

N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)(Typ.)	I _D (A) ^a	Q _g (Typ.)
40	2.2 at V _{GS} = 10 V	125	40.4 nC
	3.3 at V _{GS} = 4.5 V		

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- High density cell design for ultra low Rdson
- AEC-Q101 Qualified for Automotive Applications

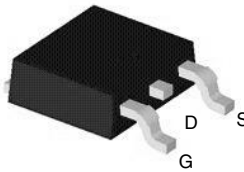


RoHS
COMPLIANT

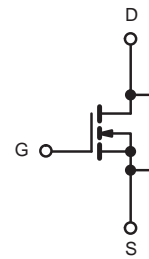
APPLICATIONS

- Load switching
- Hard switched and high frequency circuits

TO-252 Pin Configuration



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 175 °C) ^a	I _D	T _C = 25 °C	A
		T _C = 100 °C	
Pulsed Drain Current ^b	I _{DM}	400	
Single Avalanche Energy	E _{AS}	255	mJ
Maximum Power Dissipation ^c	P _D	T _C = 25 °C	W
		T _C = 100 °C	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to + 175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^d	R _{thJA}	45	°C/W
Junction-to-Case (Drain)	R _{thJC}	1	

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating; pulse width limited by max. junction temperature.
- P_D is based on max. junction temperature, using junction-case thermal resistance.
- The value of R_{thJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

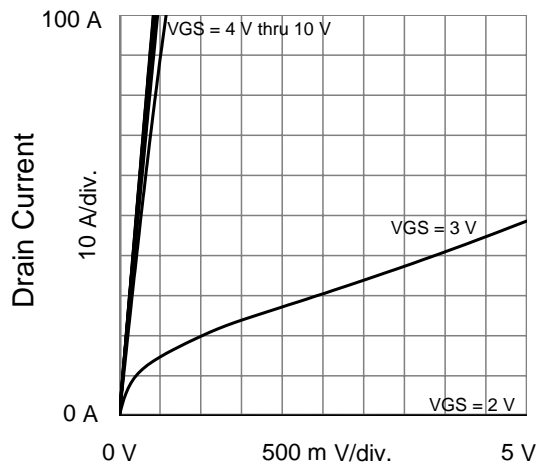
SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	40	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1	-	3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	100	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	125	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	-	2.2	2.7	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 30\text{ A}$	-	3.3	3.8	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 30\text{ A}$	-	55	-	S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 20\text{ V}, f = 1\text{ MHz}$	-	2920	-	pF
Output Capacitance	C_{oss}		-	876	-	
Reverse Transfer Capacitance	C_{rss}		-	2	-	
Total Gate Charge ^c	Q_g	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	-	40.4	-	nC
Gate-Source Charge ^c	Q_{gs}		-	5.84	-	
Gate-Drain Charge ^c	Q_{gd}		-	4.96	-	
Gate Resistance	R_g	$f = 1\text{ MHz}$	-	4.4	-	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 20\text{ V}, I_D = 30\text{ A}, R_g = 3\text{ }\Omega$ $V_{GS} = 10\text{ V}$	-	11.5	-	ns
Rise Time ^c	t_r		-	10	-	
Turn-Off Delay Time ^c	$t_{d(off)}$		-	40	-	
Fall Time ^c	t_f		-	12	-	
Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25\text{ }^\circ\text{C}$)						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	125	A
Pulsed Current	I_{SM}		-	-	400	A
Forward Voltage ^a	V_{SD}	$I_F = 1\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 30\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	-	23	-	ns
Reverse Recovery Charge	Q_{rr}		-	55	-	nC

Notes

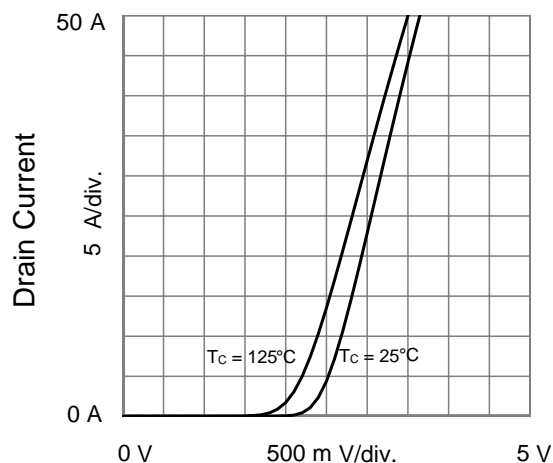
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

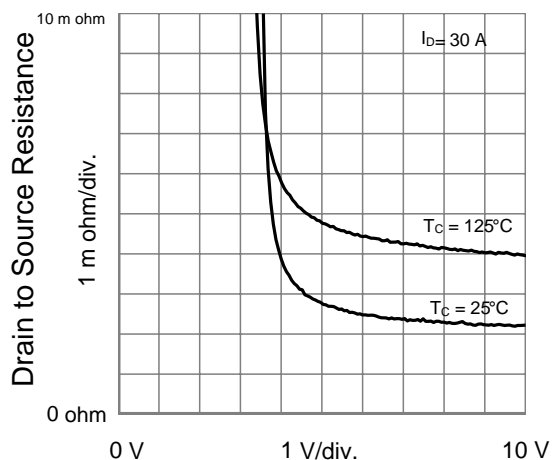
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



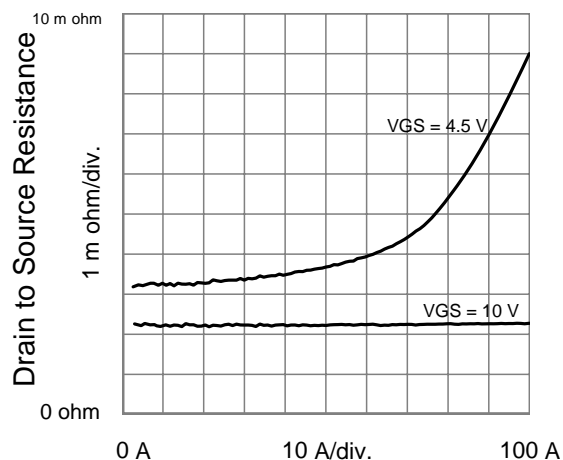
**Drain to Source Voltage
Output Characteristics**



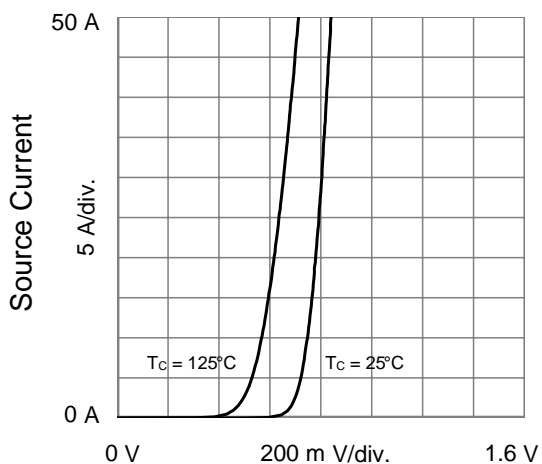
**Gate to Source Voltage
Transfer Characteristics**



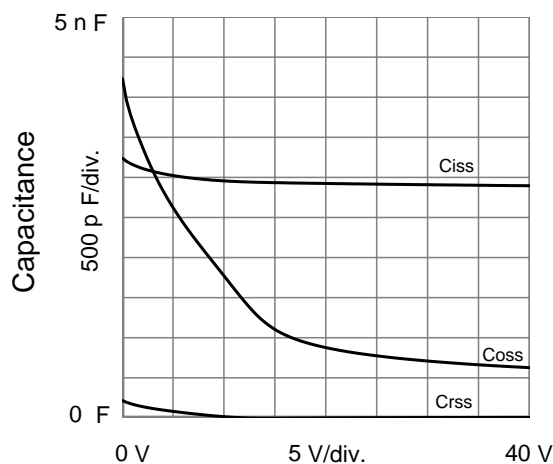
**Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage**



Drain Current

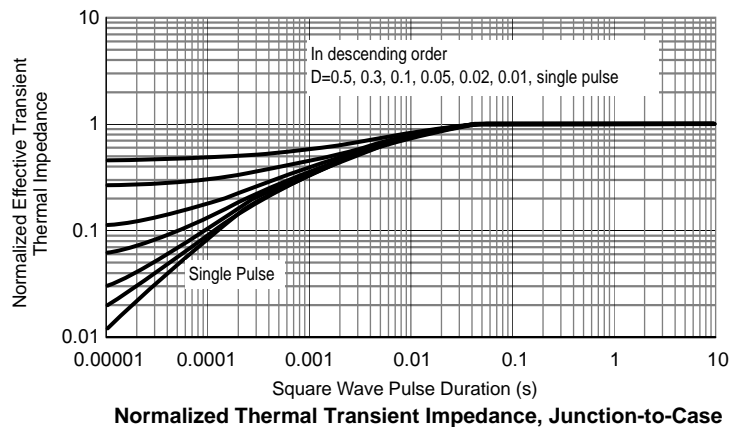
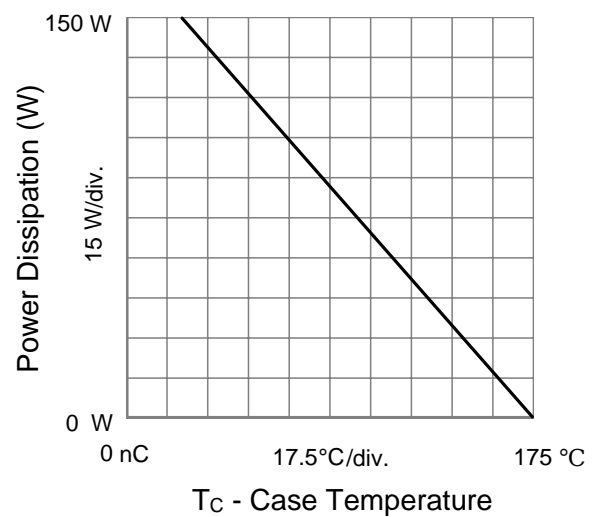
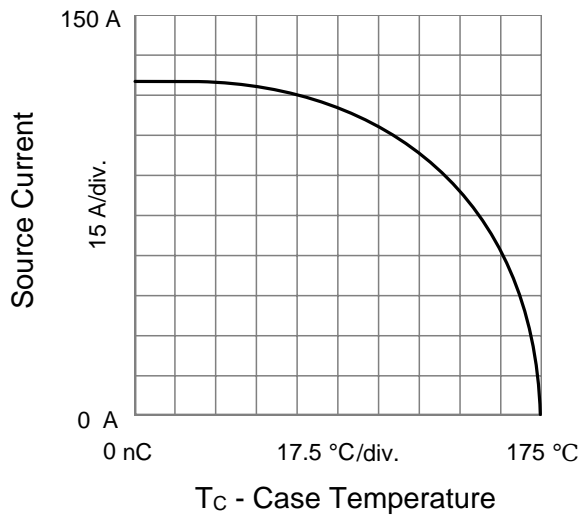
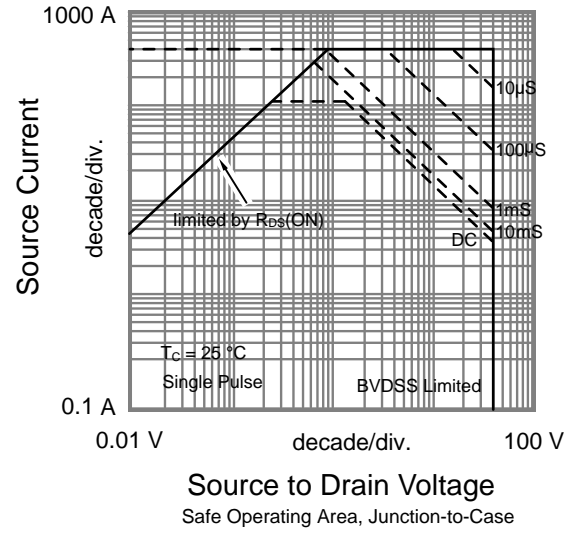
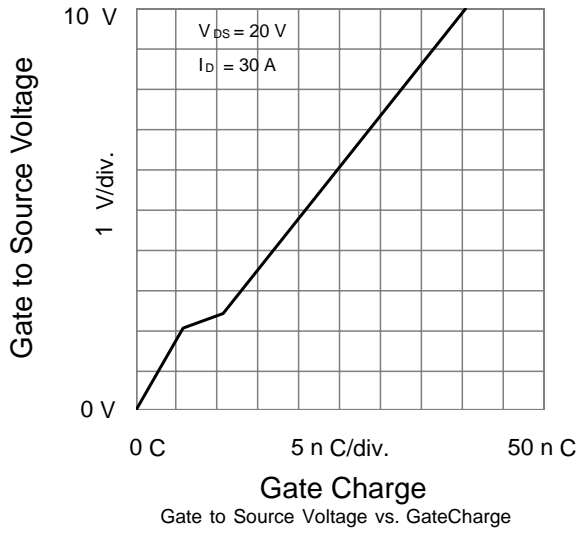


**Source to Drain Voltage
Body Diode Forward Characteristics**

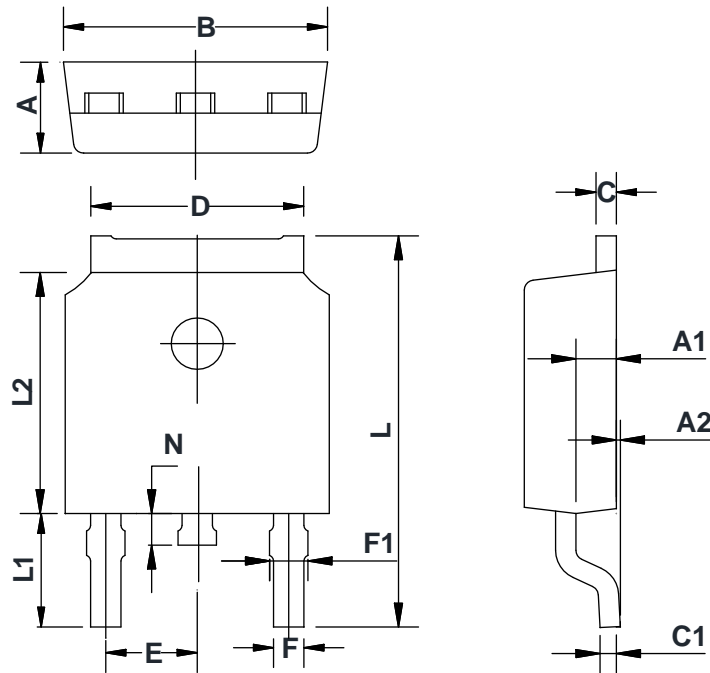


**Drain to Source Voltage
Capacitances**

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



TO-252-2L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max
A	2.10	2.30	2.50
A1	0.88	1.01	1.16
A2	0.00	0.15	0.28
B	6.40	6.60	6.80
C	0.42	0.50	0.63
C1	0.42	0.50	0.63
D	5.08	5.32	5.65
E	2.286 TYP		
F	0.63	0.76	0.89
F1	0.64	0.86	1.08
L	9.30	9.90	10.80
L1	2.40	2.80	3.60
L2	5.90	6.10	6.55
N	0.57	0.80	1.05

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