MOSFETs Silicon 500V N-Channel MOS

■ Applications

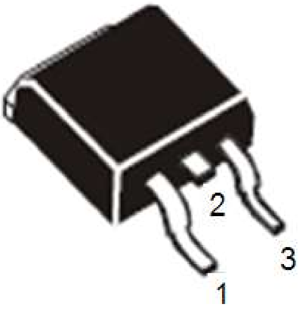
- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）

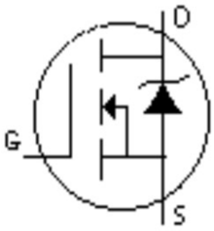
■ Features

- 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	24	A
$R_{DS(ON)}$,Typ@10V	0.12	Ω
Q_g	28	nC





Gate： 1
Drain： 2
Source： 3

TO-263

Marking	Package	Packaging	Min. package quantity
ML140R50C	TO-263	Tube	1000
		Tape & Reel	800

■ 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	24	A
Continuous Drain Current Tc=100℃ (Note 1)		15	
Drain Current-Pulsed (Note 1)	I_{DM}	70	A
Total Dissipation	P_D	150	W
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-55-150	℃
Single Pulse Avalanche Energy (Note 2)	E_{AS}	485	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	$R_{\theta JC}$	0.83	℃/W
Maximum Junction-to-Ambient (Note 3)	$R_{\theta JA}$	60	℃/W

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

Note 2：V_{DD}=50V, T_{ch}= 25℃(initial), I_{AS}=24A, R_g=25Ω.

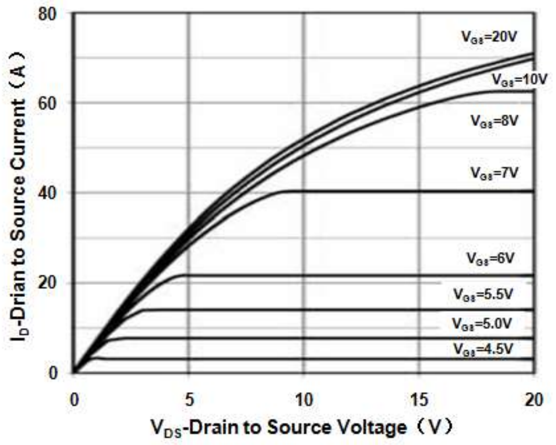
Note 3：The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C. The value in any given application depends on the user's specific board design.

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

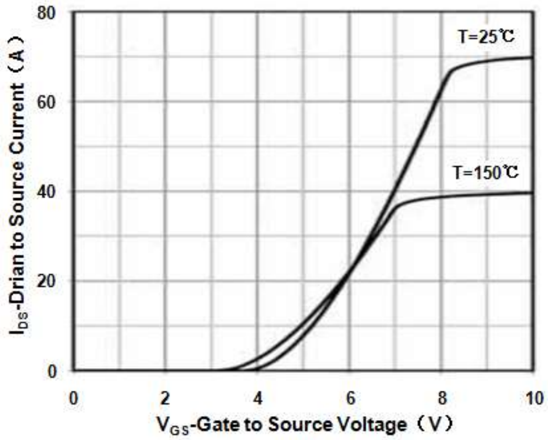
■ Electrical Characteristics（Tc=25℃ unless otherwise noted)

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=12A	-	0.12	0.14	Ω
		Tj=150°C	-	0.3	-	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz	-	1330	-	pF
Output Capacitance	C_{oss}		-	540	-	pF
Reverse Transfer Capacitance	C_{rss}		-	12	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V, f=1.0MHz	-	4.8	-	Ω
Switching Paramters						
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V,I_D=12A, V_{GS}=10V,R_G=20Ω	-	15	-	ns
Turn-On Rise Time	t_r		-	10	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	110	-	ns
Turn-Off Rise Time	t_f		-	9	-	ns
Total Gate Charge	Q_g	V_{DS}=400V,I_D=12A, V_{GS}=10V	-	28	-	nC
Gate-Source Charge	Q_{gs}		-	8.6	-	nC
Gate-Drain Charge	Q_{gd}		-	8.8	-	nC
Source-Drain Characteristics						
Max. Diode Forward Cuurent	I_S		-	-	24	A
Max. Pulsed Forward Cuurent	I_{SM}		-	-	70	A
Diode Forward Voltage	V_{sd}	V_{GS}=0V,I_S=12A	-	0.9	1.5	V
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=12A, di/dt=100A/us	-	330	-	ns
Reverse Recovery Charge	Q_{rr}		-	4.43	-	μC

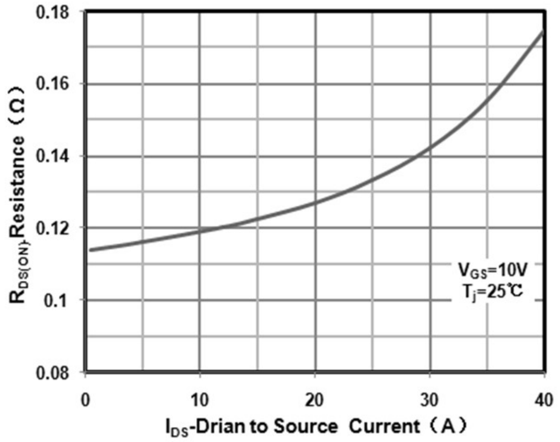
■ Characteristics Curves



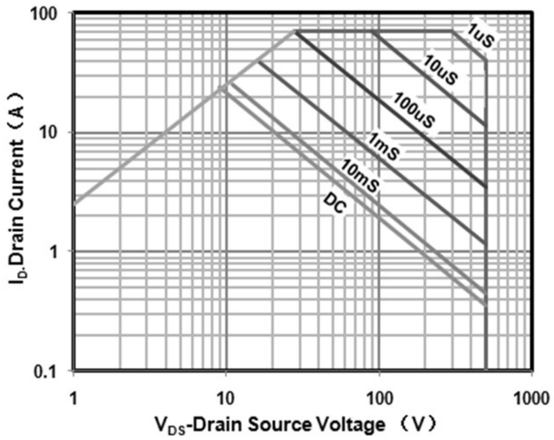
Output Characteritsics



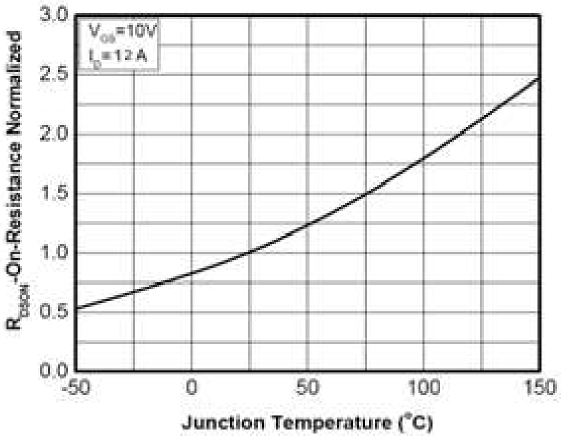
Transfer Characteritsics



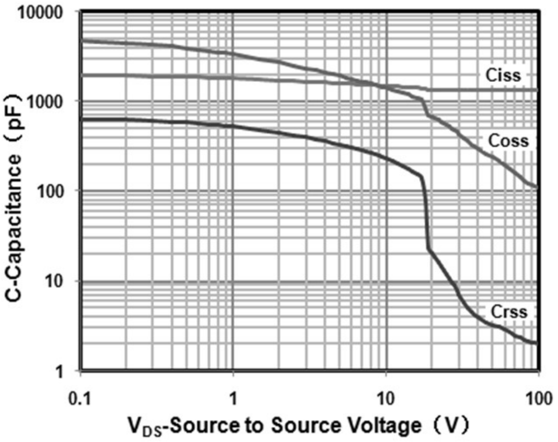
On Resistance Vs Drain Current



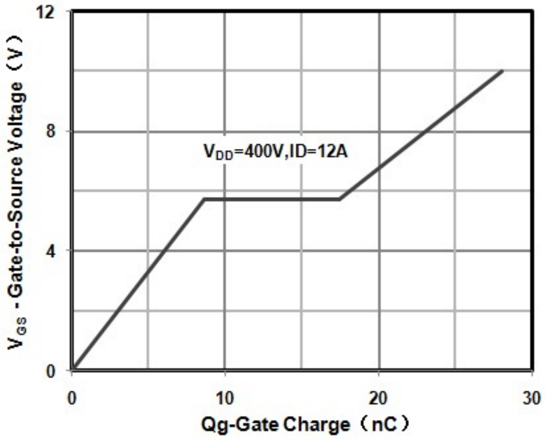
Maximum Safe Operating Area



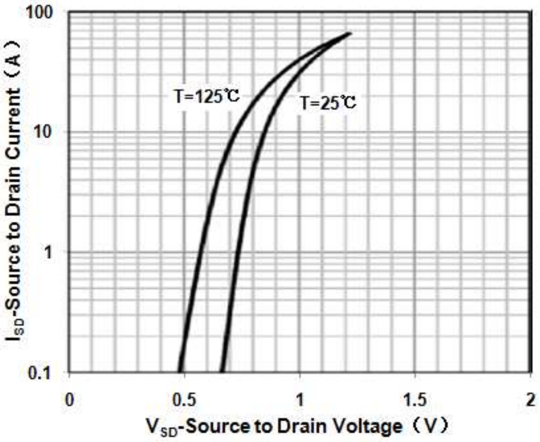
Rdson-JunctionTemperature



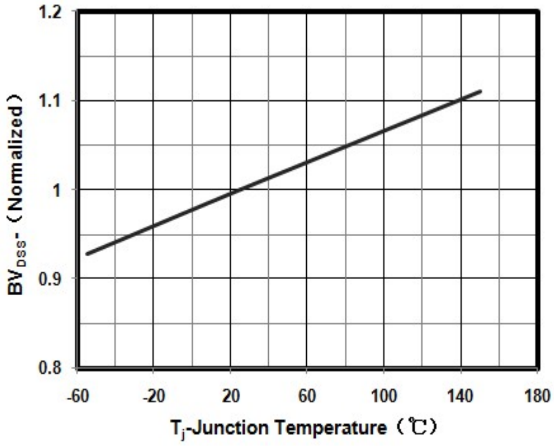
Capacitance



Gate Charge Waveform



Source-Drain Diode Forward Voltage

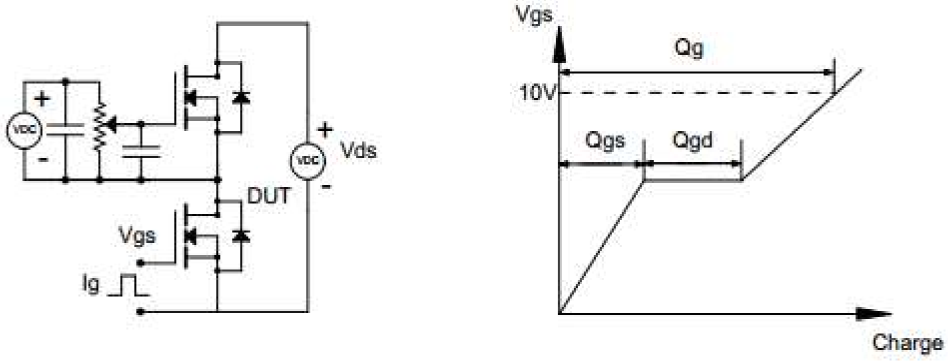


Breakdown Voltage Vs Junction Temperature

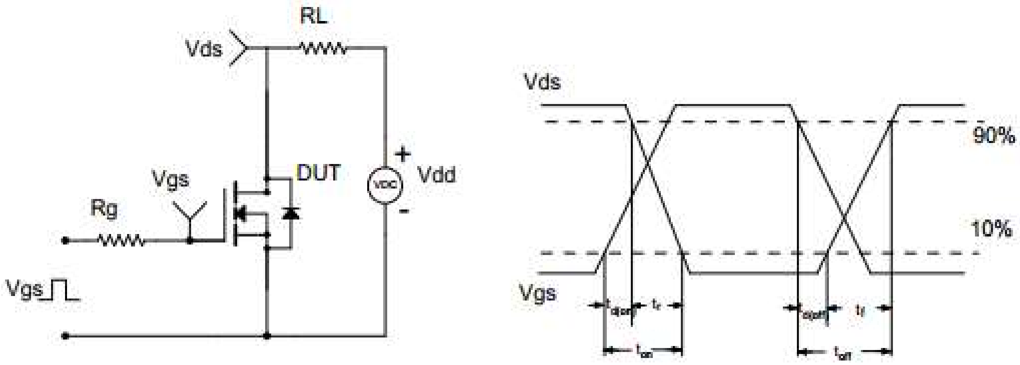
Note： The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

■ Test Circuit & Waveform

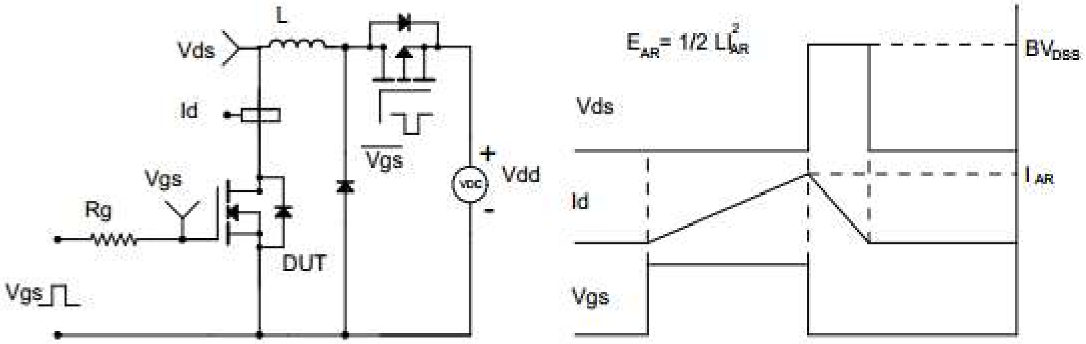
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



■ TO-263 Package Dimensions

Unit：mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	4. 42		4. 72	E	8. 99		9. 29
B	1. 22		1. 4	e1	2. 44	2. 54	2. 64
b	0. 76		0. 86	e2	4. 98		5. 18
b1	1. 22		1. 4	L1	14. 7	15. 1	15. 5
b2	0. 33		0. 43	L2	2	2. 3	2. 6
C	1. 22		1. 35	L3	1. 5		2
D	9. 95		10. 25	K	-0. 1		0. 1