MOSFETs Silicon 60V N-Channel MOS

■ Applications

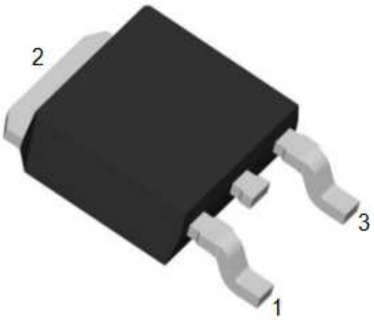
- Synchronus Rectification
- Industrial and Motor Drive
- DC/DC and AC/DC Converters
- Power Tools

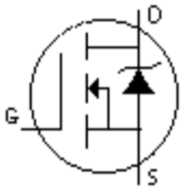
■ Features

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

■ Product Summary

V_{DS}	60	V
I_D	25	A
$R_{DS(ON)\,,Typ}$@10V	24	mΩ
$R_{DS(ON)\,,Typ}$@4.5V	30	mΩ
Q_g	21	nC





Gate： 1
Drain： 2
Source： 3

TO-252

Marking	Package	Packaging	Min. package quantity
MK030R060TL	TO-252	Tape & Reel	3000

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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current Tc=25℃ (Note 1)	I_D	25	A
Continuous Drain Current Tc=100℃ (Note 1)		10	A
Drain Current-Pulsed (Note 1)	I_{DM}	90	A
Total Dissipation	P_D	30	W
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-55-150	℃
Single Pulse Avalanche Energy (Note 2)	E_{AS}	64	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	$R_{\theta JC}$	4.36	℃/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, Tch= 25℃(initial), L=0.5mH, R_g=25Ω.

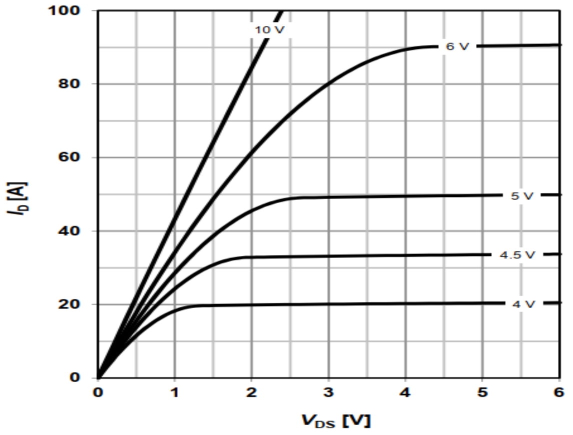
Note 3：The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The value in any given application depends on the user's specific board design.

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

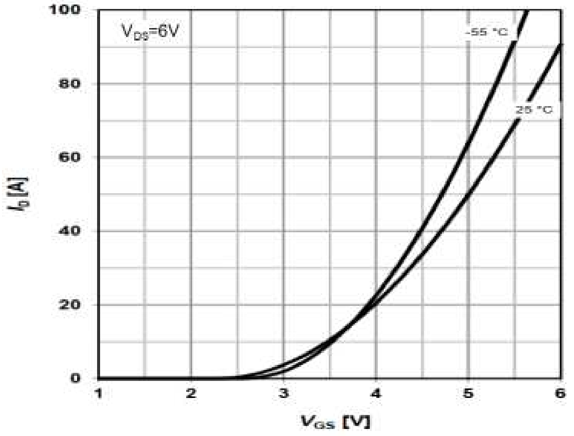
■ Electrical Characteristics（Tc=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	60	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V,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	1.2	1.8	2.5	V
Drain-Source On Resistance	$R_{DS(ON)}$	V_{GS}=4.5V,I_D=15A	-	30	38	mΩ
		Tj=125℃	-	40	-	
		V_{GS}=10V,I_D=20A	-	24	30	
		Tj=125℃	-	34	-	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=35V,V_{GS}=0V, f=1.0MHz	-	1055	-	pF
Output Capacitance	C_{oss}		-	59	-	pF
Reverse Transfer Capacitance	C_{rss}		-	47	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V, f=1.0MHz	-	4.24	-	Ω
Switching Paramters						
Total Gate Charge	Q_g	V_{DS}=30V,I_D=20A, V_{GS}=10V	-	21	-	nC
Gate-Source Charge	Q_{gs}		-	5.5	-	nC
Gate-Drain Charge	Q_{gd}		-	3.5	-	nC
Source-Drain Characteristics						
Diode Forward Voltage	V_{sd}	V_{GS}=0V,I_S=10A	-	0.86	1.2	V
Reverse Recovery Time	t_{rr}	V_R=50V,I_F=20A, di/dt=100A/us	-	43	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.04	-	uC

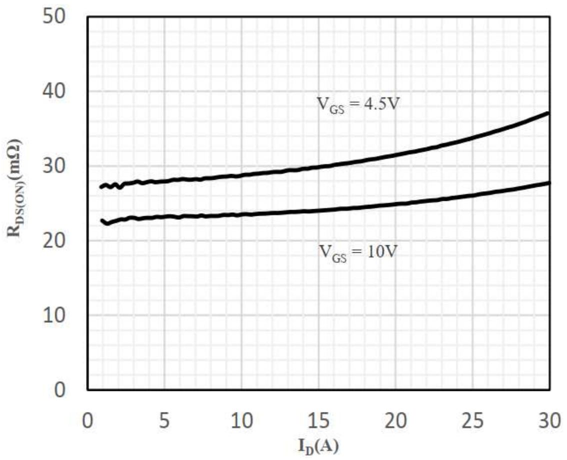
■ Characteristics Curves



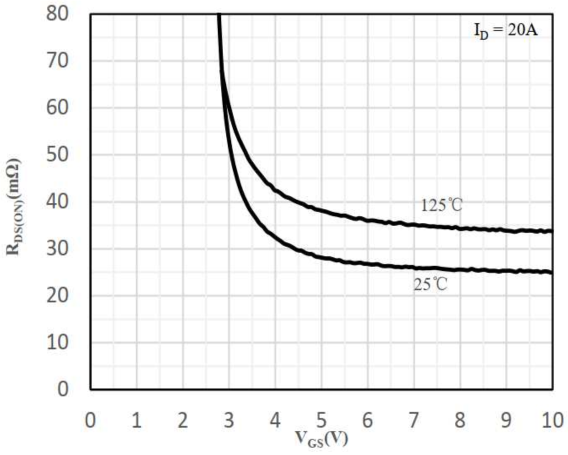
Output Characteritsics



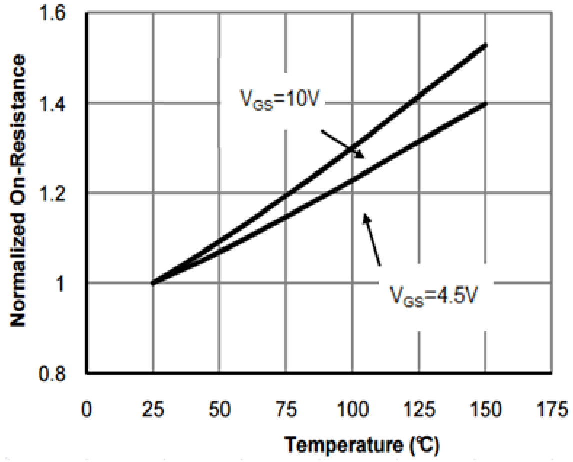
Transfer Characteritsics



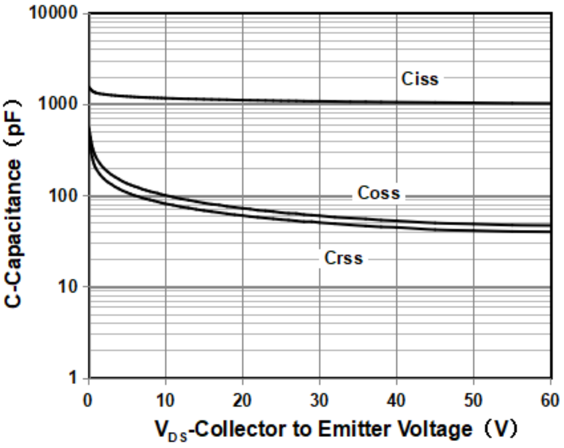
On Resistance Vs Drain Current



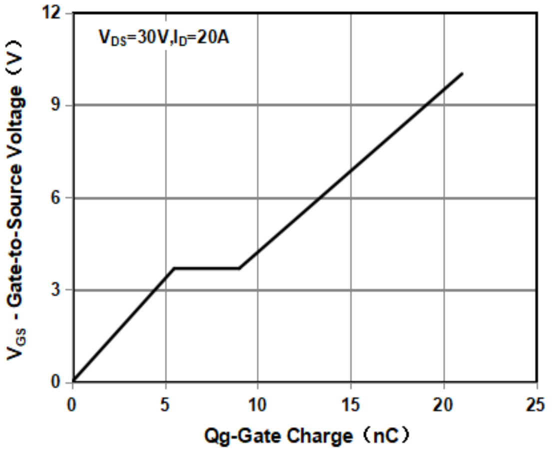
On Resistance Vs Gate Source Voltage



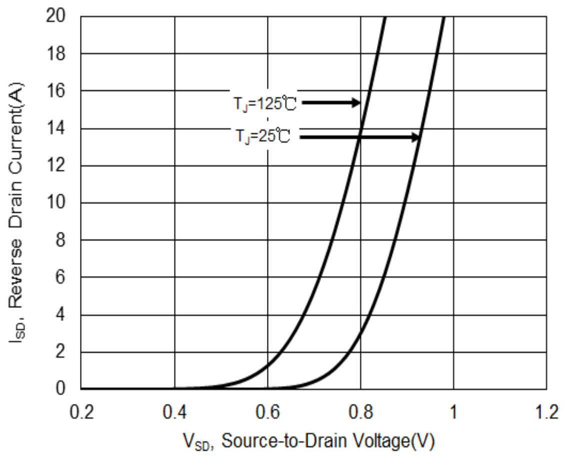
Rdson-JunctionTemperature



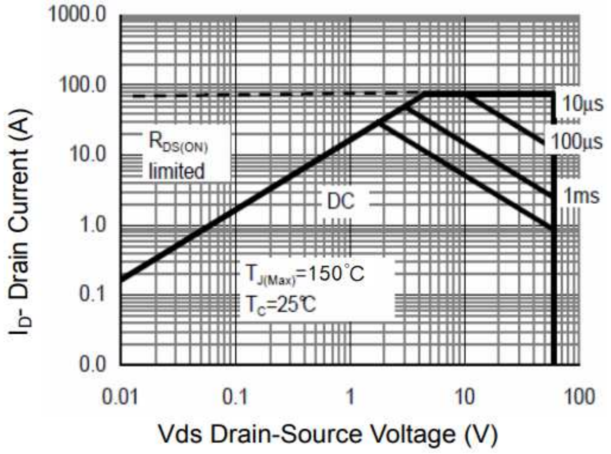
Capacitance



Gate Charge Waveform



Source-Drain Diode Forward Voltage

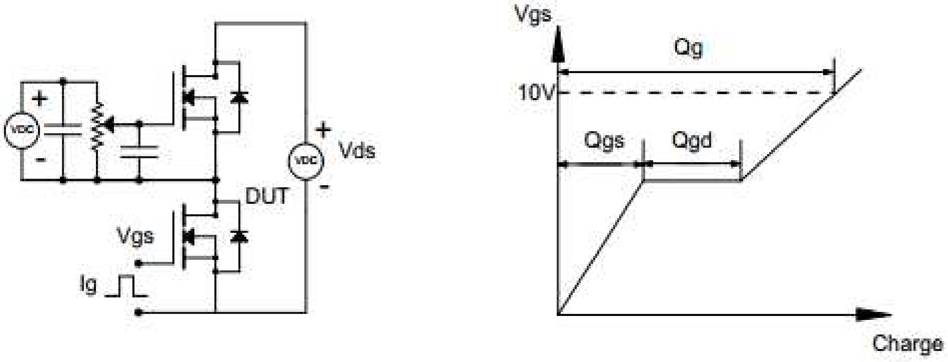


Maximum Safe Operating Area

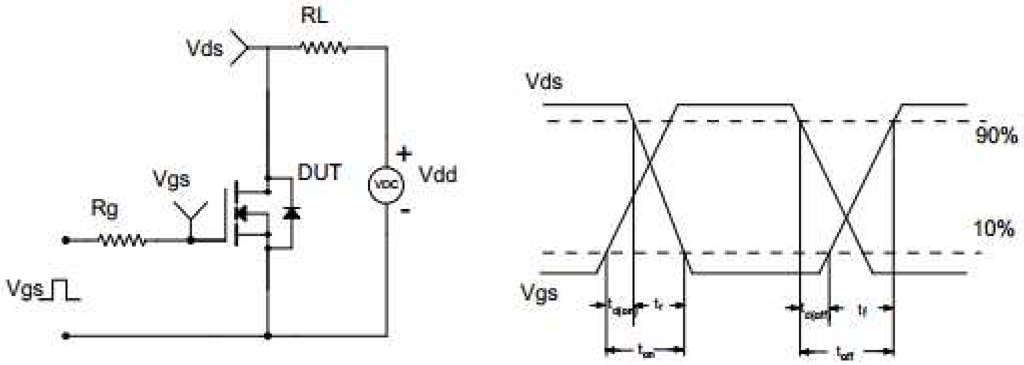
Note： The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

■ Test Circuit & Waveform

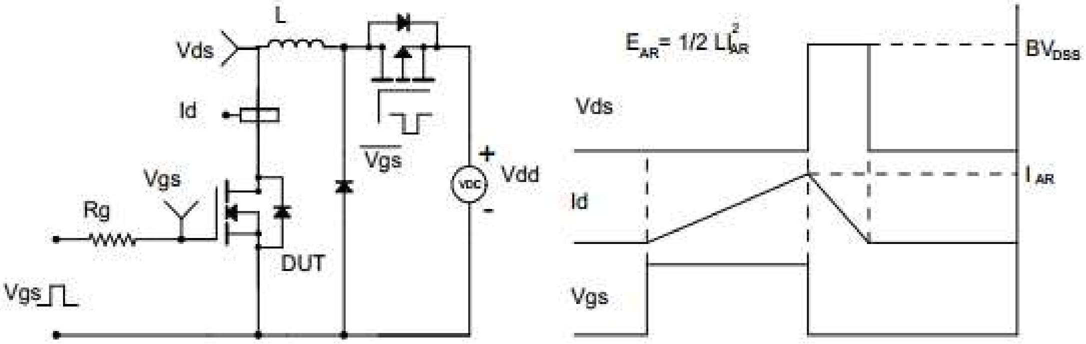
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



■ TO-252 Package Dimensions

Unit：mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	2.10		2.50	E	5.80		6.30
B	0.80		1.25	e1	2.25	2.30	2.35
b	0.50		0.85	e2	4.45		4.75
b1	0.50		0.90	L1	9.50		10.20
b2	0.45		0.60	L2	0.90		1.45
C	0.45		0.60	L3	0.60		1.10
D	6.35		6.75	K	-0.1		0.10
D1	5.10		5.50