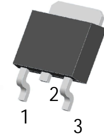
60N03 N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$MAX	I_D
30V	9mΩ@10V	60A
	17mΩ@4.5V	

TO-251
TO-252

1. GATE
2. DRAIN
3. SOURCE



DESCRIPTION

The MOSFET uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

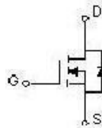
FEATURES

- High density cell design for ultra low $R_{DS(ON)}$
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

APPLICATIONS

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	60	A
Pulsed Drain Current	I_{DM}	240	A
Single Pulsed Avalanche Energy	E_{AS}(1)	400	mJ
Power Dissipation	P_D	1.25	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	100	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{stg}	-55 ~+150	℃
Lead Temperature for Soldering Purposes(1/8'' from case for 10s)	T_L	260	℃

(1).E_{AS} condition: V_{DD}=20V,L=0.5mH, R_G=25Ω, Starting T_J = 25°C

T_a=25 ℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	30			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =40V, V_{GS} =0V			1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V			±100	nA
On characteristics (note1)						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.2	1.5	2.5	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =20A		7.2	9	mΩ
		V_{GS} =4.5V, I_D =20A		11	17	mΩ
Forward transconductance	g_{FS}	V_{DS} =10V, I_D =20A	15			S
Dynamic characteristics (note 2)						
Input capacitance	C_{iss}	V_{DS} =20V,V_{GS} =0V, f =1MHz		1800		pF
Output capacitance	C_{oss}			280		
Reverse transfer capacitance	C_{rss}			190		
Switching characteristics (note 2)						
Total gate charge	Q_g	V_{DS}=20V, V_{GS}=10V, I_D=20A		29		nC
Gate-source charge	Q_{gs}			4.5		
Gate-drain charge	Q_{gd}			6.4		
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V,I_D=2A, V_{GS}=10V,R_G=3Ω, R_L=1Ω		6.4		ns
Turn-on rise time	t_r			17.2		
Turn-off delay time	$t_{d(off)}$			29.6		
Turn-off fall time	t_f			16.8		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage(note1)	V_{SD}	V_{GS} =0V, I_S=20A			1.2	V
Continuous drain-source diode forward current	I_S				60	A
Pulsed drain-source diode forward current	I_{SM}				240	A

Notes:

1. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
2. Guaranteed by design, not subject to production.

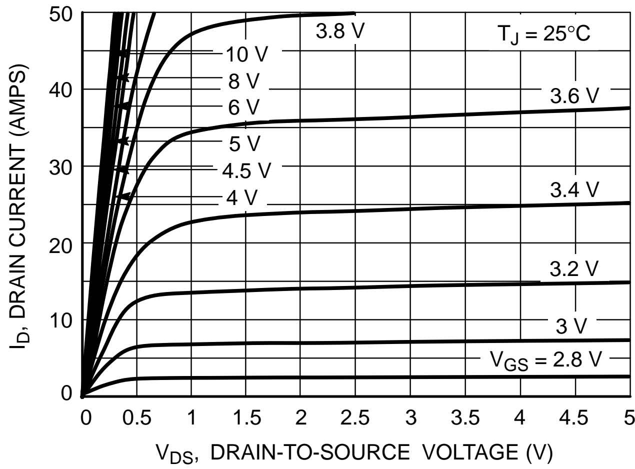


Figure 1. On-Region Characteristics

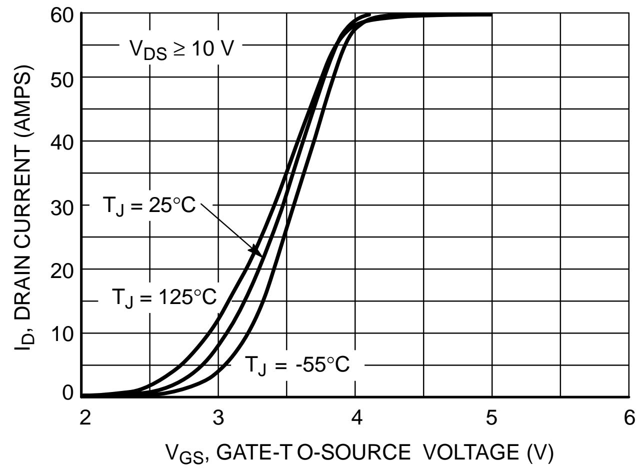


Figure 2. Transfer Characteristics

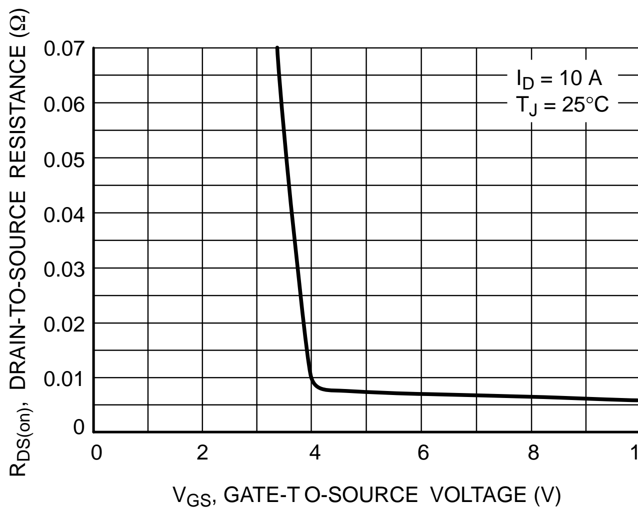


Figure 3. On-Resistance versus Gate-To-Source Voltage

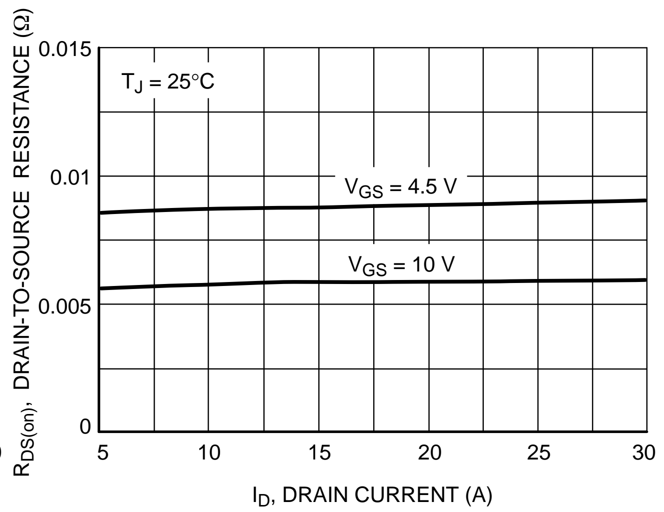


Figure 4. On-Resistance versus Drain Current and Gate Voltage

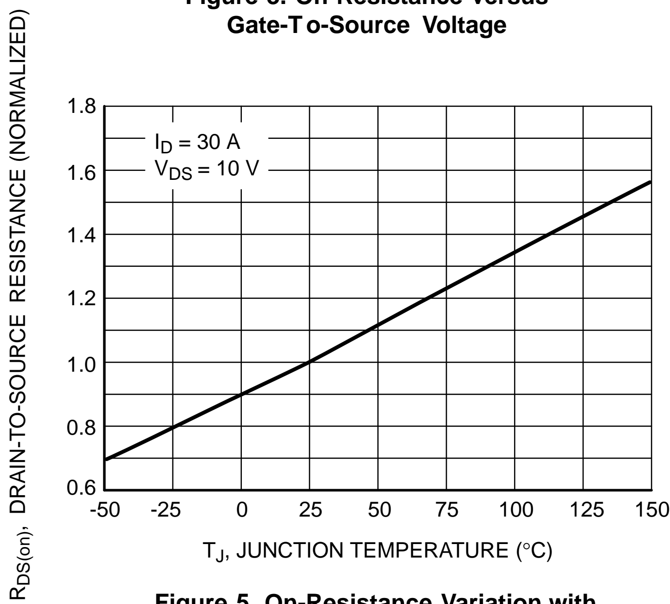


Figure 5. On-Resistance Variation with Temperature

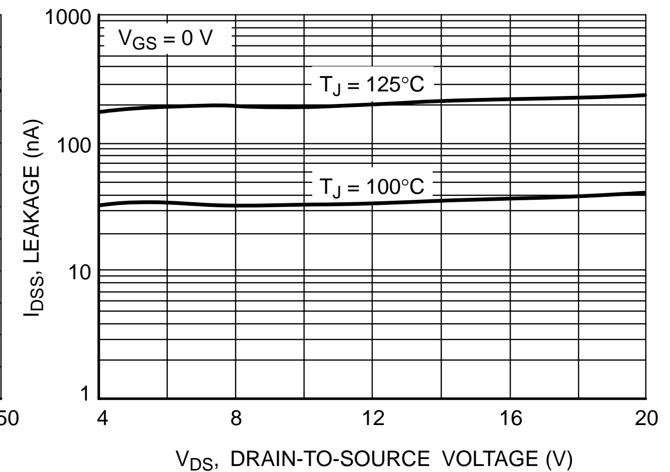


Figure 6. Drain-To-Source Leakage Current versus Voltage

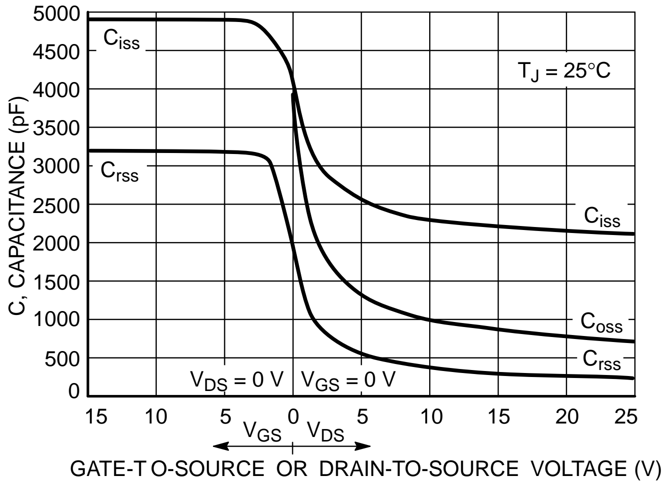


Figure 7. Capacitance Variation

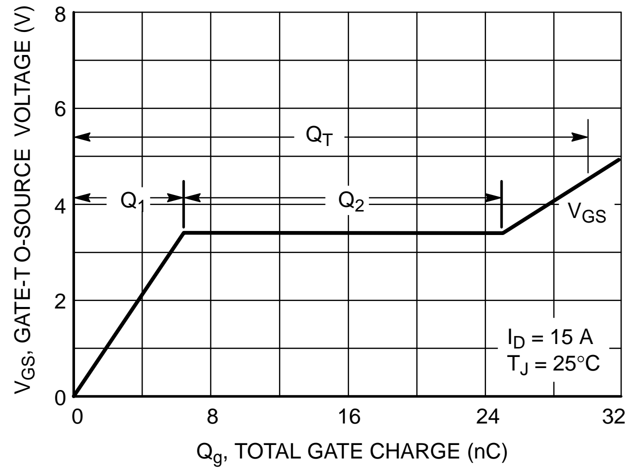


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

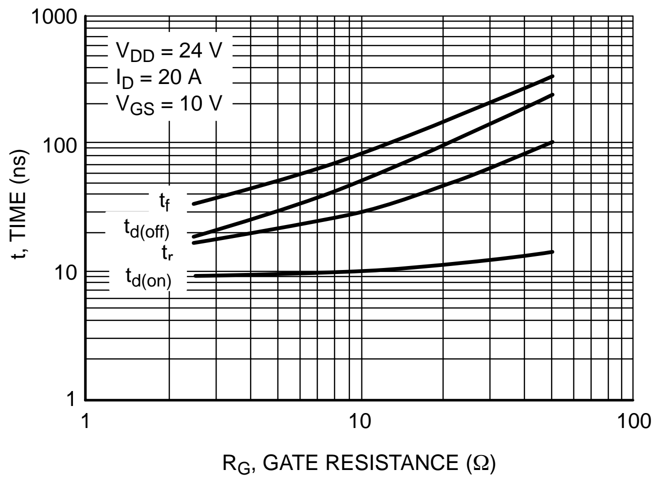


Figure 9. Resistive Switching Time Variation versus Gate Resistance

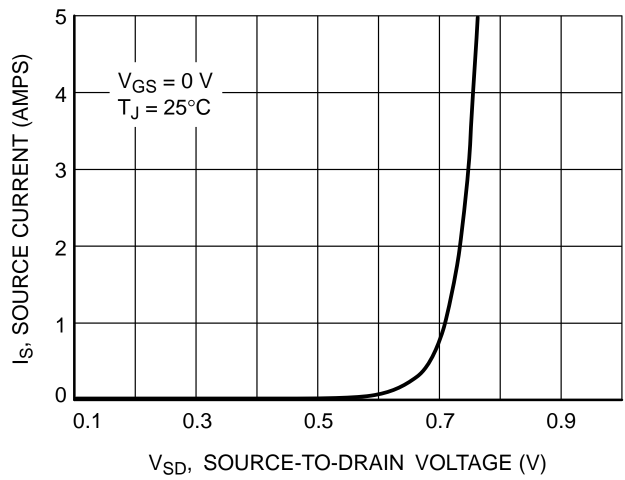


Figure 10. Diode Forward Voltage versus Current