

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	1.9 at V _{GS} = 10 V	145	43 nC

FEATURES

- DT-SGT Power MOSFET
- Very Low On-resistance
- Excellent FOM(Figure of Merit)
- 100% UIS and Rg Tested



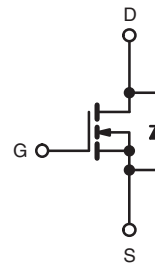
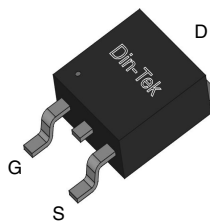
RoHS
COMPLIANT

APPLICATIONS

- Load Switching
- Motor Driver
- High Frequency Switching, Synchronous Rectification

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 = 150 °C) ^a	I _D	T _C = 25 °C	A
		T _C = 100 °C	
Pulsed Drain Current ^b	I _{DM}	561	
Single Avalanche Energy	E _{AS}	462	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 +150	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^d	R _{thJA}	38	°C/W
Junction-to-Case (Drain)	R _{thJC}	1.6	

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	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.0	-	4.0	
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
		$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	100	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	145	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	1.9	2.3	m Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 20\text{ A}$	-	44	-	S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 20\text{ V}, f = 1\text{ MHz}$	-	3014	-	μF
Output Capacitance	C_{oss}		-	1544	-	
Reverse Transfer Capacitance	C_{rss}		-	71	-	
Total Gate Charge ^c	Q_g	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	43	-	nC
Gate-Source Charge ^c	Q_{gs}		-	12.7	-	
Gate-Drain Charge ^c	Q_{gd}		-	8.4	-	
Gate Resistance	R_g	$f = 1\text{ MHz}$	-	1.2	-	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_{GEN} = 3\text{ }\Omega, I_D = 20\text{ A}, V_{GS} = 10\text{ V}$	-	7.5	-	ns
Rise Time ^c	t_r		-	17	-	
Turn-Off Delay Time ^c	$t_{d(off)}$		-	24	-	
Fall Time ^c	t_f		-	11	-	
Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25\text{ }^\circ\text{C}$)						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	105	A
Pulsed Current	I_{SM}		-	-	561	A
Forward Voltage ^a	V_{SD}	$I_F = 2\text{ A}, V_{GS} = 0\text{ V}$	-	0.7	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	-	46	-	ns
Reverse Recovery Charge	Q_{rr}		-	50	-	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)

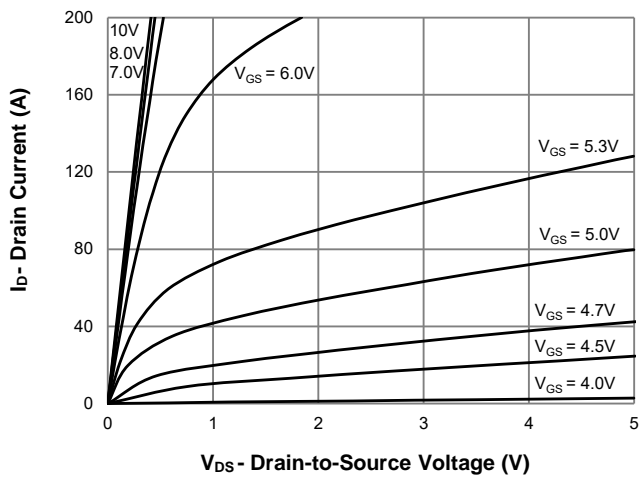


Figure 1: Output Characteristics

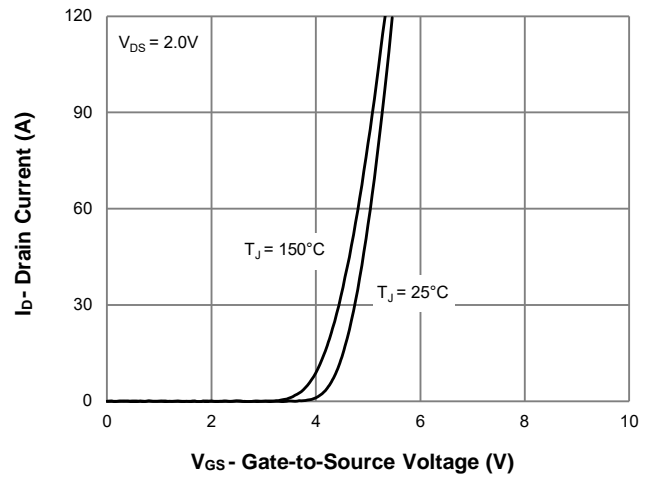


Figure 2: Transfer Characteristics

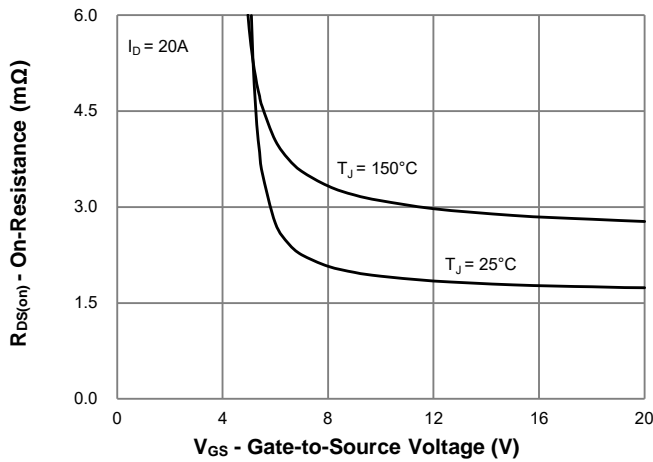


Figure 3: On-Resistance vs. Gate-Source Voltage

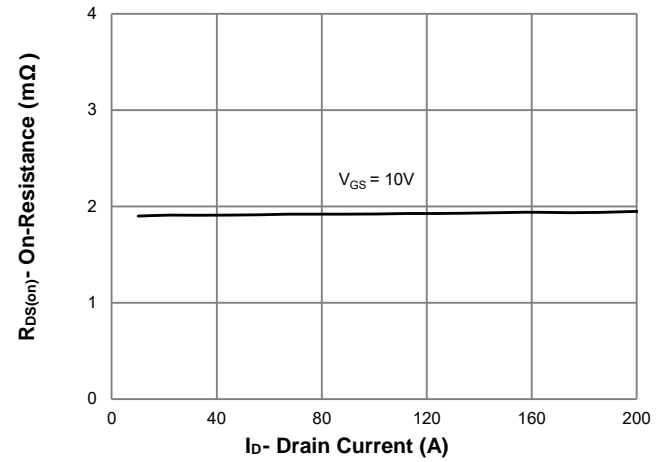


Figure 4: On-Resistance vs. Gate-Source Voltage

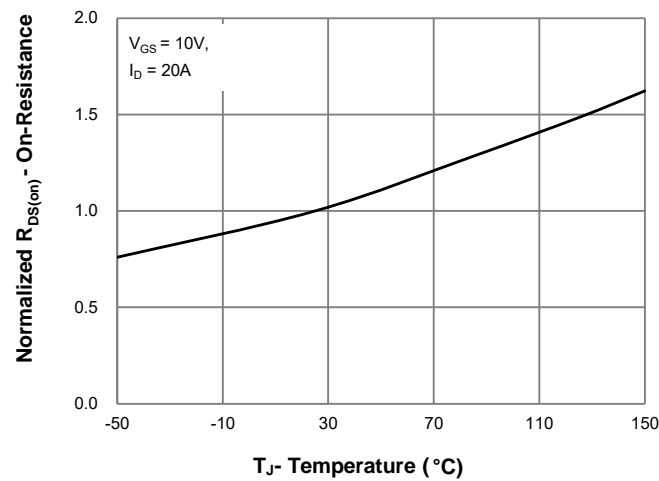


Figure 5: On-Resistance vs. Junction Temperature

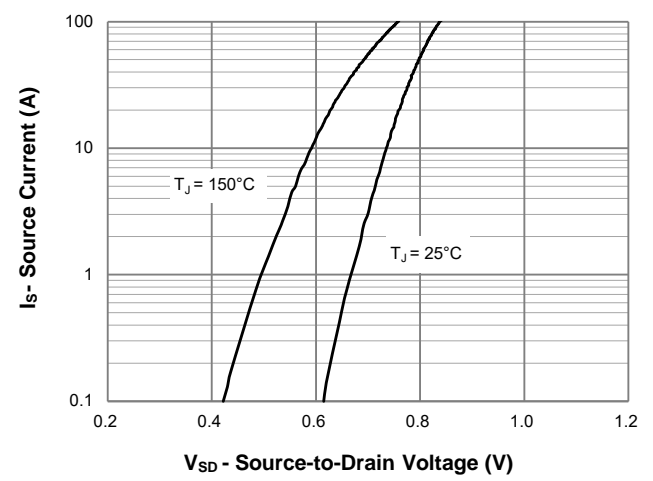


Figure 6: Source-Drain Diode Forward Voltage

TYPICAL CHARACTERISTICS (25°C unless otherwise noted)

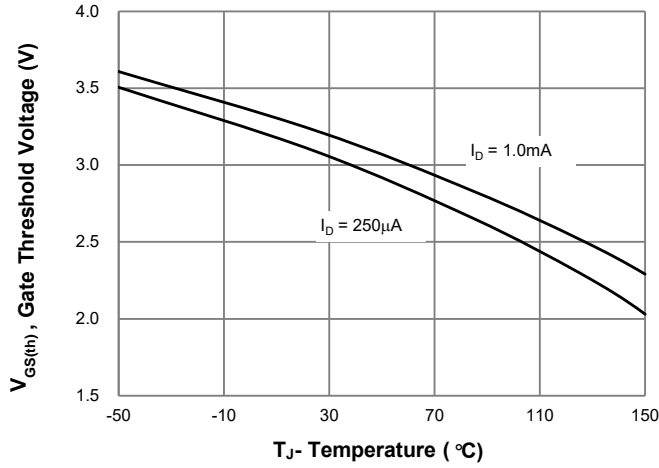


Figure 7: Gate Threshold Variation vs. Junction Temperature

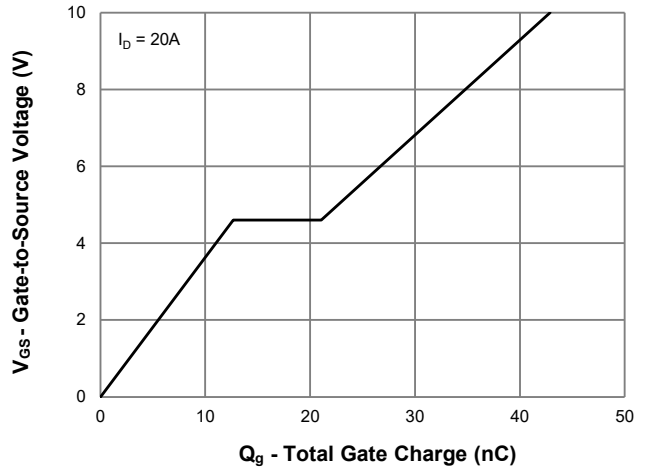


Figure 8: Gate Charge Characteristics

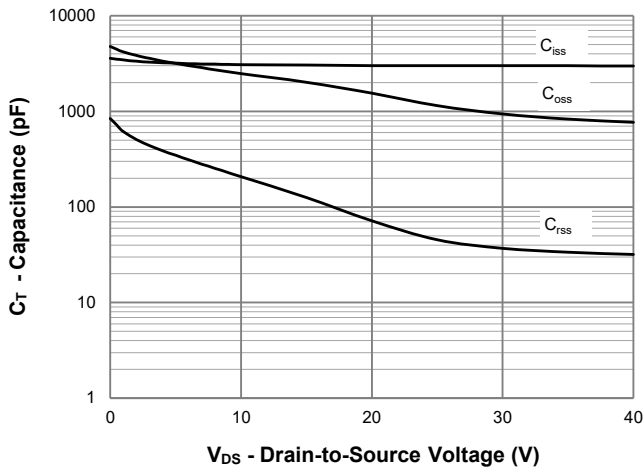


Figure 9: Capacitance Characteristics

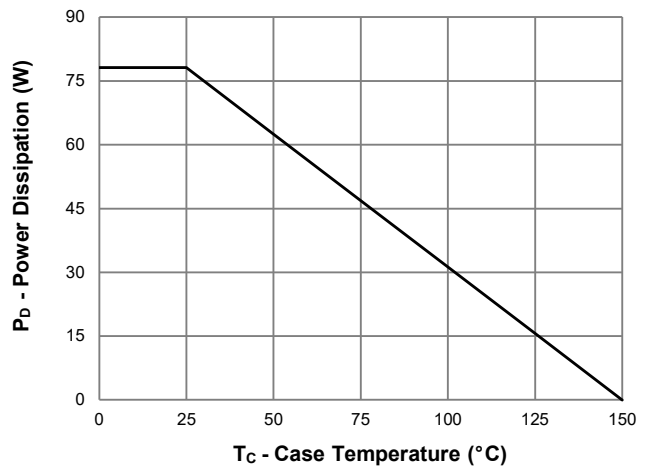


Figure 10: Power Derating

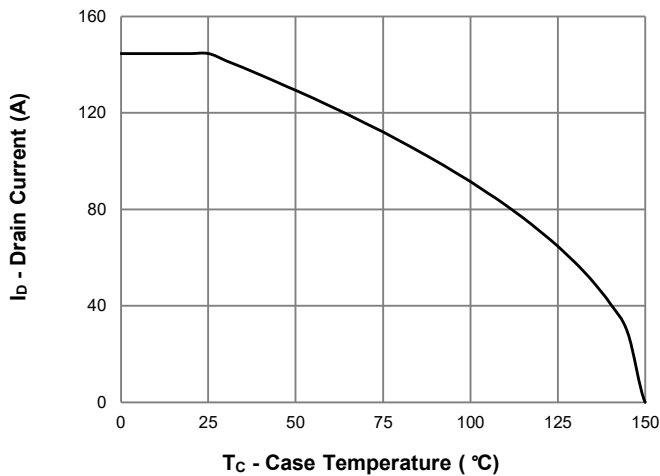


Figure 11: Current Derating

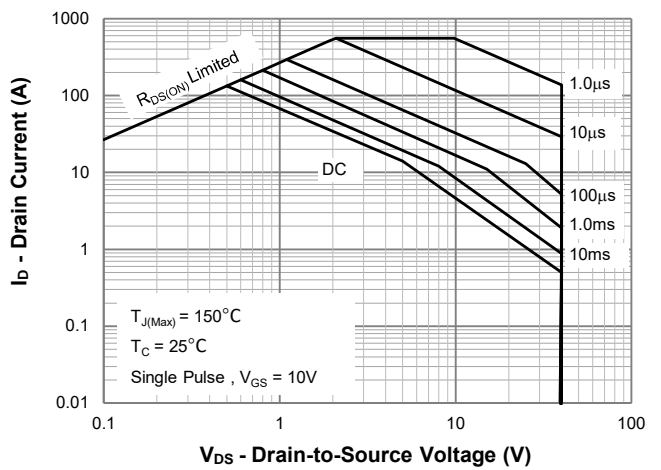


Figure 12: Safe Operating Area

TYPICAL CHARACTERISTICS (25°C unless otherwise noted)

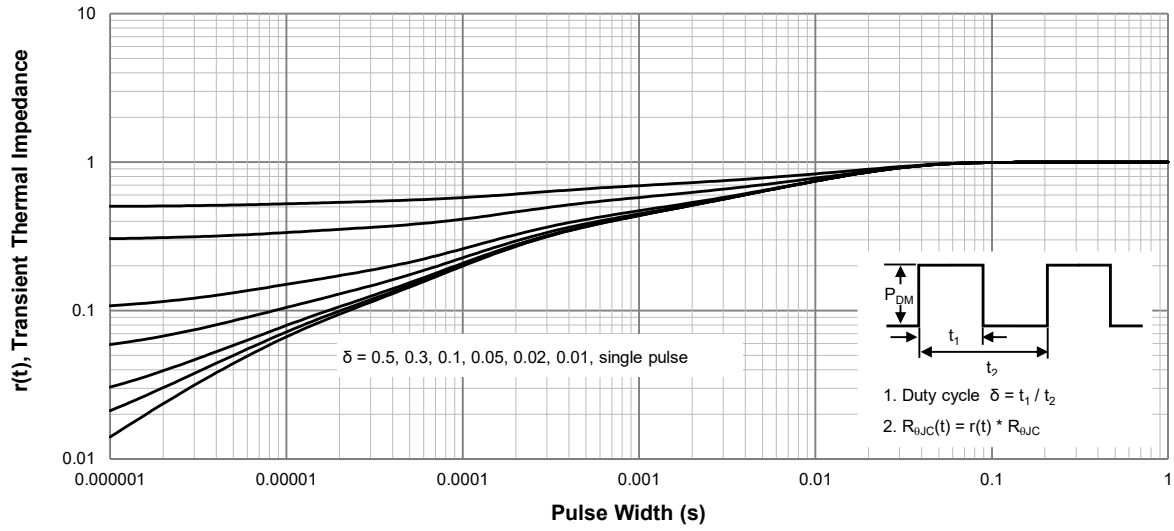
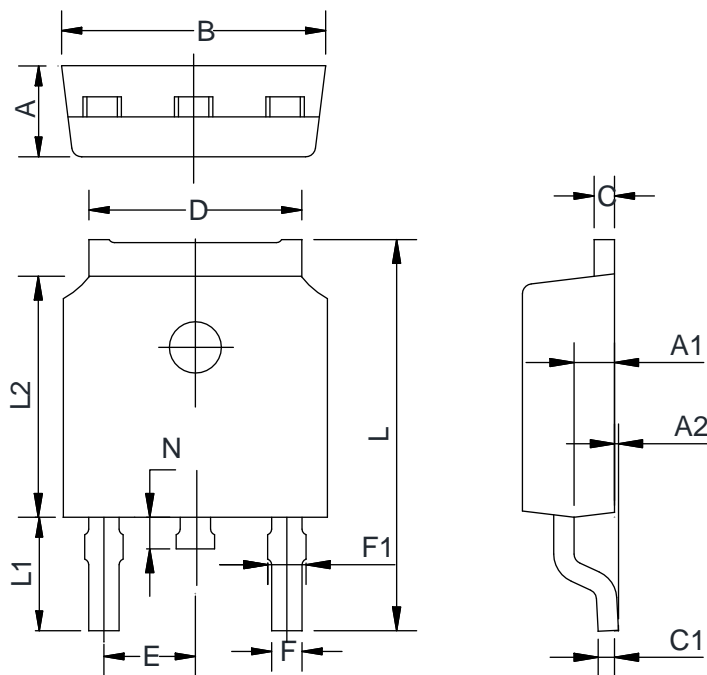


Figure 13: Normalized Maximum Transient Thermal Impedance

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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