

MOSFETs Silicon 40V N-Channel MOS
■ Applications

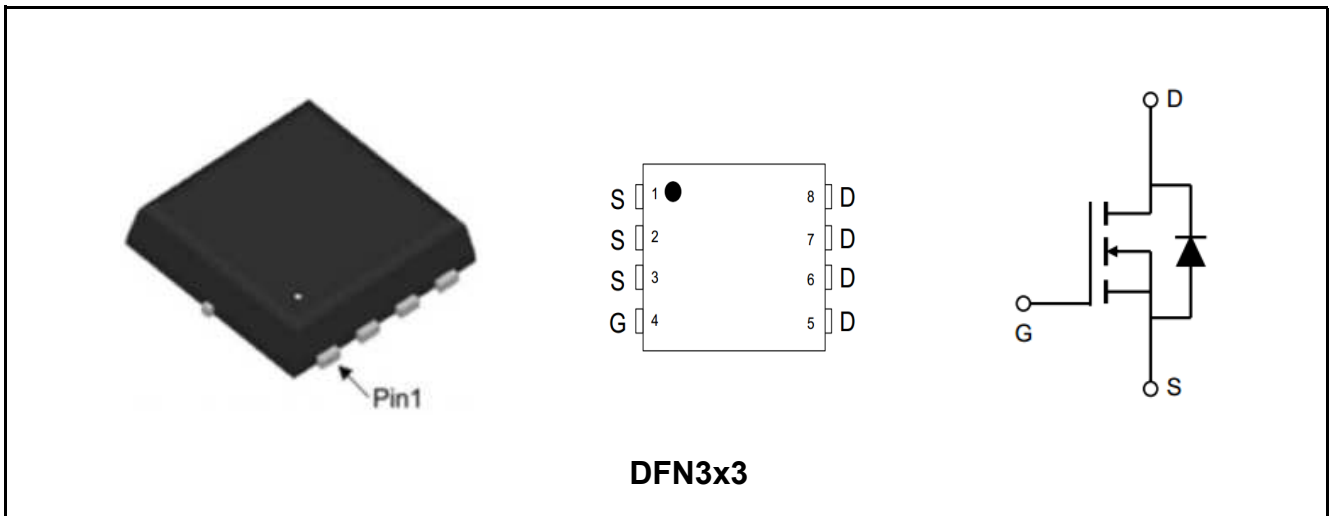
- Synchronous Rectification
- Industrial and Motor Drive
- DC/DC and AC/DC Converters
- Power Tools

■ Features

- High-Speed Switching
- Low $R_{DS(ON)}$
- Low Gate Charge
- Capable of 4.5 V Gate Drive
- RoHS and Halogen-Free Compliant
- 100% UIS and RG Tested

■ Product Summary

V_{DS}	40	V
I_D	70	A
$R_{DS(ON)}, Typ@10V$	3.6	m Ω
$R_{DS(ON)}, Typ@4.5V$	4.8	m Ω
Q_g	22.5	nC



Marking	Package	Packaging	Min. package quantity
ME005R040SL	DFN3*3	Tape & Reel	5000



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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current Tc=25°C (Note 1)	I_D	70	A
Continuous Drain Current Tc=100°C (Note 1)		48	A
Drain Current-Pulsed (Note 1)	I_{DM}	200	A
Total Dissipation	P_D	50	W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{stg}	-55-150	°C
Single Pulse Avalanche Energy (Note 2)	E_{AS}	115	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	$R_{\theta JC}$	2.5	°C/W
Maximum Junction-to-Ambient (Note 3)	$R_{\theta JA}$	50	°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 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 $T_A=25^{\circ}C$. 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.





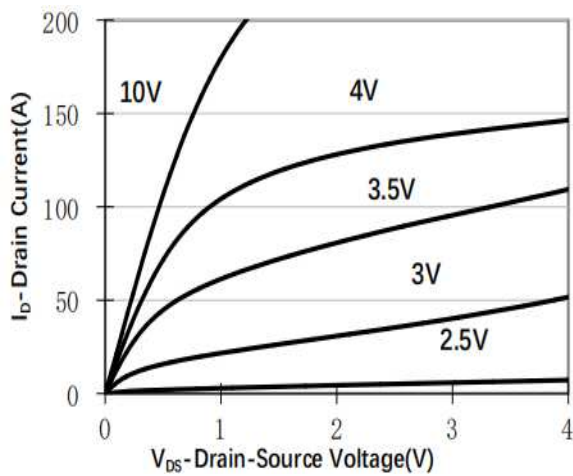
■ Electrical Characteristics (Tc=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	40	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	1.3	1.8	2.3	V
Drain-Source On Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =15A	-	4.8	6.2	mΩ
		Tj=125℃	-	7.2	-	
		V _{GS} =10V, I _D =20A	-	3.6	4.7	
		Tj=125℃	-	6	-	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f=1.0MHz	-	1181	-	pF
Output Capacitance	C _{oss}		-	477	-	pF
Reverse Transfer Capacitance	C _{rss}		-	57.8	-	pF
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1.0MHz	-	1	-	Ω
Switching Paramters						
Turn-On Delay Time	t _{d(on)}	V _{DS} =20V, I _D =20A, V _{GS} =10V, R _L =2Ω	-	5.3	-	ns
Turn-On Rise Time	t _r		-	40	-	ns
Turn-Off Delay Time	t _{d(off)}		-	24	-	ns
Turn-Off Fall Time	t _f		-	7.6	-	ns
Total Gate Charge	Q _g	V _{DS} =20V, I _D =20A, V _{GS} =10V	-	22.5	-	nC
Gate-Source Charge	Q _{gs}		-	5.3	-	nC
Gate-Drain Charge	Q _{gd}		-	4.2	-	nC
Source-Drain Characteristics						
Diode Forward Voltage	V _{sd}	V _{GS} =0V, I _S =10A	-	0.7	-	V
Reverse Recovery Time	t _{rr}	V _R =40V, I _F =30A, di/dt=500A/us	-	12	-	ns
Reverse Recovery Charge	Q _{rr}		-	1.54	-	nC

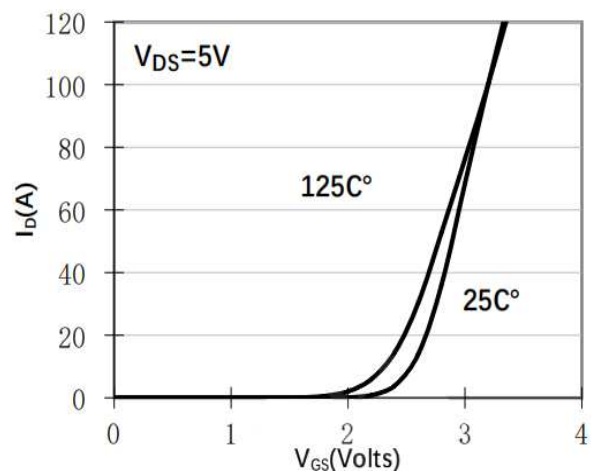




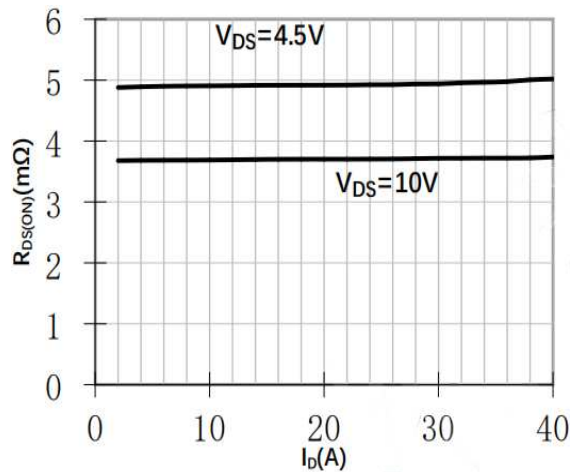
■ Characteristics Curves



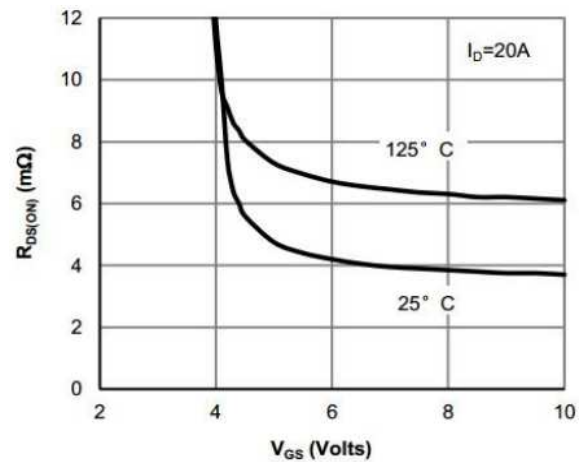
Output Characteristics



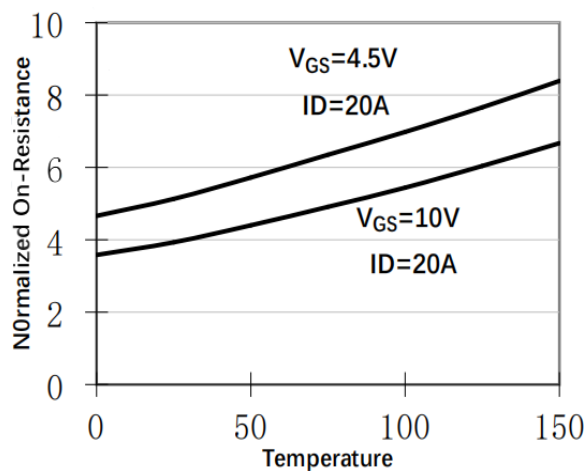
Transfer Characteristics



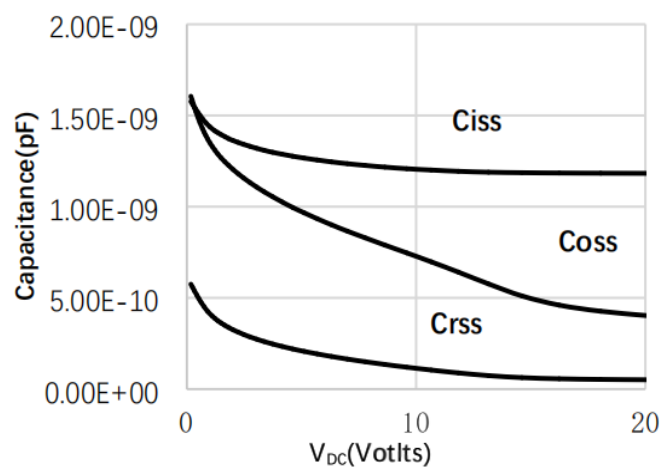
On Resistance Vs Drain Current



On Resistance Vs Gate Source Voltage

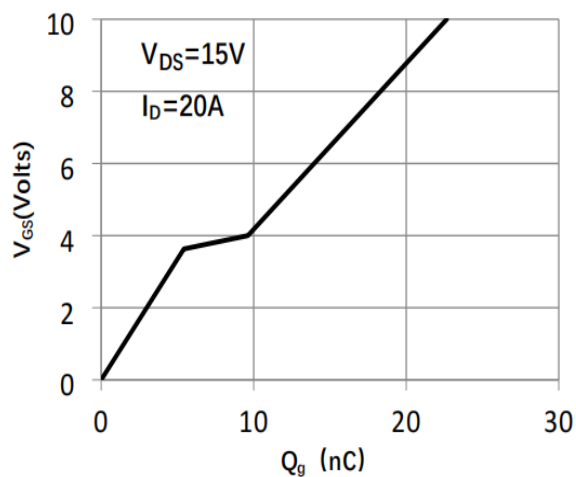


Rdson-JunctionTemperature

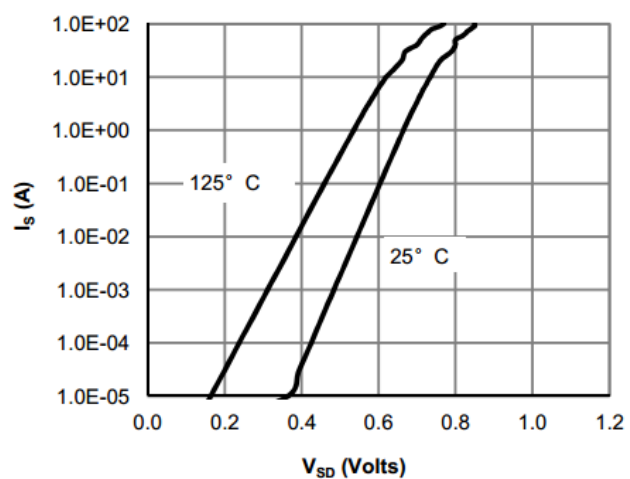


Capacitance

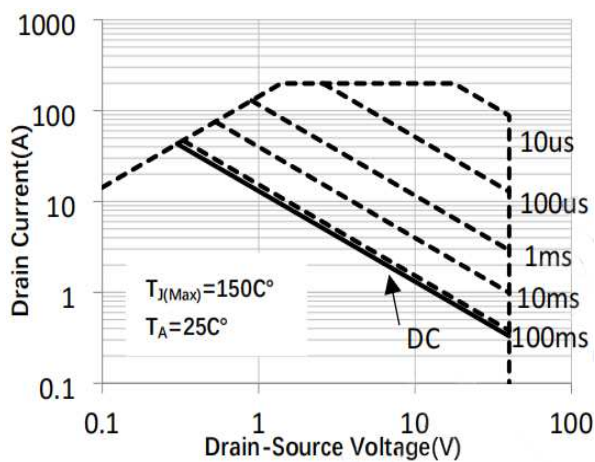




Gate Charge Waveform



Source-Drain Diode Forward Voltage



Maximum Safe Operating Area

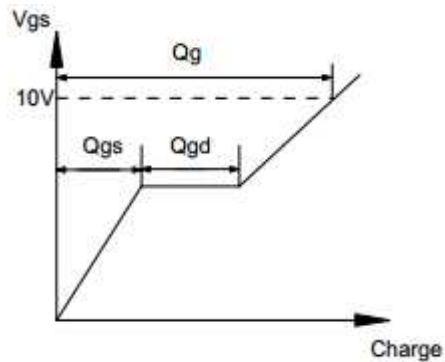
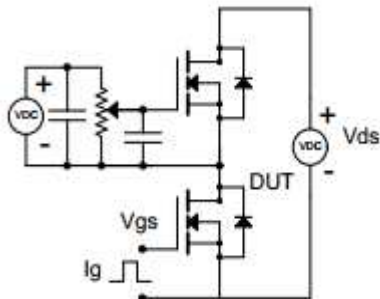
Note : The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



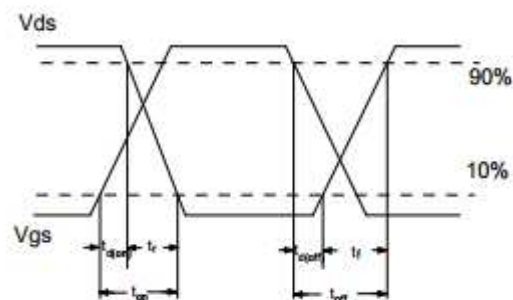
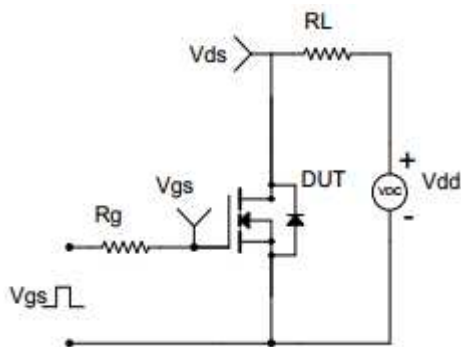


■ Test Circuit & Waveform

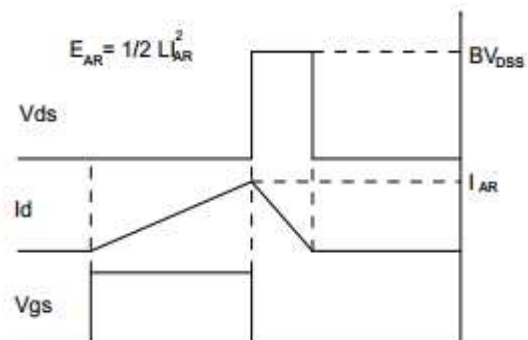
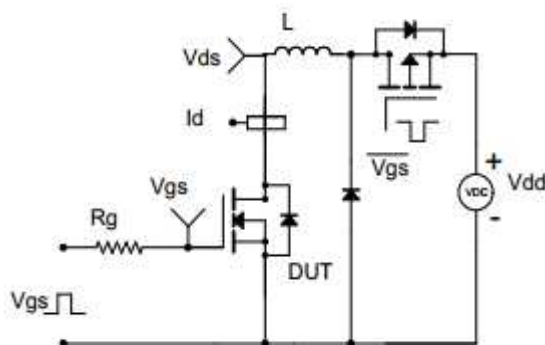
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform





■ DFN3X3 Package Dimensions

Unit: mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	0.70	0.75	0.80	b	0.25	0.30	0.35
c	0.10	0.15	0.25	D	3.25	3.35	3.45
E	3.20	3.30	3.40	D1	3.00	3.10	3.20
E1	3.00	3.15	3.20	D2	1.78	1.88	1.98
E2	2.39	2.49	2.59	D3	—	0.13	—
L	0.30	0.40	0.50	e	—	0.65	—
L1	—	0.13	—	H	0.30	0.39	0.50
M	—	—	0.15				

