

N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ) (Typ.)	I _D (A) ^a	Q _g (Typ.)
60	74 at V _{GS} = 10 V	20	7.2 nC
	78 at V _{GS} = 4.5 V		

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

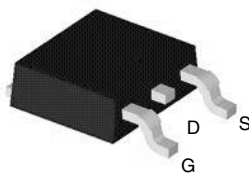


RoHS
COMPLIANT

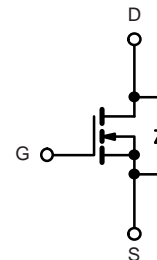
APPLICATIONS

- DC/DC Converters

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}	60	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _C = 25 °C	20
		T _C = 100 °C	12
Pulsed Drain Current ^b	I _{DM}	60	A
Single Avalanche Energy	E _{AS}	20	mJ
Maximum Power Dissipation ^c	P _D	T _C = 25 °C	30
		T _C = 100 °C	12
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to +150	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	MAX	UNIT
Junction-to-Ambient (PCB Mount) ^d	R _{thJA}	45	°C/W
Junction-to-Case (Drain)	R _{thJC}	4.16	

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.

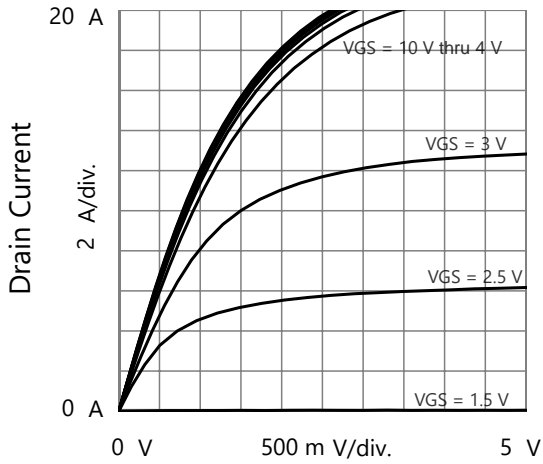
SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$	60			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			20	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 8\text{ A}$		74	81	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 6\text{ A}$		78	89	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 8\text{ A}$		18		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		262		pF
Output Capacitance	C_{oss}			25		
Reverse Transfer Capacitance	C_{rss}			19		
Total Gate Charge	Q_g	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}, I_D = 8\text{ A}$		7.2		nC
Gate-Source Charge	Q_{gs}			1		
Gate-Drain Charge	Q_{gd}			2.3		
Gate Resistance	R_g	$f = 1\text{ MHz}$		3		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, I_D = 8\text{ A}, R_g = 3\text{ }\Omega$ $V_{GS} = 10\text{ V}$		8		ns
Rise Time	t_r			7.5		
Turn-Off Delay Time	$t_{d(off)}$			20		
Fall Time	t_f			5		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			20	A
Pulse Diode Forward Current	I_{SM}				60	
Body Diode Voltage	V_{SD}	$I_S = 1\text{ A}$			1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 8\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		25		ns
Body Diode Reverse Recovery Charge	Q_{rr}				28	

Notes:

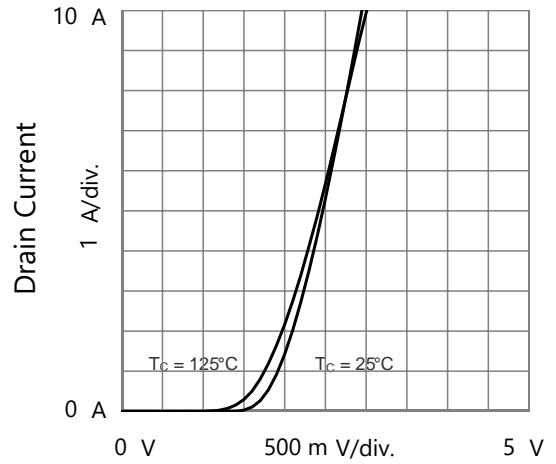
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

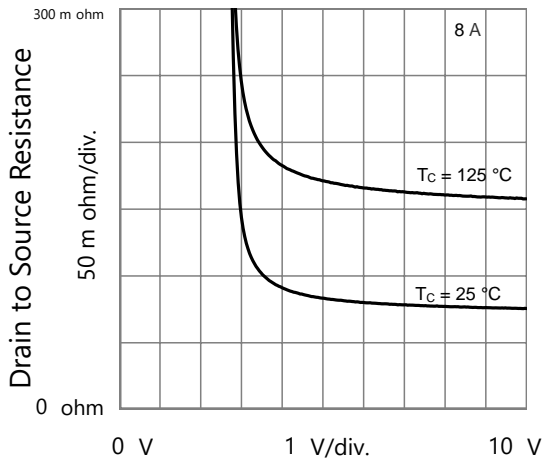
TYPICAL CHARACTERISTICS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)



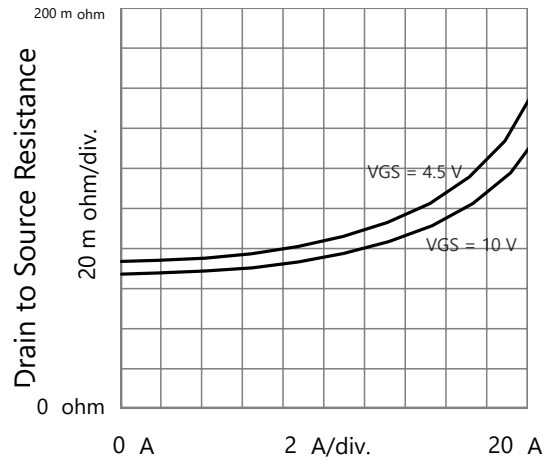
Drain to Source Voltage
Output Characteristics



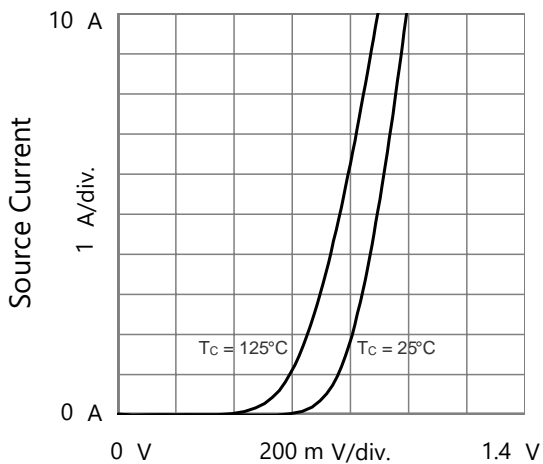
Gate to Source Voltage
Transfer Characteristics



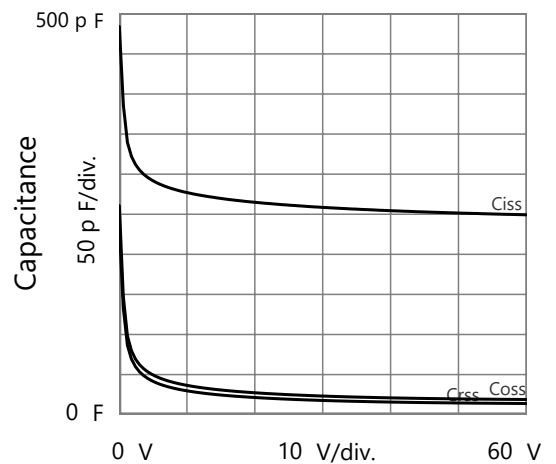
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

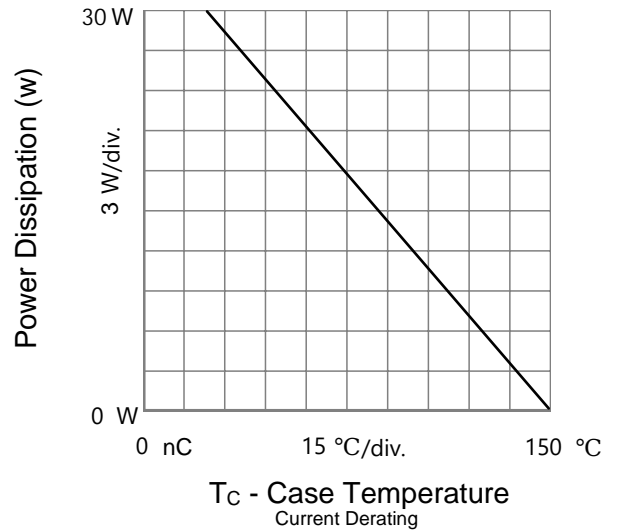
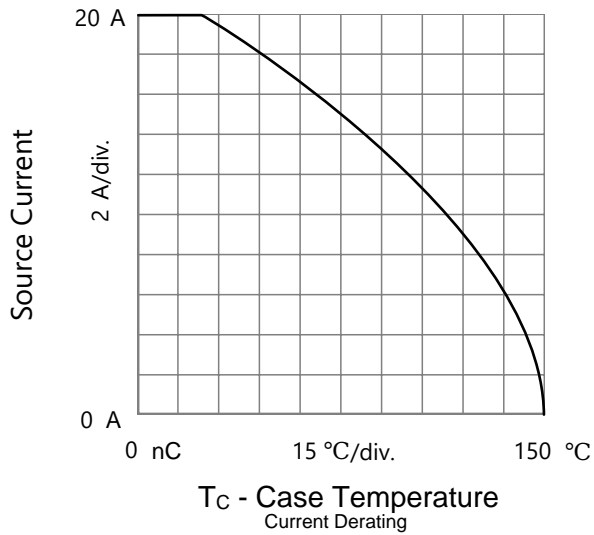
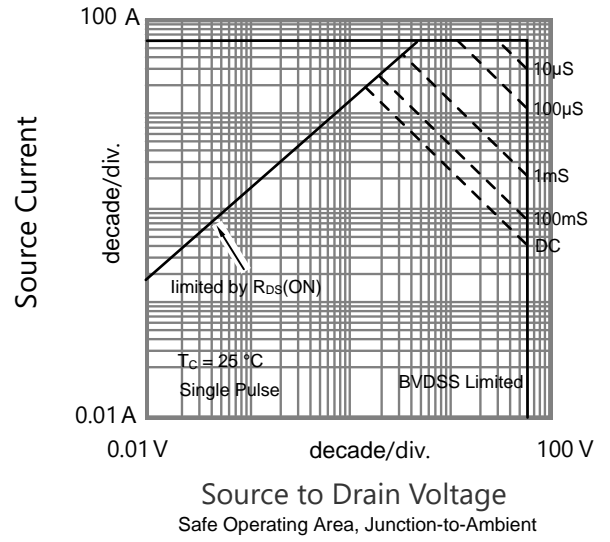
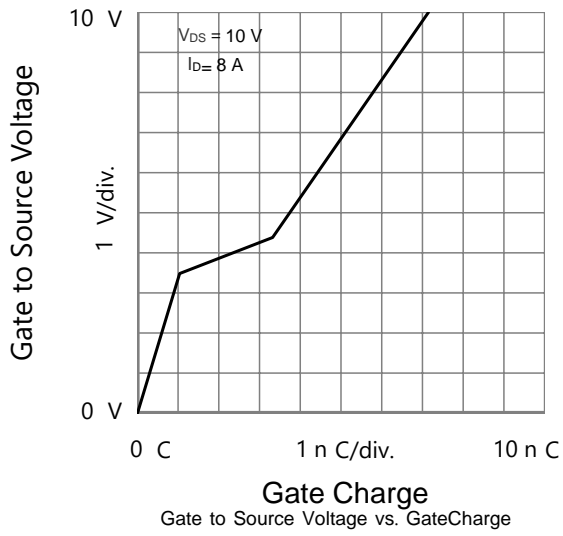


Source to Drain Voltage
Body Diode Forward Characteristics

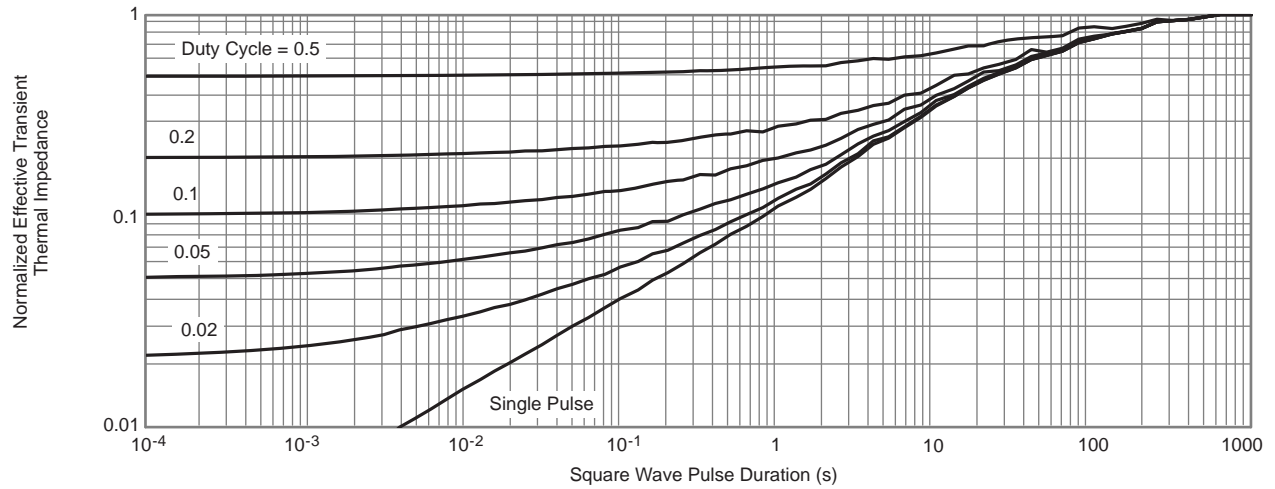


Drain to Source Voltage
Capacitances

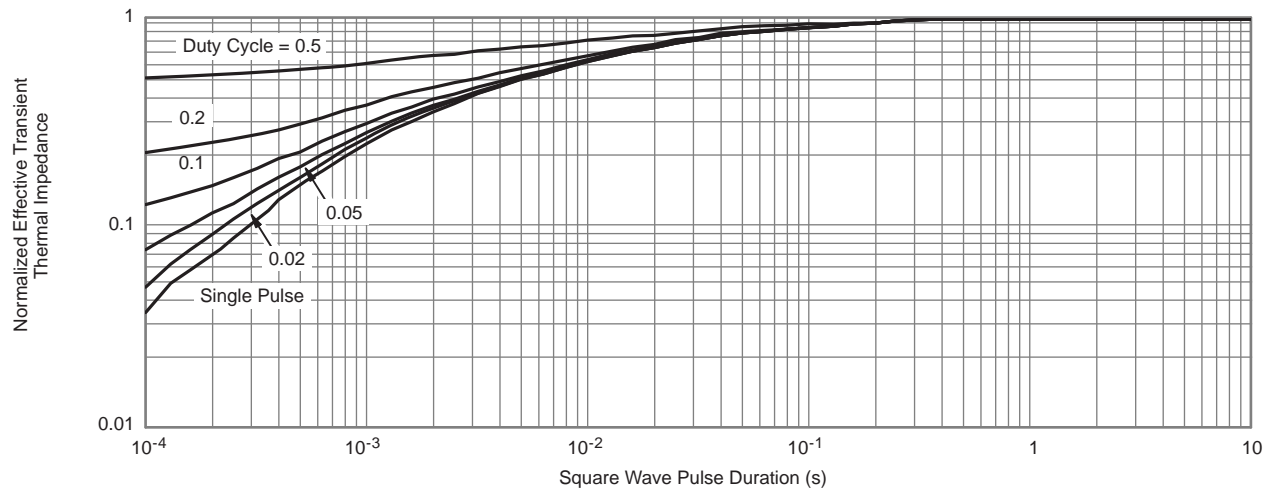
TYPICAL CHARACTERISTICS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)



TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)

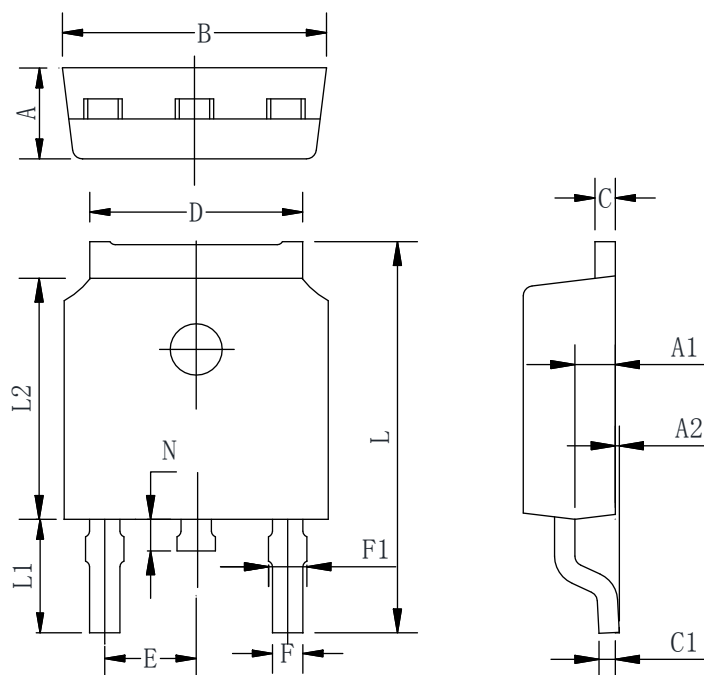


Normalized Thermal Transient Impedance, Junction-to-Ambient



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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