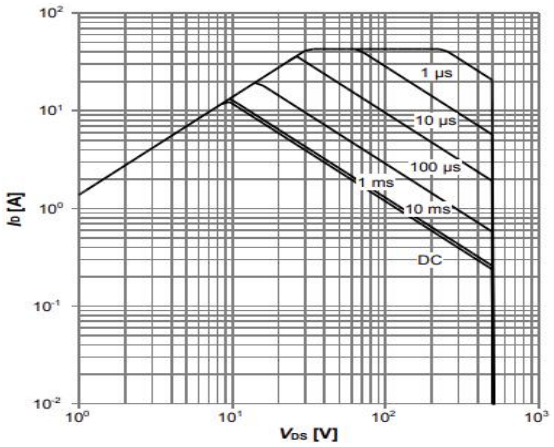
Output Characteritsics



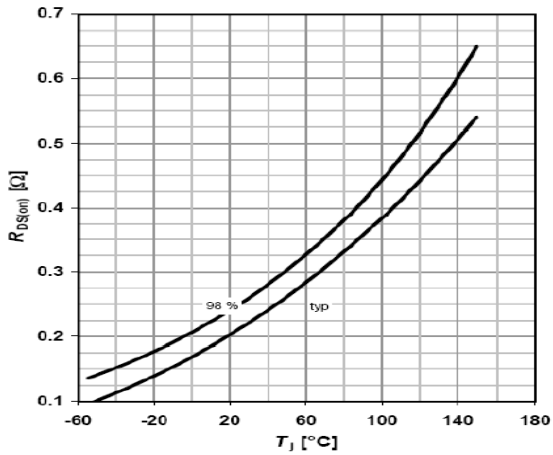
Transfer Characteritsics



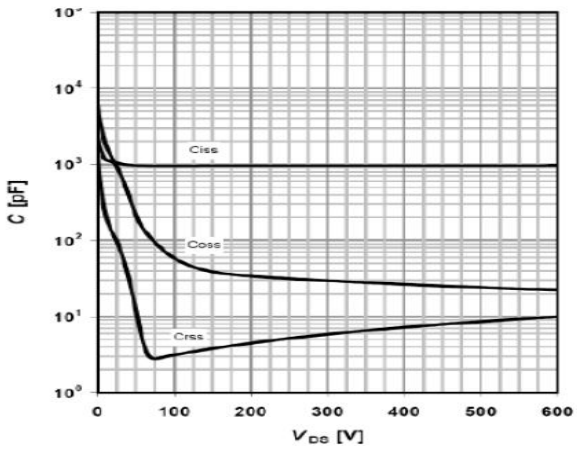
On Resistance Vs Drain Current



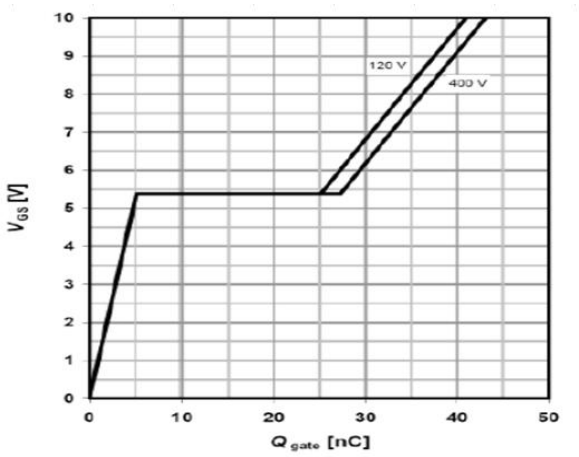
Maximum Safe Operating Area



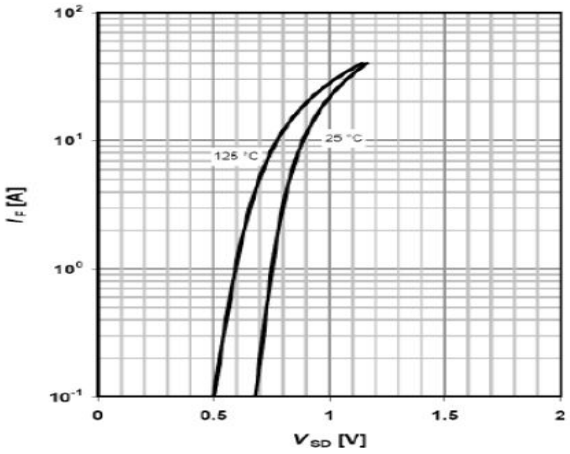
Rdson-JunctionTemperature



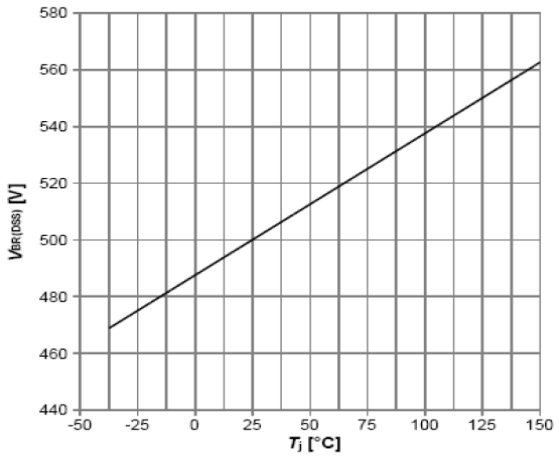
Capacitance



Gate Charge Waveform



Source-Drain Diode Forward Voltage

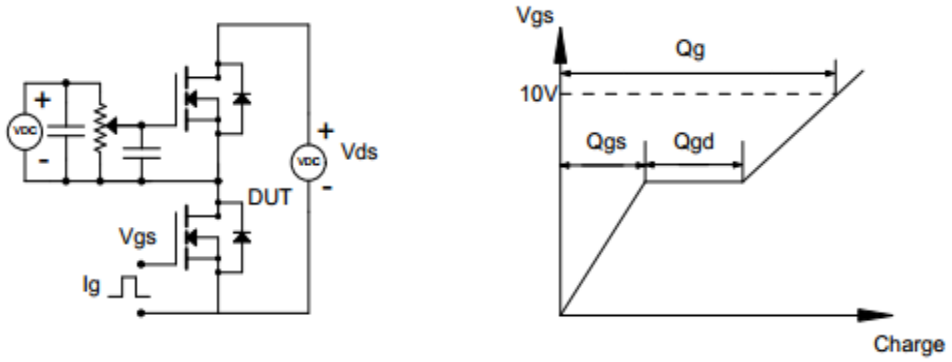


Breakdown Voltage Vs Junction Temperature

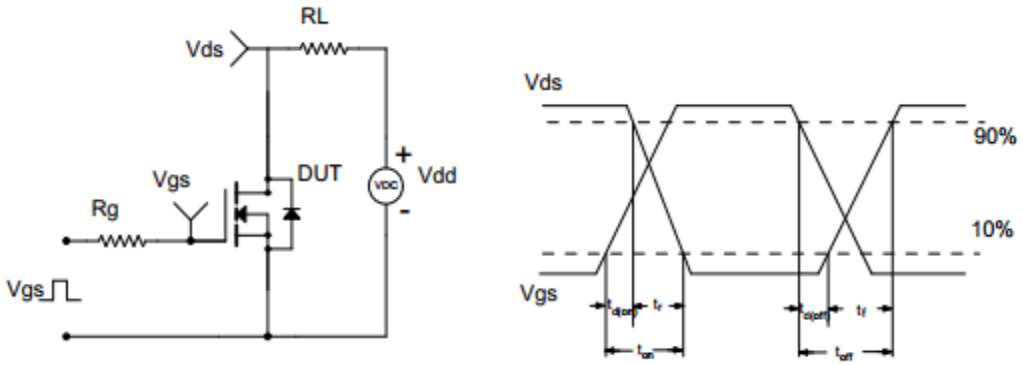
Note： The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

■ Test Circuit & Waveform

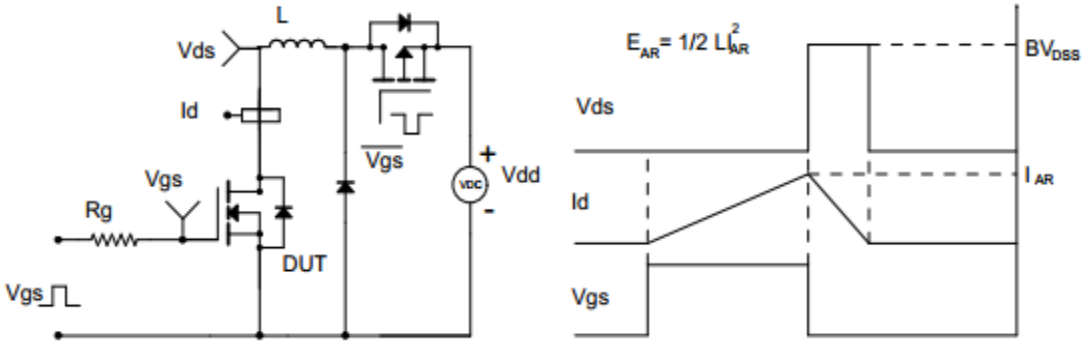
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



■ TO-247L Package Dimensions

Unit：mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	4.80		5.20	E1	13.00		13.60
A1	2.20	2.40	2.60	E2	5.00		5.50
A2	1.85		2.15	E3	1.90		2.60
b	1.07		1.33	e		5.44	
b2	1.90		2.16	L	19.30		19.90
b4	2.90		3.20	L1	3.75	3.95	4.15
c	0.52		0.68	ΦP	3.40		3.80
D	20.70		21.30	ΦP1	7.00		7.40
D1	16.15		16.95	S	6.04	6.15	6.30
E	15.50		16.10