

## 30V/20A N-Channel MOSFET

### Features

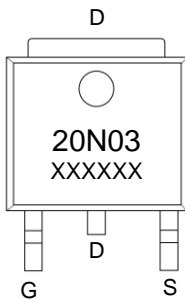
- Trench Power LV MOSFET technology
- High density cell design for low  $R_{DS(ON)}$

### Product Summary

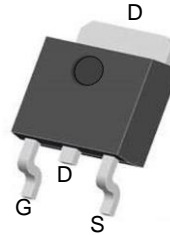
$V_{DS}$	$R_{DS(ON)}$ MAX	$I_D$ MAX
30V	35m $\Omega$ @10V	20A
	45m $\Omega$ @4.5V	

### Application

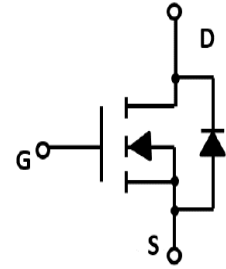
- Battery protection
- Load switch
- Power management



20N03 : Device code  
XXXXXX : Code



TO-252 top view



Schematic diagram

Marking and pin assignment

Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)				
Symbol	Parameter		Rating	Unit
<b>Common Ratings (<math>T_C=25^\circ\text{C}</math> Unless Otherwise Noted)</b>				
$V_{DS}$	Drain-Source Breakdown Voltage		30	V
$V_{GS}$	Gate-Source Voltage		$\pm 12$	V
$T_J$	Maximum Junction Temperature		150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range		-50 to 155	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	20	A
<b>Mounted on Large Heat Sink</b>				
$I_{DM}$	Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	65	A
$I_D$	Continuous Drain Current@ $GS=10V$	$T_C=25^\circ\text{C}$	20	A
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	1.2	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient>(*1 in2 Pad of 2-oz Copper), Max.)		104	$^\circ\text{C/W}$

<b>Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)</b>						
<b>Symbol</b>	<b>Parameter</b>	<b>Condition</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
B <sub>V(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	--	--	1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.65	0.9	1.5	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =5.8A	--	21	35	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.0A	--	27	45	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =4.0A	--	33	60	
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	--	632	--	pF
C <sub>OSS</sub>	Output Capacitance		--	58	--	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance		--	70	--	pF
<b>Switching Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =5.8A, V <sub>GS</sub> =10V	--	17.3	--	nC
Q <sub>gs</sub>	Gate Source Charge		--	2.2	--	nC
Q <sub>gd</sub>	Gate Drain Charge		--	2.1	--	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V, I <sub>D</sub> =5.8A, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω	--	4.4	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	28.3	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	16.5	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	26.3	--	nS
<b>Source- Drain Diode Characteristics</b>						
V <sub>SD</sub>	Forward on voltage	T <sub>J</sub> =25°C, I <sub>S</sub> =5.8A,	--	--	1.2	V

## Typical Operating Characteristics

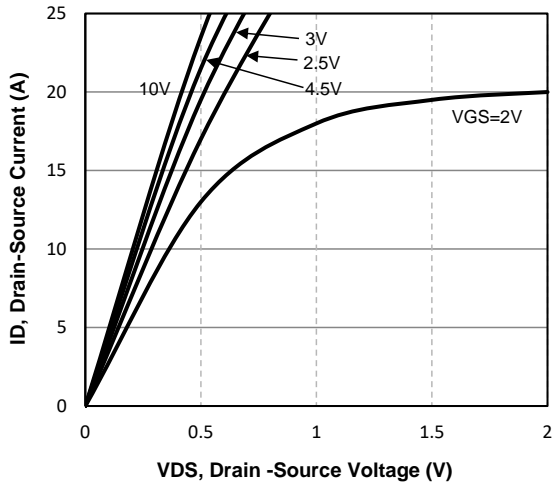


Fig1. Typical Output Characteristics

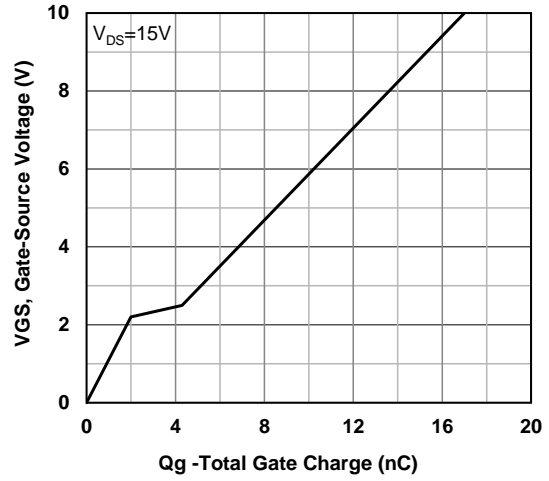


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

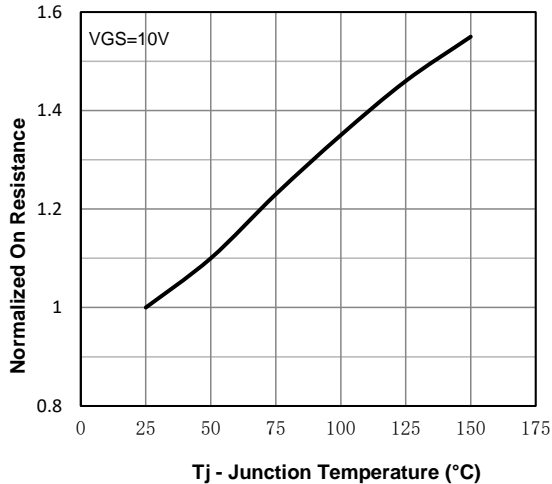


Fig3. Normalized On-Resistance Vs. Temperature

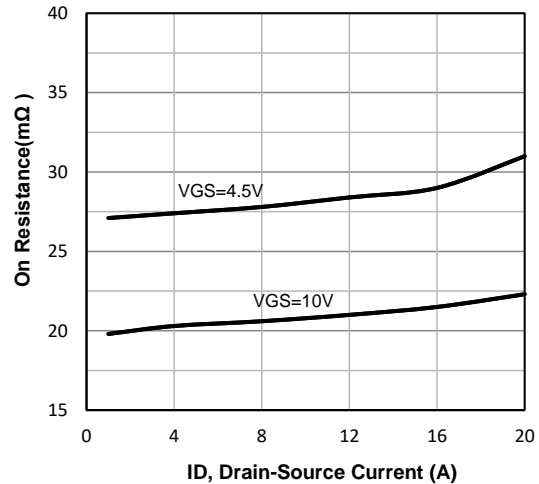


Fig4. On-Resistance Vs. Drain-Source

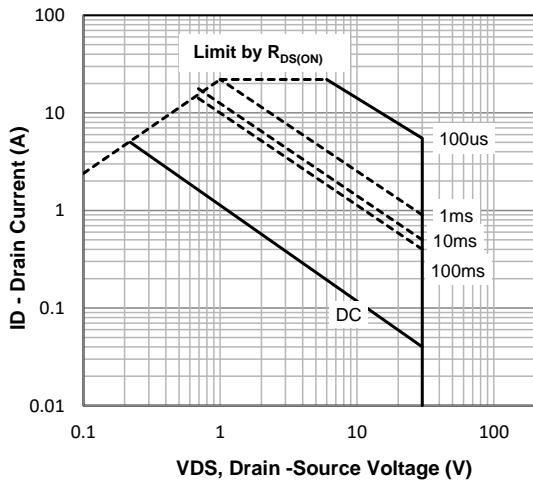


Fig5. Maximum Safe Operating Area

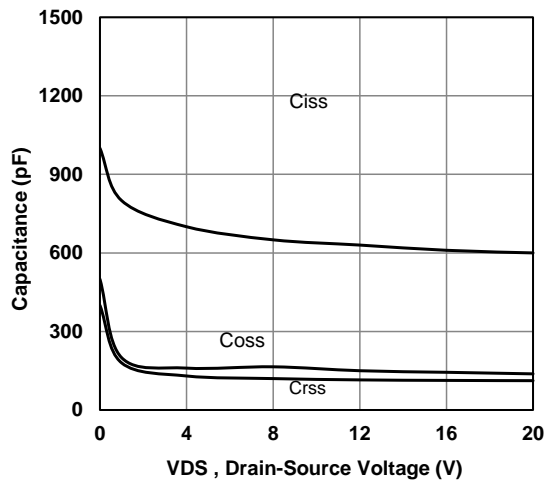
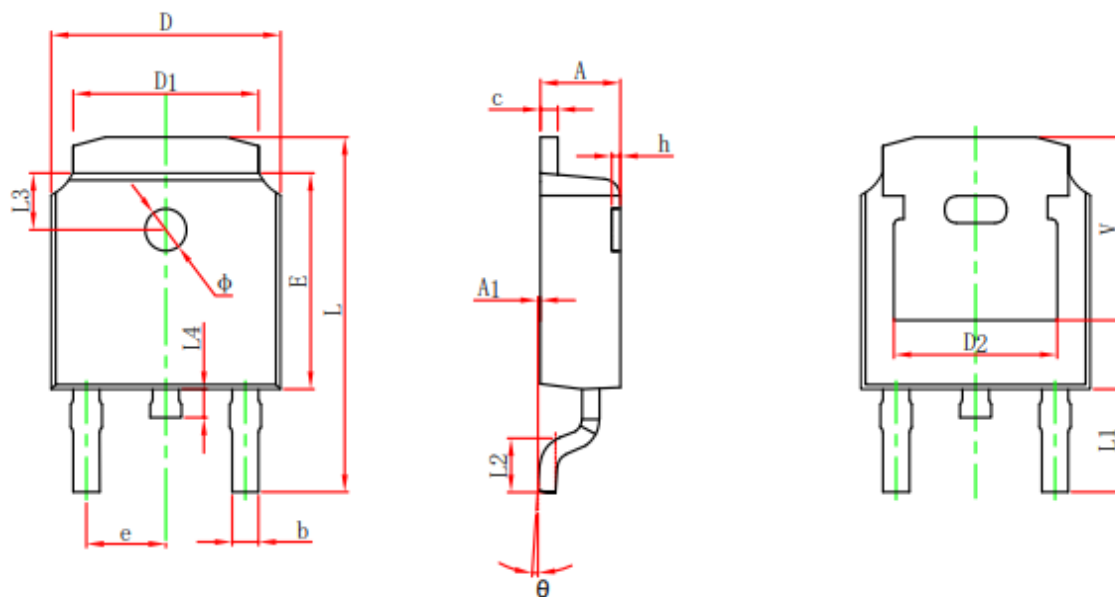


Fig6 Typical Capacitance Vs. Drain-Source Voltage

**TO-252 Package information**


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	