P-Channel 40 V (D-S) MOSFEET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
- 40	3.5 at V_{GS} = - 10 V	- 100[d]
	5 at V_{GS} = - 4.5 V	- 85[d]

FEATURES

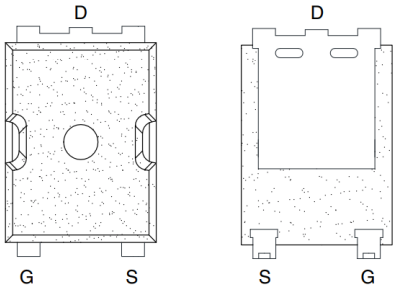
- DT-Trench Power MOSFET
- 100 % Rg and UIS Tested

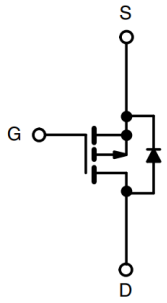
RoHS COMPLIANT

APPLICATIONS

- Load Switch
- DC/DC Converter

PTO-252





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)	T_C = 25 °C	I_D	- 100[d]	A
	T_C = 125 °C		- 65	
Pulsed Drain Current		I_{DM}	- 430	
Avalanche Current single pulse		I_{AS}	- 95	
Avalanche Energy single pulse[a]	L = 0.1 mH	E_{AS}	125	mJ
Power Dissipation	T_C = 25 °C	P_D	143[c]	W
	T_A = 25 °C		4.6[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]	t ≤ 10 s	R_{thJA}	16	30	°C/W
	Steady State		30	60	
Junction-to-Case		R_{thJC}	-	2.0	

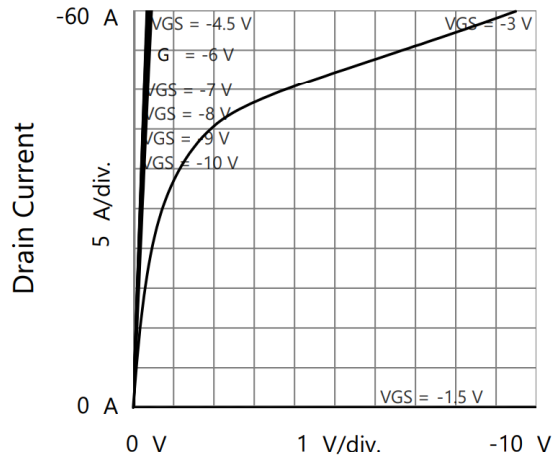
Notes:
a. Duty cycle ≤ 1 %.
b. When mounted on 1" square PCB (FR-4 material).
c. See SOA curve for voltage derating.
d. Package limited.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1		- 3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 40 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 32 V, V_{GS} = 0 V, T_J = 125 °C			- 50	
		V_{DS} = - 32 V, V_{GS} = 0 V, T_J = 150 °C			- 100	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = - 5 V, V_{GS} = - 10 V	- 100			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 30 A		3.5	4.8	mΩ
		V_{GS} = - 4.5 V, I_D = - 20 A		5	6.5	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 5 V, I_D = - 30 A		89		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = - 20 V, f = 1 MHz		8325		pF
Output Capacitance	C_{oss}			608		
Reverse Transfer Capacitance	C_{rss}			411		
Total Gate Charge[c]	Q_g	V_{DS} = - 20 V, V_{GS} = - 10 V, I_D = -30 A		53		nC
Gate-Source Charge[c]	Q_{gs}			31		
Gate-Drain Charge[c]	Q_{gd}			14		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = - 20 V, R_L = 0.6 Ω I_D≅ - 30 A, V_{GEN} = - 10 V, R_G = 6Ω		38		ns
Rise Time[c]	t_r			21		
Turn-Off Delay Time[c]	$t_{d(off)}$			70		
Fall Time[c]	t_f			53		
Source-Drain Diode Ratings and Characteristics T_C = 25 °C[b]						
Continuous Current	I_S				-100	A
Forward Voltage[a]	V_{SD}	I_F = - 1 A, V_{GS} = 0 V		- 0.7	- 1.0	V
Reverse Recovery Time	t_{rr}	I_F = - 30 A, dI/dt = 100 A/µs		50		ns
Reverse Recovery Charge	Q_{rr}	I_F = - 30 A, dI/dt = 100 A/µs		63		nC

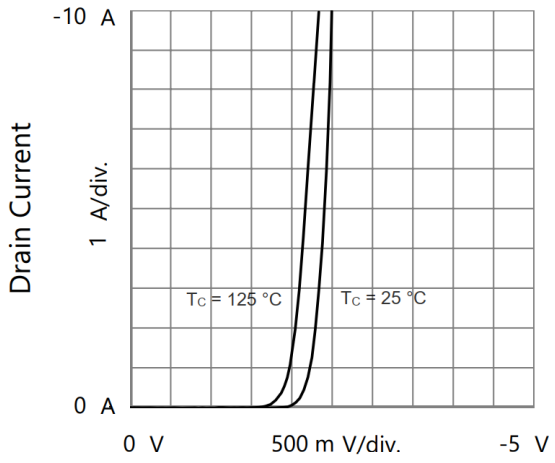
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

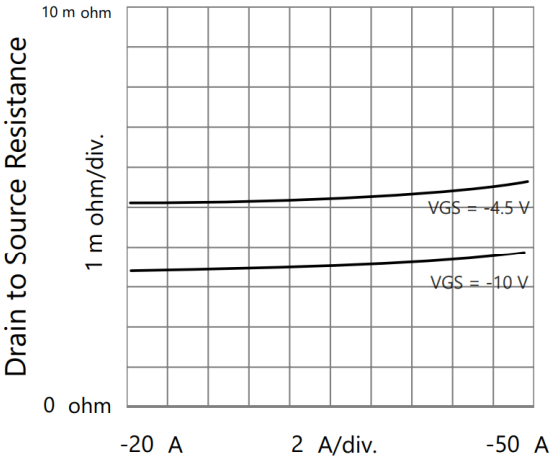
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



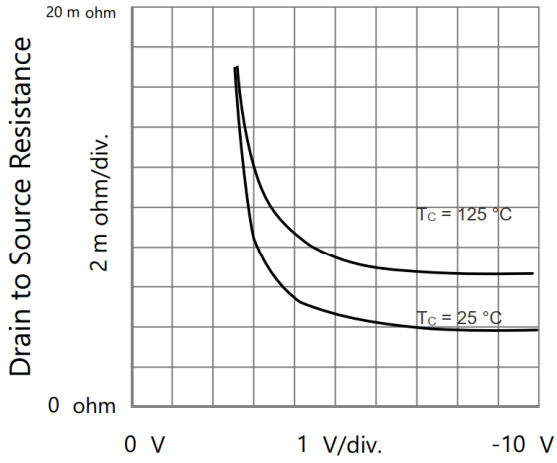
Drain to Source Voltage
Output Characteristics



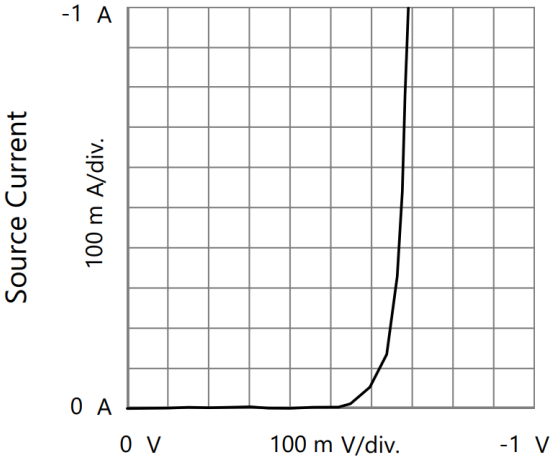
Gate to Source Voltage
Transfer Characteristics



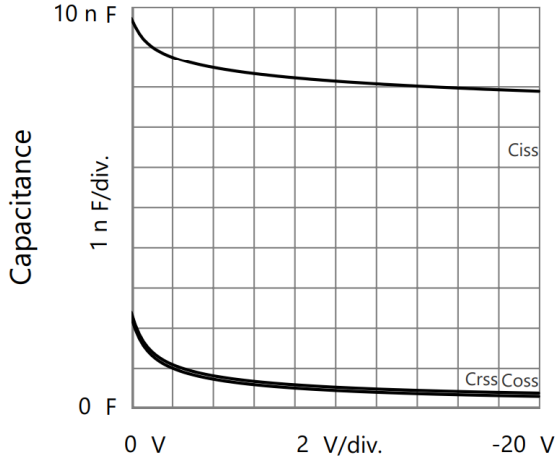
Drain Current
Drain to Source Resistance vs. Drain Current



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

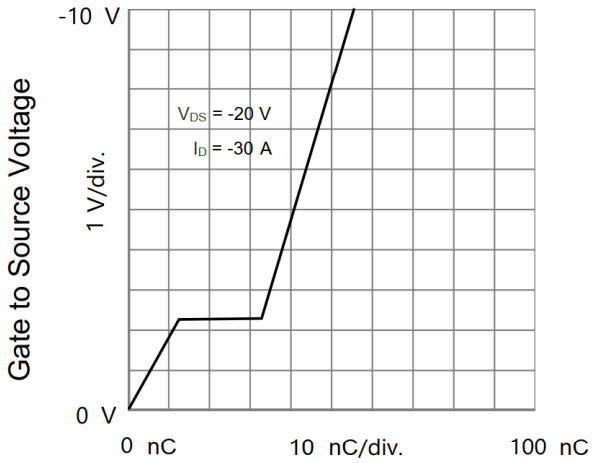


Source to Drain Voltage
Body Diode Forward Characteristics

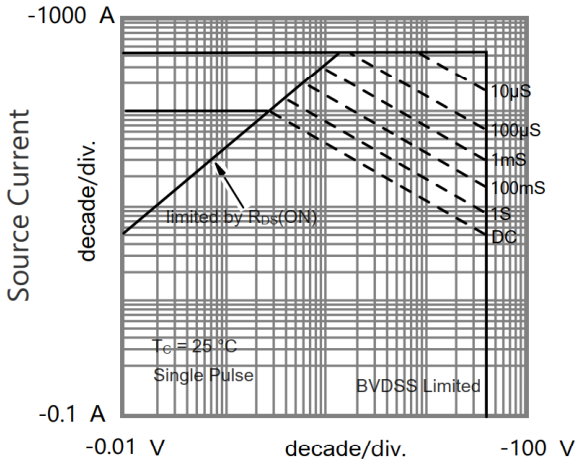


Drain to Source Voltage
Capacitances

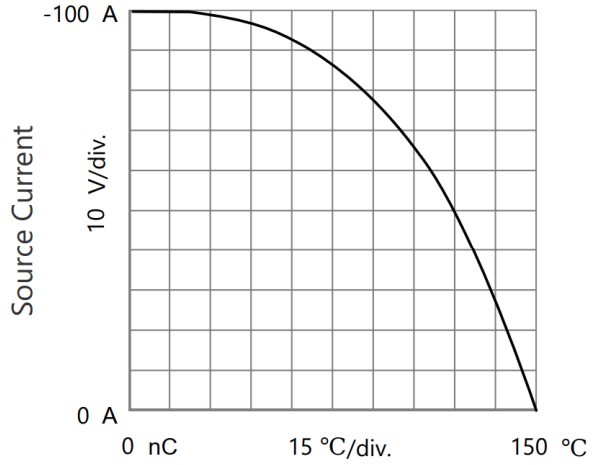
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



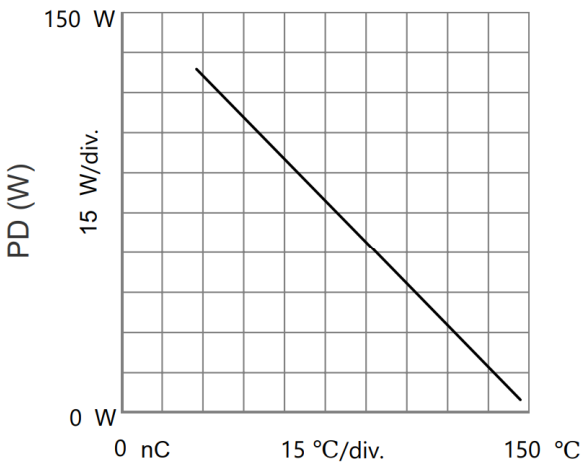
Gate to Source Voltage vs. GateCharge



Safe Operating Area, Junction-to-Ambient

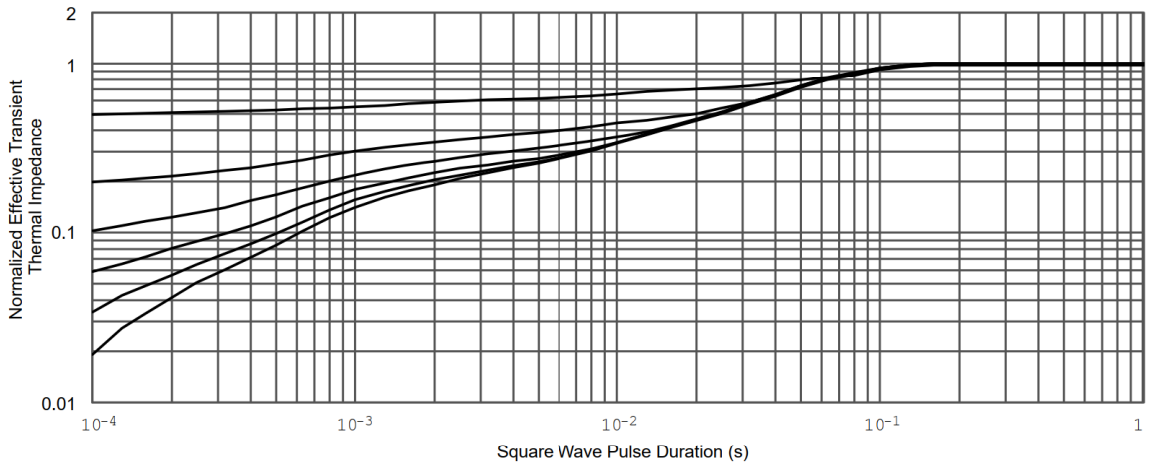


Current Derating



Power Derating

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

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 ℃)

  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.

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