

**MOSFETs Silicon 250V N-Channel MOS**
**■ Applications**

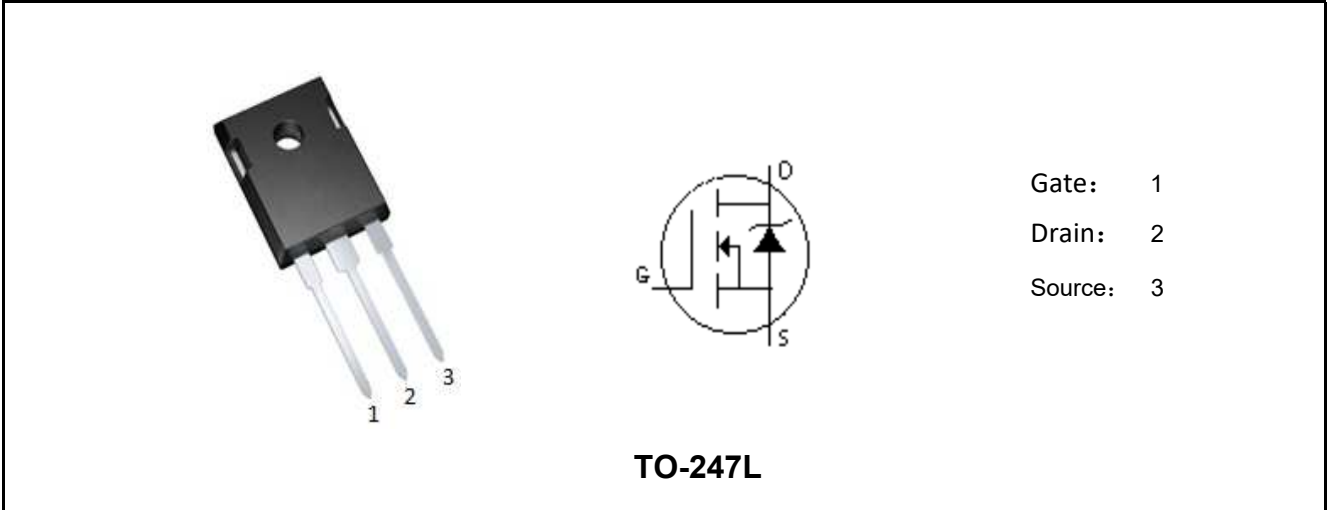
- Synchronous Rectification
- Industrial and Motor Drive
- DC/DC and AC/DC Converters
- Power Tools
- BMS

**■ Features**

- High-Speed Switching
- Low  $R_{DS(ON)}$
- Good stability and uniformity with high EAS
- RoHS and Halogen-Free Compliant
- 100% UIS and RG Tested

**■ Product Summary**

$V_{DS}$	250	V
$I_D$	90	A
$R_{DS(ON)}, Typ @ 10V$	29	m $\Omega$
$Q_g$	365	nC



Marking	Package	Packaging	Min. package quantity
MSL035R250PH	TO-247L	Tube	450



**■ Absolute Maximum Ratings (Tc=25°C unless otherwise noted)**

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	250	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current Tc=25°C (Note 1)	$I_D$	90	A
Continuous Drain Current Tc=100°C (Note 1)		65	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	360	A
Total Dissipation	$P_D$	310	W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{stg}$	-55-150	°C
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	2680	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	$R_{\theta JC}$	0.4	°C/W
Maximum Junction-to-Ambient	$R_{\theta JA}$	40	°C/W

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

Note 2:  $V_{DD}=50V$ ,  $T_{ch}=25^\circ C$ (initial),  $L=0.5mH$ ,  $R_g=25\Omega$ .

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



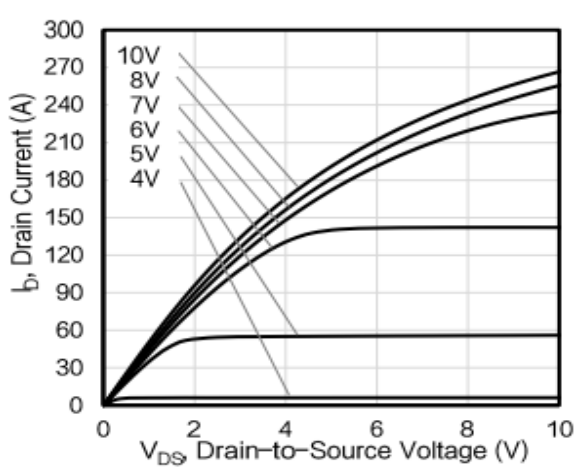
**■ Electrical Characteristics (Tc=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	250	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=250V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4	V
Drain-Source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	29	35	m $\Omega$
		Tj=125°C	-	58	-	
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=35V, V_{GS}=0V,$ $f=1.0MHz$	-	5840	-	pF
Output Capacitance	$C_{oss}$		-	715	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	405	-	pF
Gate Resistance	$R_g$	$V_{DS}=0V, V_{GS}=0V,$ $f=1.0MHz$	-	1.2	-	$\Omega$
<b>Switching Parameters</b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=100V, I_D=45A,$ $V_{GS}=10V, R_G=25\Omega$	-	40	-	ns
Turn-On Rise Time	$t_r$		-	100	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	360	-	ns
Turn-Off Fall Time	$t_f$		-	130	-	ns
Total Gate Charge	$Q_g$	$V_{DS}=200V, I_D=25A,$ $V_{GS}=10V$	-	365	-	nC
Gate-Source Charge	$Q_{gs}$		-	33	-	nC
Gate-Drain Charge	$Q_{gd}$		-	173	-	nC
<b>Source-Drain Characteristics</b>						
Diode Forward Voltage	$V_{sd}$	$V_{GS}=0V, I_S=45A$	-	0.85	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_R=200V, I_F=25A,$ $di/dt=100A/\mu s$	-	380	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	6	-	$\mu C$

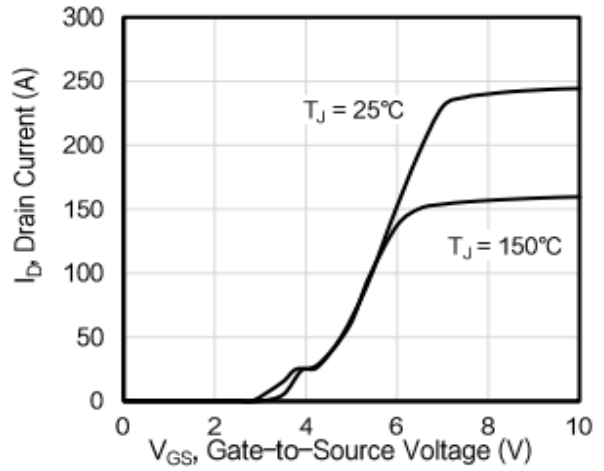




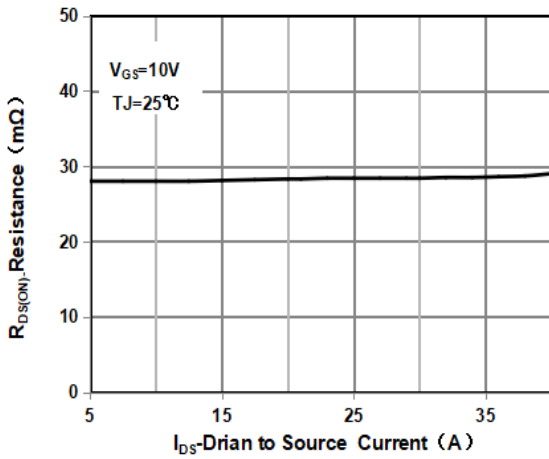
■ Characteristics Curves



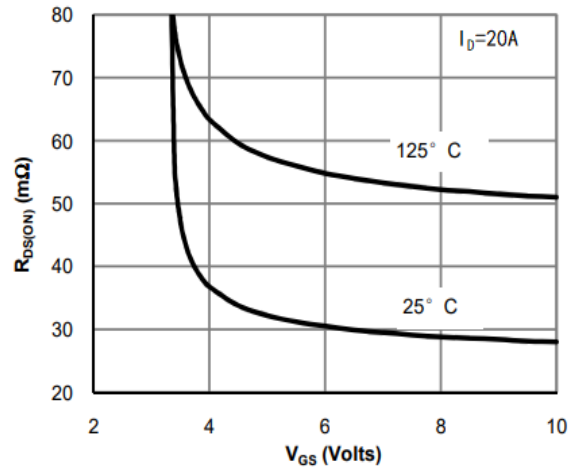
Output Characterisics



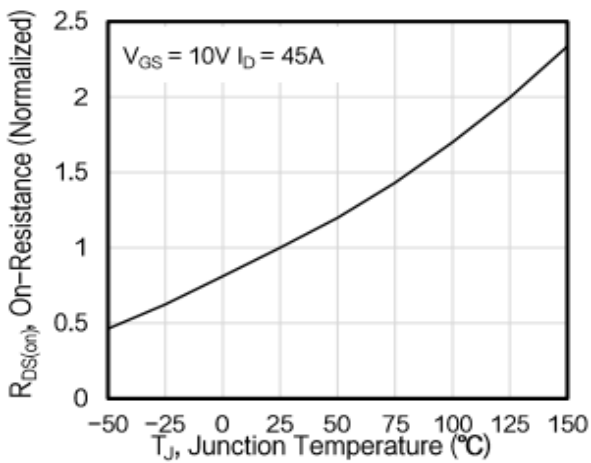
Transfer Characterisics



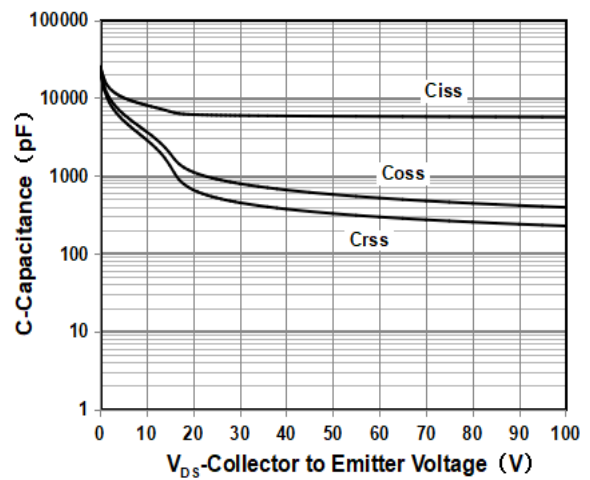
On Resistance Vs Drain Current



On Resistance Vs Gate Source Voltage

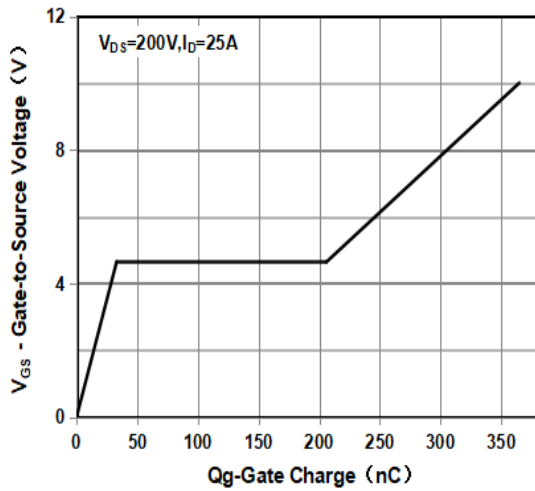


Rdson-JunctionTemperature

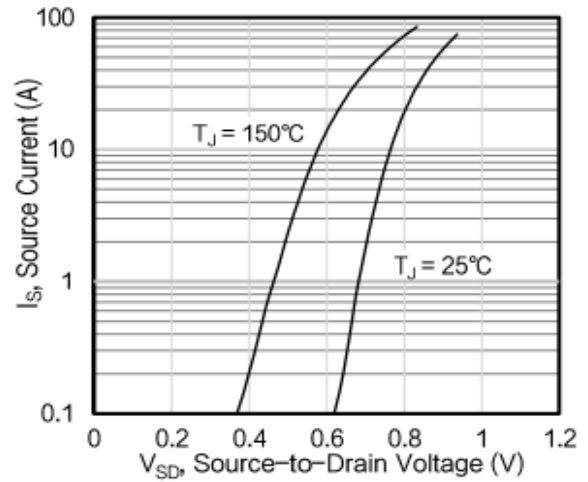


Capacitance

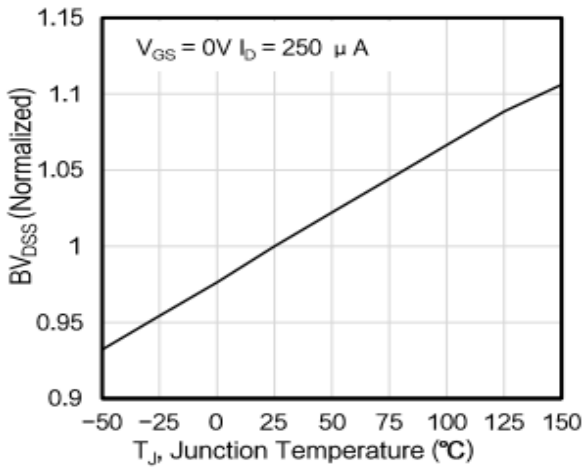




Gate Charge Waveform



Source-Drain Diode Forward Voltage



BVDSS Variation vs. Temperature

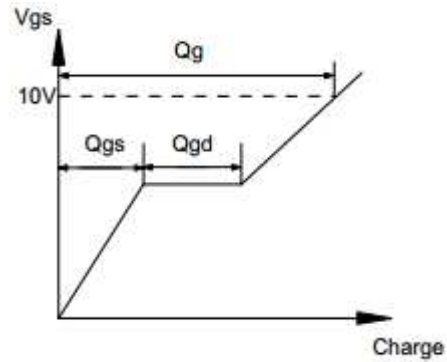
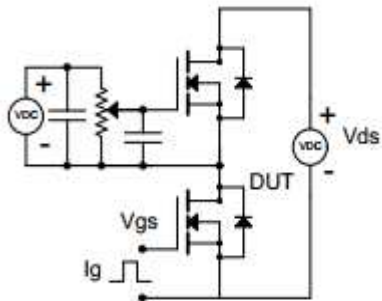
Note : The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



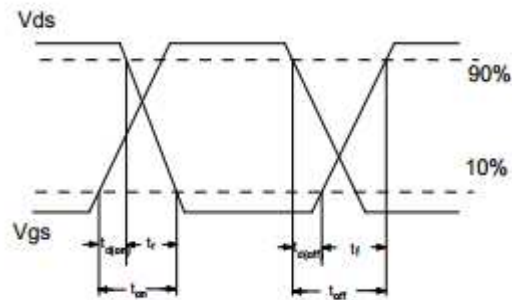
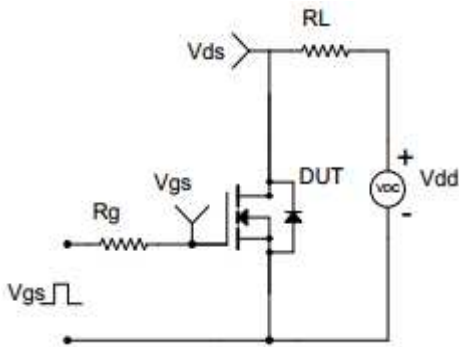


■ Test Circuit & Waveform

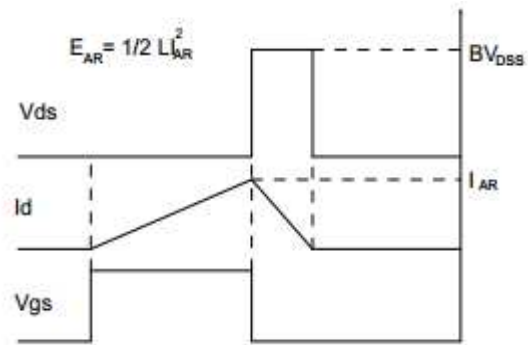
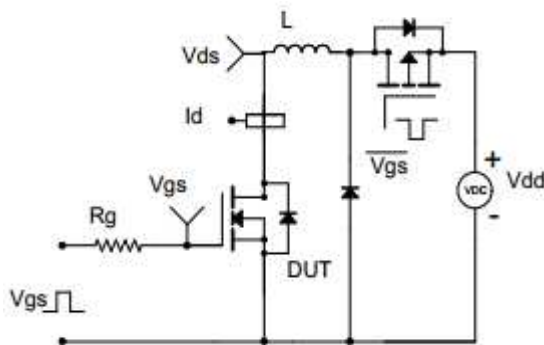
Gate Charge Test Circuit & Waveform



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				

