

P-Channel 40 V (D-S) MOSFEET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)	I _D (A)
- 40	5 at V _{GS} = - 10 V	- 85 ^d
	7.3 at V _{GS} = - 4.5 V	- 70 ^d

FEATURES

- DT-Trench Power MOSFET
- 100 % Rg and UIS Tested

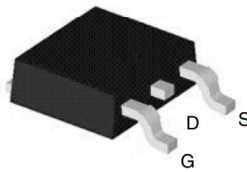
APPLICATIONS

- Load Switch
- DC/DC Converter

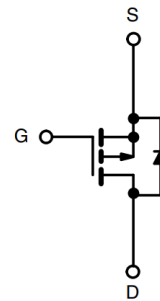


RoHS
COMPLIANT

TO-252 Pin Configuration



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 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)	I _D	T _C = 25 °C	- 85 ^d
		T _C = 125 °C	- 50
Pulsed Drain Current	I _{DM}	- 320	A
Avalanche Current single pulse	I _{AS}	- 80	
Avalanche Energy single pulse ^a	E _{AS}	55	mJ
Power Dissipation	P _D	T _C = 25 °C	105 ^c
		T _A = 25 °C	3.9 ^{b, c}
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient ^b	R _{thJA}	t ≤ 10 s	20	30
		Steady State	40	60
Junction-to-Case	R _{thJC}	-	2.0	°C/W

Notes:

- Duty cycle ≤ 1 %.
- When mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.
- Package limited.

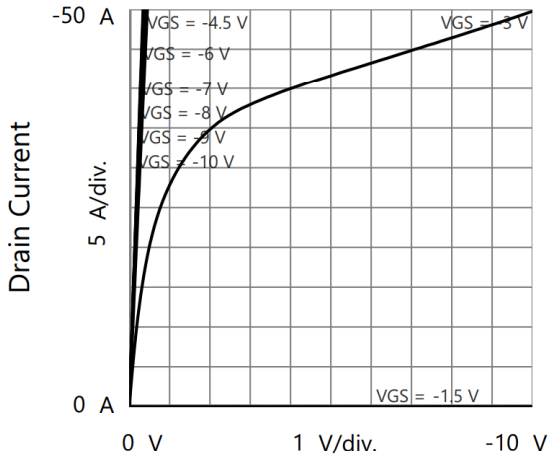
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3	V
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
		$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-100	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-85			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -30\text{ A}$		5	6	m Ω
		$V_{GS} = -4.5\text{ V}, I_D = -20\text{ A}$		7.3	9	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -30\text{ A}$		89		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -20\text{ V}, f = 1\text{ MHz}$		6250		pF
Output Capacitance	C_{oss}			530		
Reverse Transfer Capacitance	C_{rss}			470		
Total Gate Charge ^c	Q_g	$V_{DS} = -20\text{ V}, V_{GS} = -10\text{ V}, I_D = -30\text{ A}$		86		nC
Gate-Source Charge ^c	Q_{gs}			30		
Gate-Drain Charge ^c	Q_{gd}			17		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -20\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \approx -30\text{ A}, V_{GEN} = -10\text{ V}, R_G = 6\text{ }\Omega$		35		ns
Rise Time ^c	t_r			20		
Turn-Off Delay Time ^c	$t_{d(off)}$			82		
Fall Time ^c	t_f			55		
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}^b$						
Continuous Current	I_S				-85	A
Forward Voltage ^a	V_{SD}	$I_F = -1\text{ A}, V_{GS} = 0\text{ V}$		-0.7	-1.0	V
Reverse Recovery Time	t_{rr}	$I_F = -30\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		48		ns
Reverse Recovery Charge	Q_{rr}	$I_F = -30\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		62		nC

Notes:

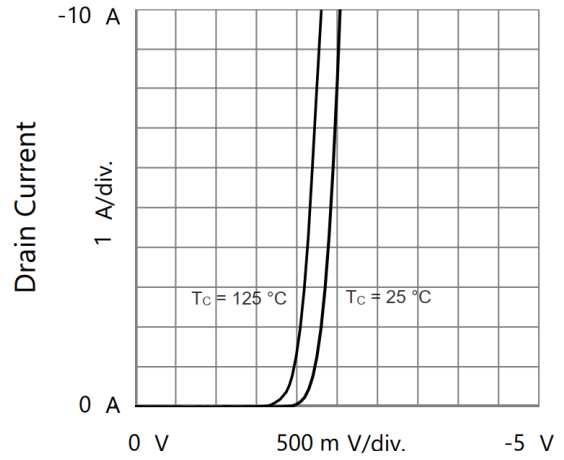
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

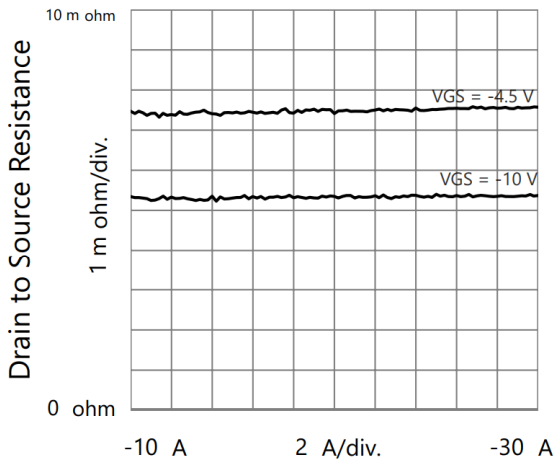
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



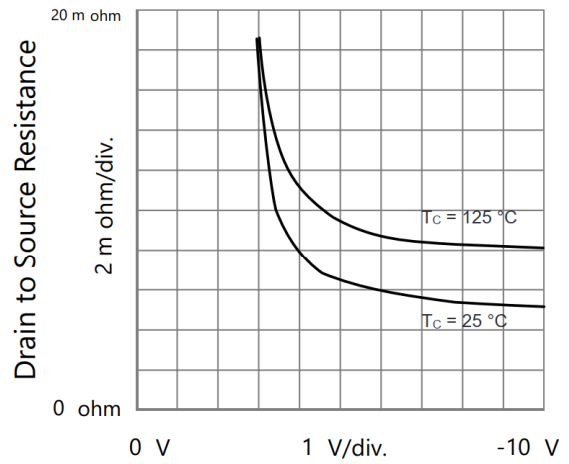
Drain to Source Voltage
Output Characteristics



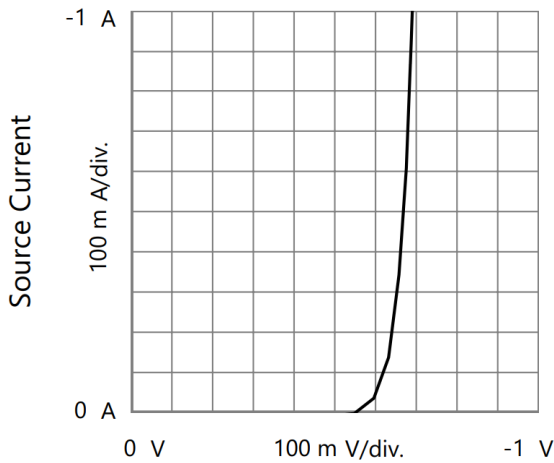
Gate to Source Voltage
Transfer Characteristics



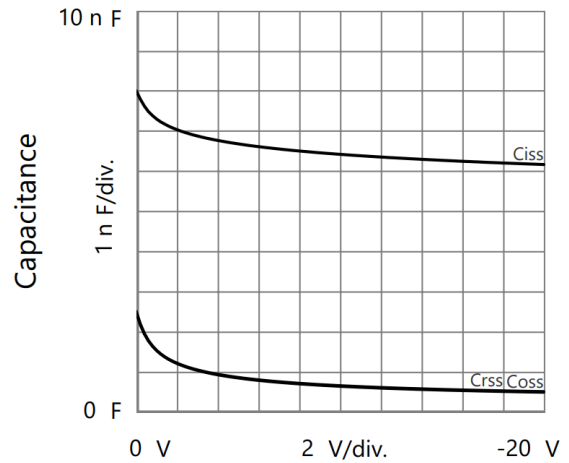
Drain Current
Drain to Source Resistance vs. Drain Current



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

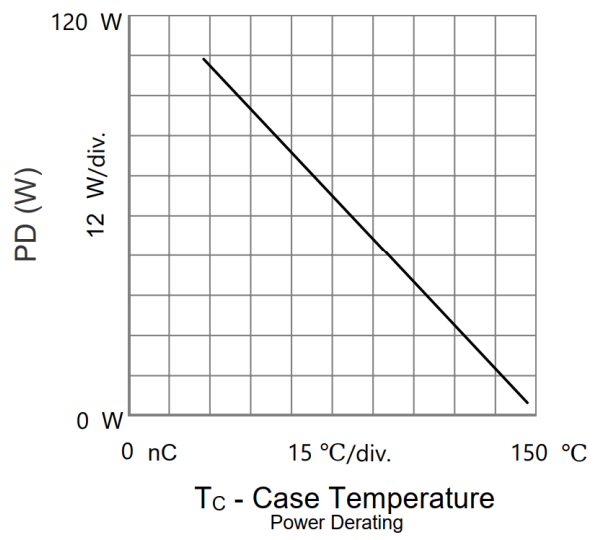
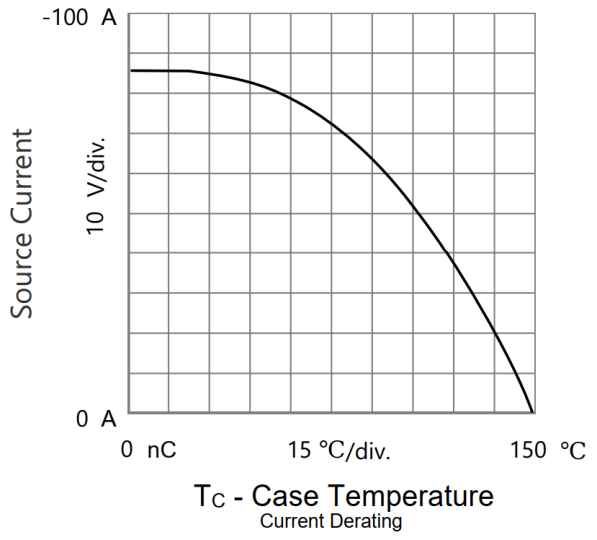
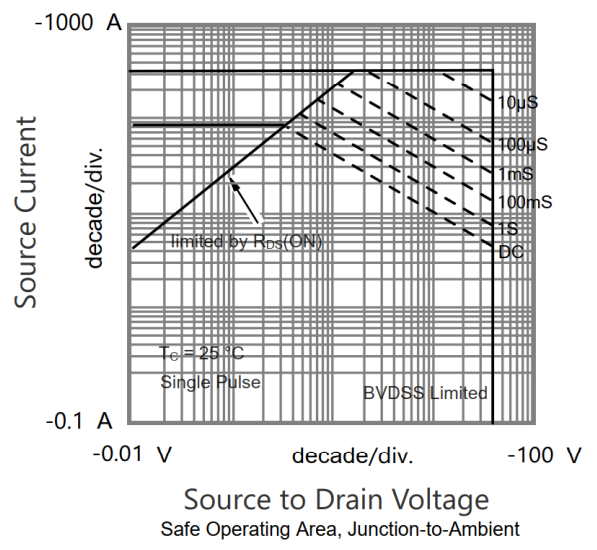
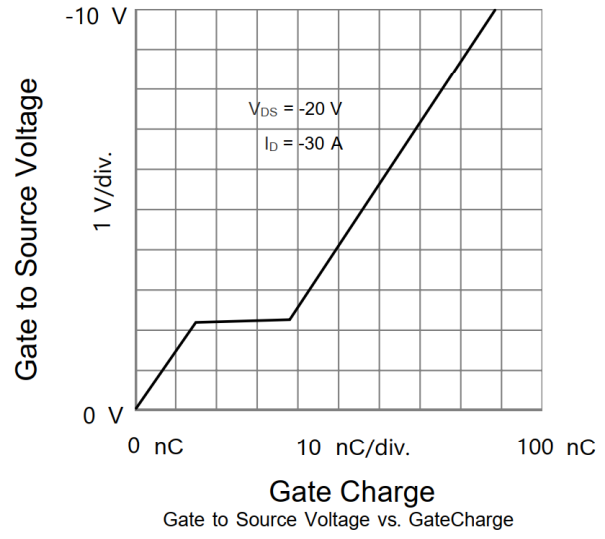


Source to Drain Voltage
Body Diode Forward Characteristics

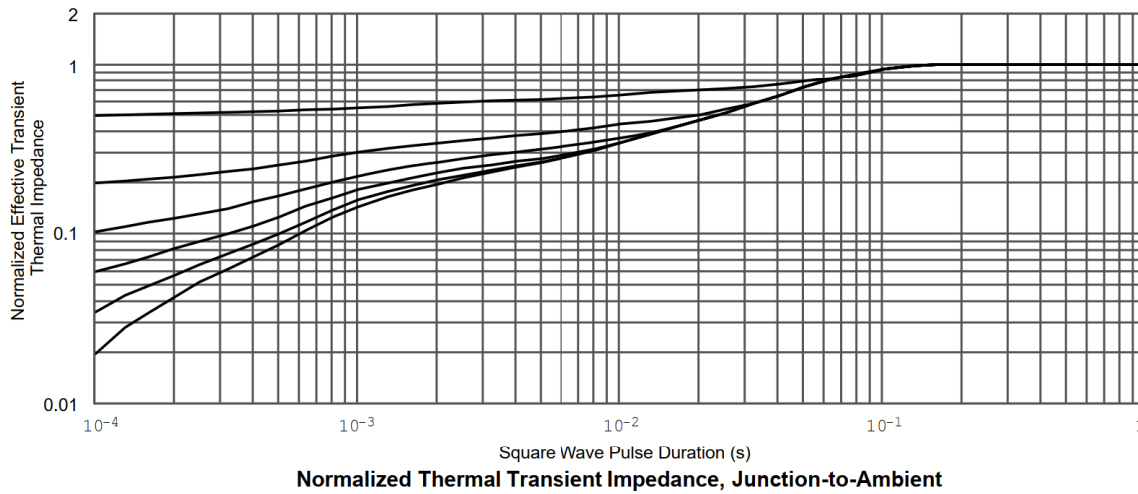


Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



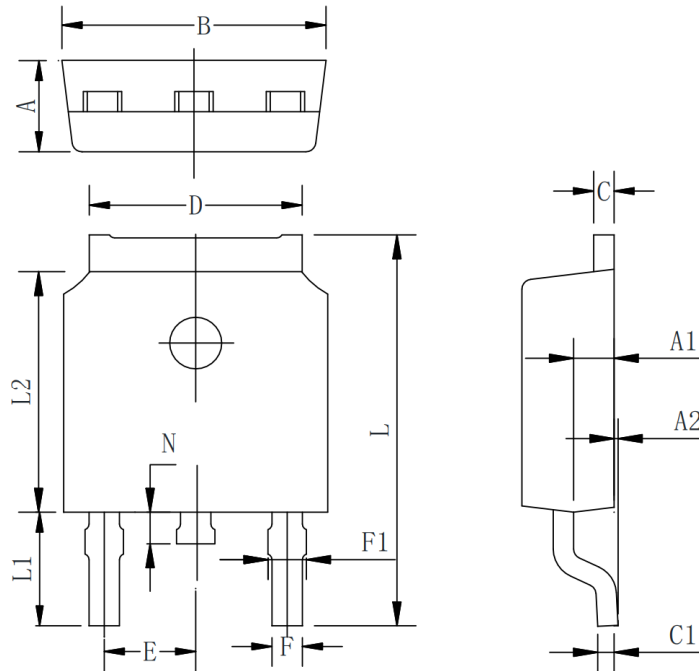
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Foot (25 °C)
 are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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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