

P-Channel 40 V (D-S) MOSFEET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
- 40	0.0096 at V _{GS} = - 10 V	- 70 ^d
	0.012 at V _{GS} = - 4.5 V	- 60 ^d

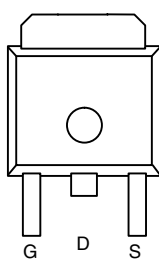
FEATURES

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

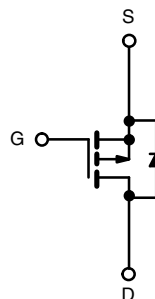

RoHS
 COMPLIANT

APPLICATIONS

- Load Switch

TO-252


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	- 70 ^d
		T _C = 125 °C	- 41
Pulsed Drain Current	I _{DM}	- 280	A
Avalanche Current	I _{AR}	- 63	
Repetitive Avalanche Energy ^a	E _{AR}	125	mJ
Power Dissipation	P _D	T _C = 25 °C	88 ^c
		T _A = 25 °C	2.9 ^{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	°C/W
		Steady State	40	
Junction-to-Case	R _{thJC}	-	2.1	

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 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	- 70			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 30 A		0.0096	0.0125	Ω
		V _{GS} = - 4.5 V, I _D = - 20 A		0.012	0.016	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 30 A		66		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = - 20 V, f = 1 MHz		4910		pF
Output Capacitance	C _{oss}			392		
Reverse Transfer Capacitance	C _{rss}			103		
Total Gate Charge ^c	Q _g	V _{DS} = - 20 V, V _{GS} = - 10 V, I _D = -30 A		55		nC
Gate-Source Charge ^c	Q _{gs}			21		
Gate-Drain Charge ^c	Q _{gd}			7		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = - 20 V, R _L = 0.6 Ω I _D ≐ - 5 A, V _{GEN} = - 10 V, R _G = 6Ω		10		ns
Rise Time ^c	t _r			30		
Turn-Off Delay Time ^c	t _{d(off)}			62		
Fall Time ^c	t _f			22		
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				- 55	A
Forward Voltage ^a	V _{SD}	I _F = - 1 A, V _{GS} = 0 V		- 0.7	- 1.2	V
Reverse Recovery Time	t _{rr}	I _F = - 10 A, dI/dt = 100 A/μs		39		ns
Reverse Recovery Charge	Q _{rr}	I _F = - 10 A, dI/dt = 100 A/μs		47		nC

Notes:

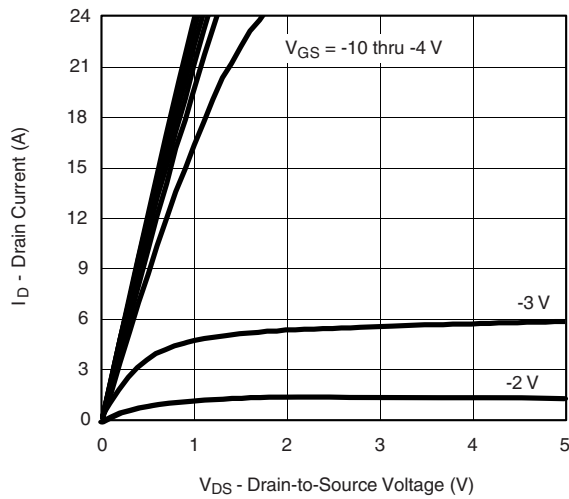
 a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

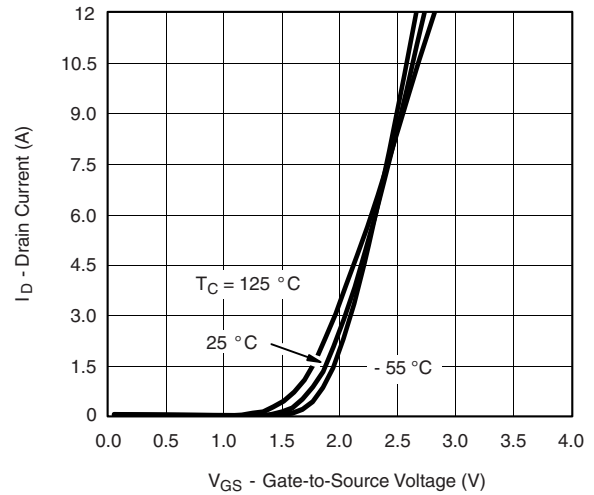
c. Independent of operating temperature.

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.

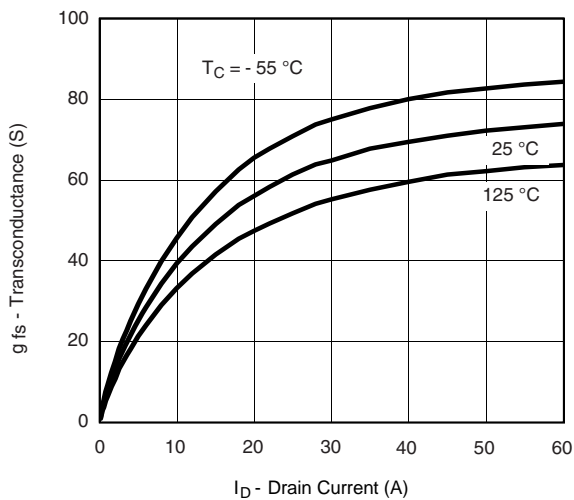
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



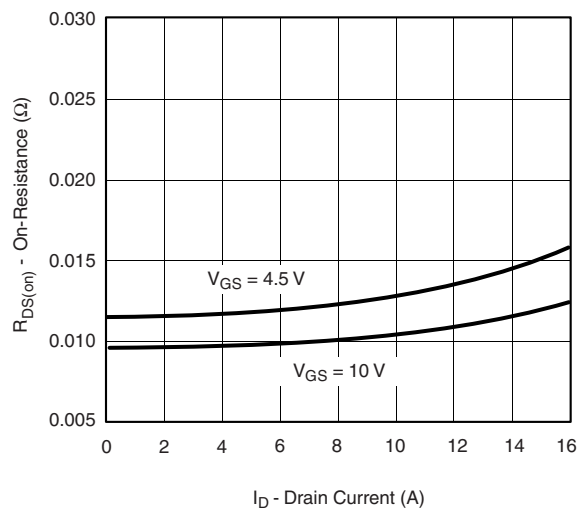
Output Characteristics



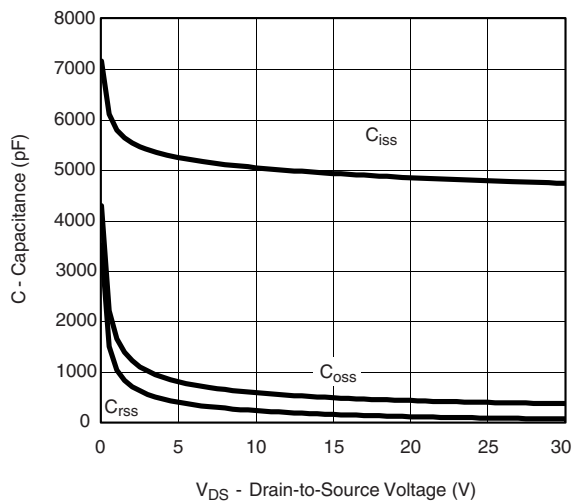
Transfer Characteristics



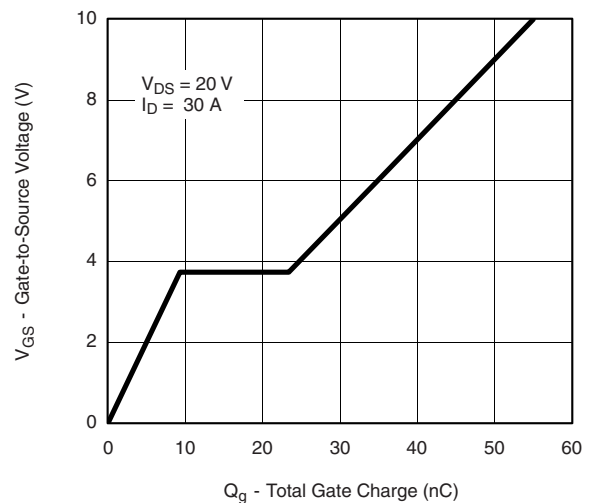
Transconductance



On-Resistance vs. Drain Current

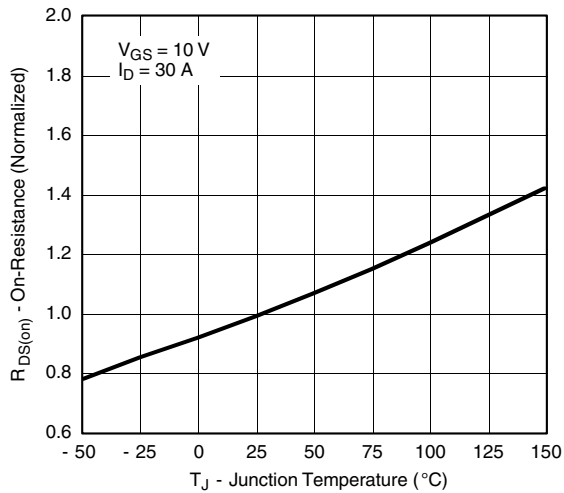


Capacitance

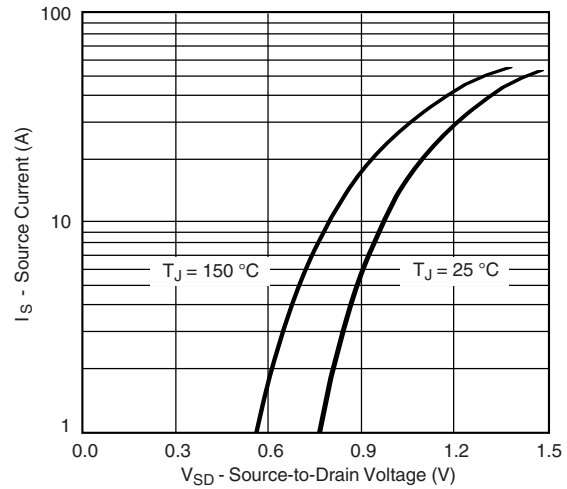


Gate Charge

TYPICAL CHARACTERISTICS

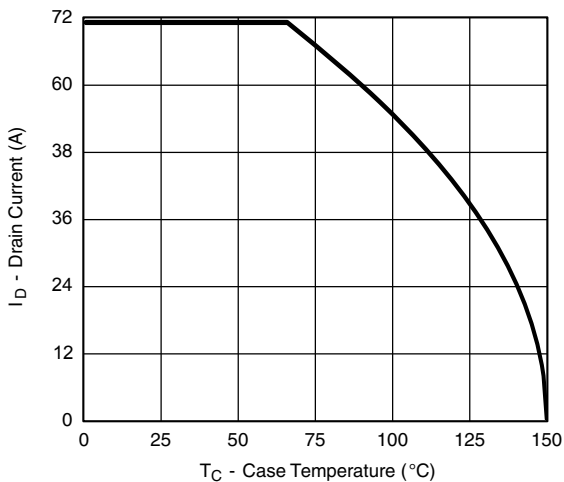


On-Resistance vs. Junction Temperature

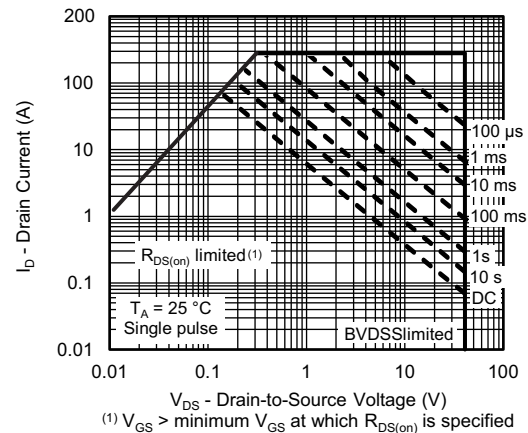


Source-Drain Diode Forward Voltage

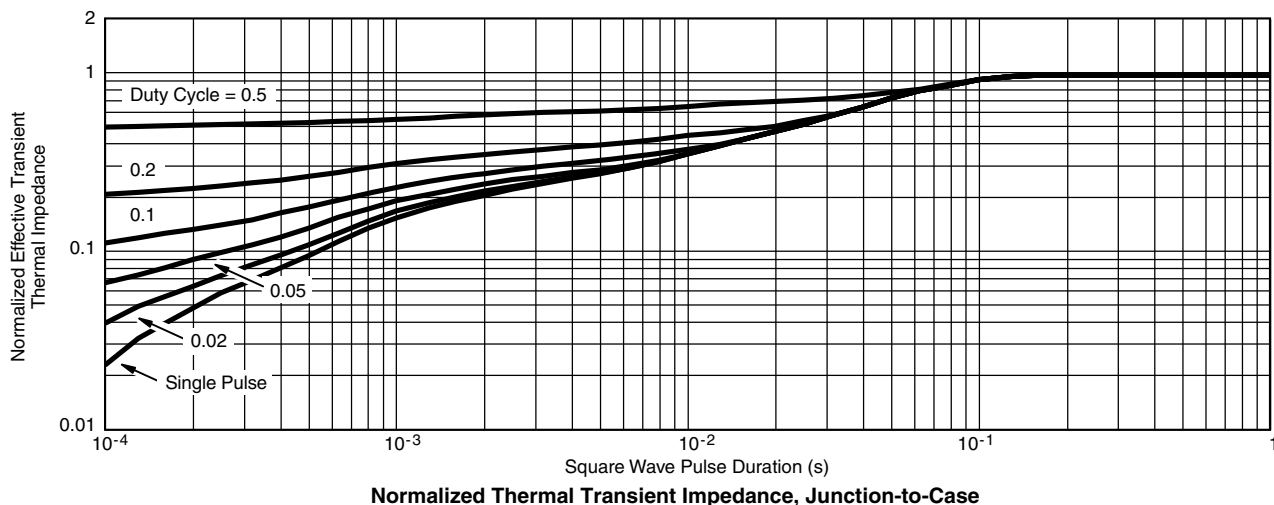
THERMAL RATINGS (25 $^{\circ}\text{C}$, unless otherwise noted)



Drain Current vs. Case Temperature



Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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