

N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a
60	0.0049 at V _{GS} = 10 V	60

FEATURES

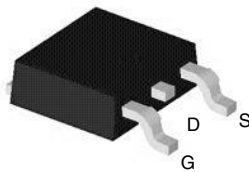
- 175 °C Junction Temperature
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested



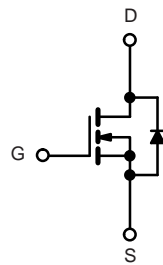
Applications

- Synchronous Rectification in DC/DC and AC/DC Converters
- Industrial and Motor Drive applications

TO-252 Pin Configuration



Top View



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	V _{GS}	± 20	V
Continuous Drain Current (T _J = 175 °C) ^b	I _D	T _C = 25 °C	60
		T _C = 100 °C	50 ^a
Pulsed Drain Current	I _{DM}	210	A
Continuous Source Current (Diode Conduction)	I _S	60 ^a	
Avalanche Current	I _{AS}	62	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH E _{AS}	125	mJ
Maximum Power Dissipation	P _D	T _C = 25 °C	146
		T _A = 25 °C	12 ^{b,c}
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R _{thJA}	t ≤ 10 sec	13	°C/W
		Steady State	35	
Maximum Junction-to-Case	R _{thJC}	0.76	1.0	

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t ≤ 10 s.

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)

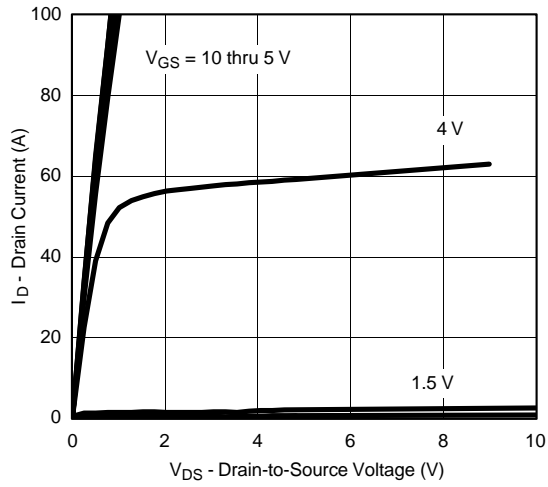
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1	-	3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	65			A
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$		0.0049	0.0059	Ω
		$V_{GS} = 10\text{ V}, I_D = 10\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.0055	0.0068	
		$V_{GS} = 10\text{ V}, I_D = 10\text{ A}, T_J = 175\text{ }^\circ\text{C}$		0.0063	0.0079	
		$V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$		0.0058	0.0075	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 10\text{ A}$		80		S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		10620		μF
Output Capacitance	C_{oss}			750		
Reverse Transfer Capacitance	C_{rss}			85		
Total Gate Charge ^c	Q_g	$V_{DS} = 48\text{ V}, V_{GS} = 10\text{ V}, I_D = 10\text{ A}$		58	75	nC
Gate-Source Charge ^c	Q_{gs}			15		
Gate-Drain Charge ^c	Q_{gd}			19		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 48\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		23		ns
Rise Time ^c	t_r			32		
Turn-Off Delay Time ^c	$t_{d(off)}$			28		
Fall Time ^c	t_f			11		
Source-Drain Diode Ratings and Characteristics ($T_C = 25\text{ }^\circ\text{C}$)						
Pulsed Current	I_{SM}				210	A
Diode Forward Voltage	V_{SD}	$I_F = 10\text{ A}, V_{GS} = 0\text{ V}$		1		V
Reverse Recovery Time	t_{rr}	$I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		31		ns

Notes:

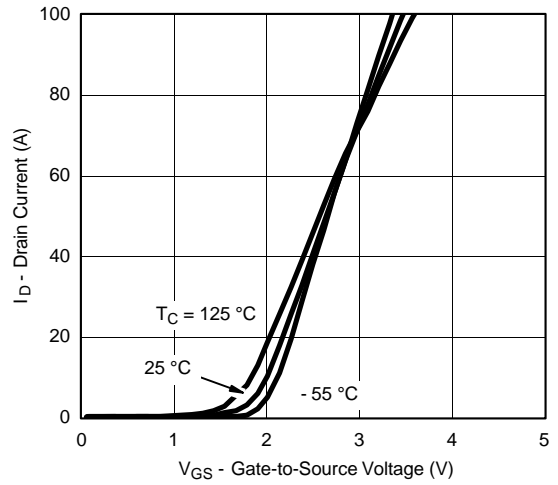
- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- c. Independent of operating temperature.

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.

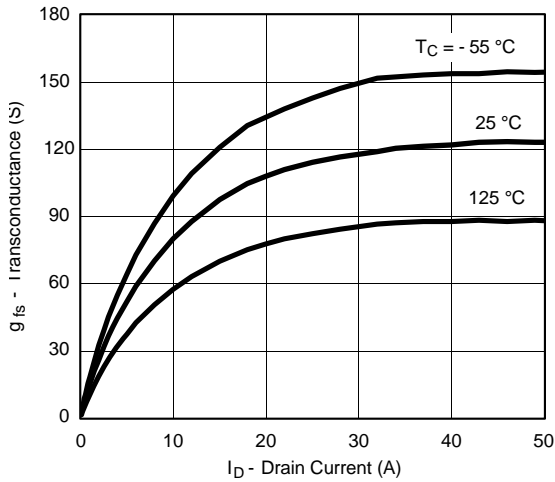
TYPICAL CHARACTERISTICS (25 °C unless noted)



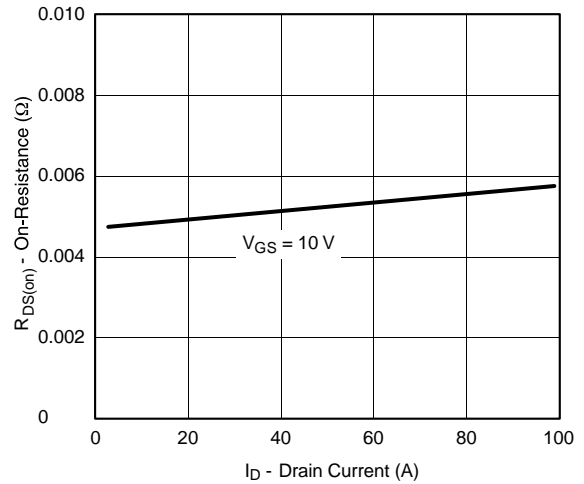
Output Characteristics



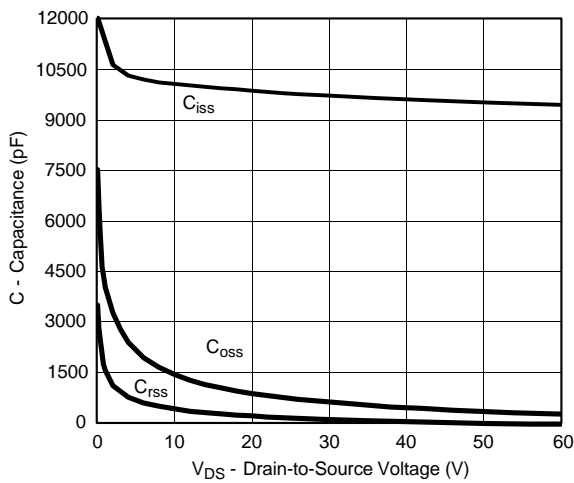
Transfer Characteristics



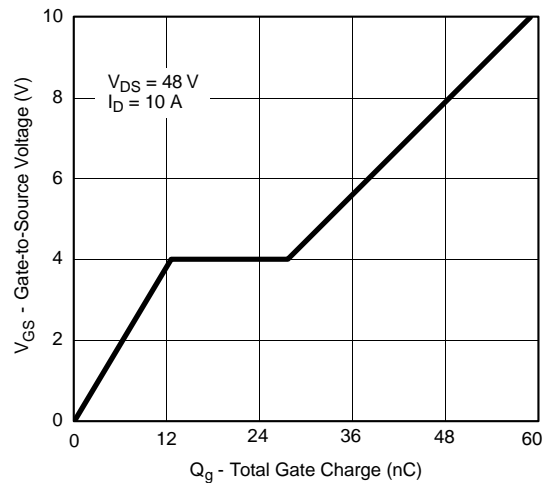
Transconductance



On-Resistance vs. Drain Current

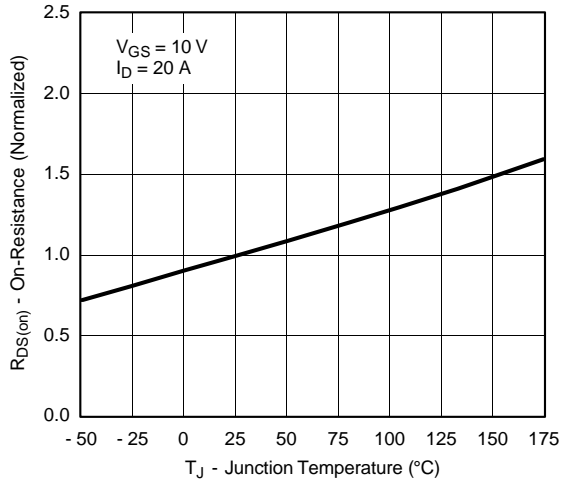


Capacitance

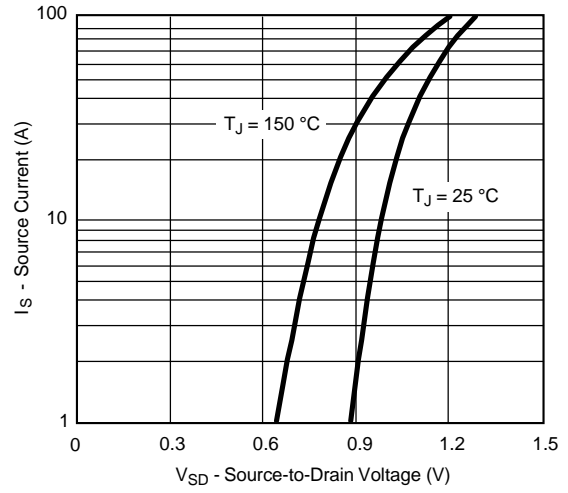


Gate Charge

TYPICAL CHARACTERISTICS (25 °C unless noted)

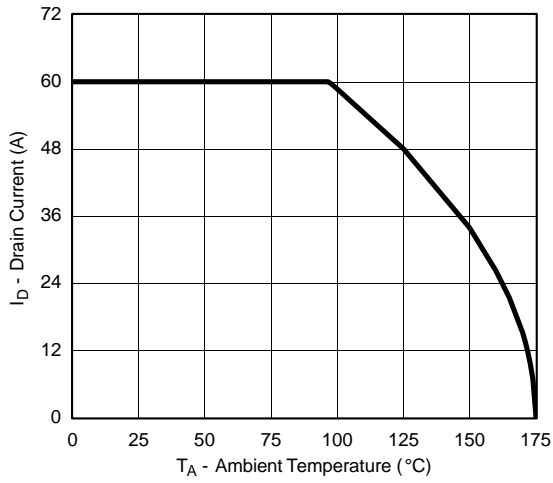


On-Resistance vs. Junction Temperature

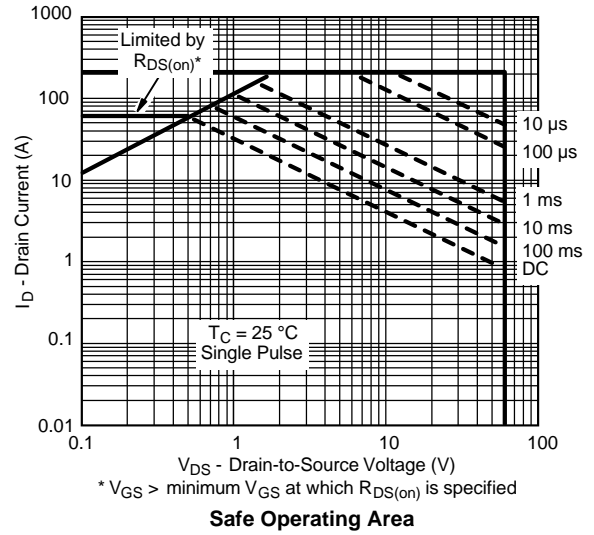


Source-Drain Diode Forward Voltage

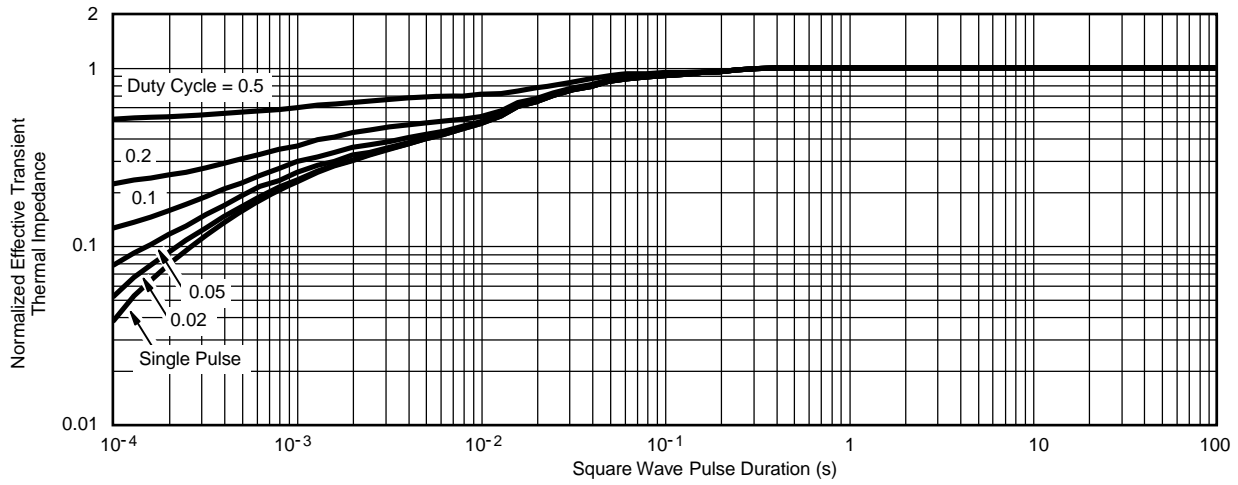
THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature

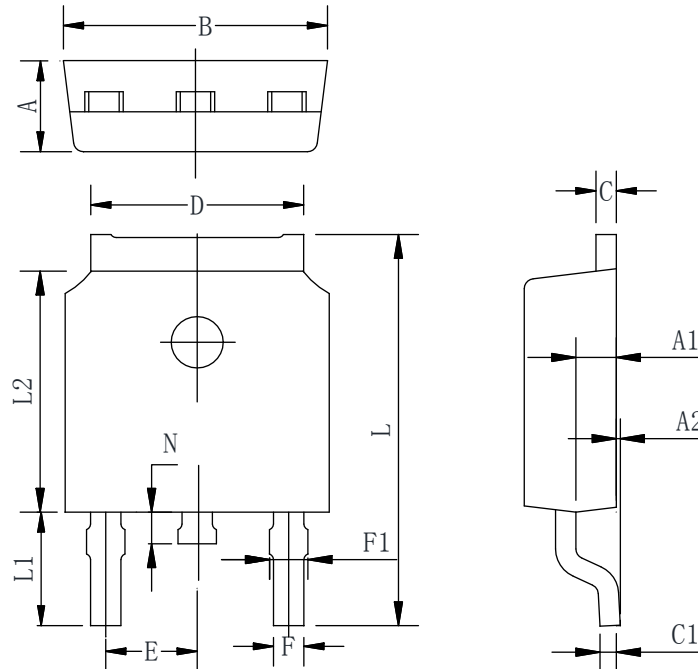


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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	2.4	2.8	3.6
L2	5.90	6.10	6.55
N	0.57	0.80	1.05

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