

P-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
- 40	0.106 at V _{GS} = - 10 V	- 15 ^d
	0.125 at V _{GS} = - 4.5 V	- 10 ^d

FEATURES

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

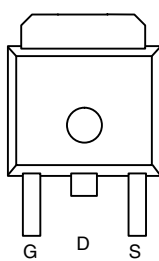


RoHS
COMPLIANT

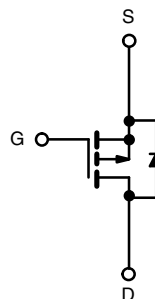
APPLICATIONS

- 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	- 15 ^d	
		T _C = 125 °C	- 10.5	
Pulsed Drain Current	I _{DM}	- 60	A	
Avalanche Current	I _{AS}	- 15		
Single Pulse Avalanche Energy ^a	L = 0.1 mH	E _{AS}	51	mJ
Power Dissipation	P _D	T _C = 25 °C	19 ^c	W
		T _A = 25 °C	1.5 ^{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	40	50	°C/W
		Steady State	50	60	
Junction-to-Case	R _{thJC}	0.82	1.1		

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)

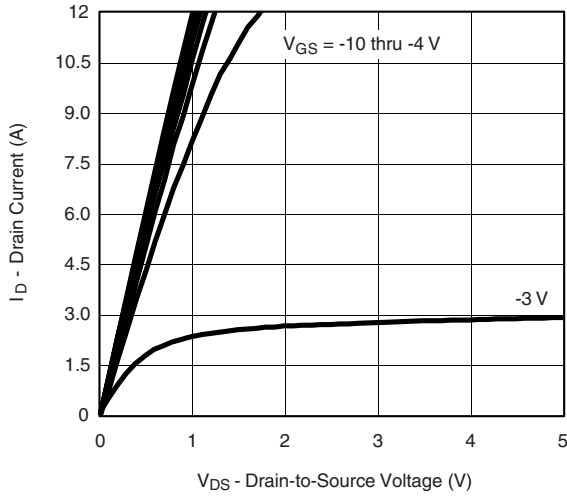
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1		- 3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}$			- 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	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	- 15			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		0.106	0.130	Ω
		$V_{GS} = -10\text{ V}, I_D = -5\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.145	
		$V_{GS} = -10\text{ V}, I_D = -5\text{ A}, T_J = 150\text{ }^\circ\text{C}$			0.157	
		$V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$		0.125	0.150	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -5\text{ A}$		61		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		1880		μF
Output Capacitance	C_{oss}			480		
Reverse Transfer Capacitance	C_{rss}			205		
Total Gate Charge ^c	Q_g	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		110	165	nC
Gate-Source Charge ^c	Q_{gs}			23		
Gate-Drain Charge ^c	Q_{gd}			18		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \cong -5\text{ A}, V_{GEN} = -10\text{ V}, R_G = 6\text{ }\Omega$		15	23	ns
Rise Time ^c	t_r			70	105	
Turn-Off Delay Time ^c	$t_{d(off)}$			155	235	
Fall Time ^c	t_f			175	260	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$ ^b						
Continuous Current	I_S				- 15	A
Pulsed Current	I_{SM}				- 60	
Forward Voltage ^a	V_{SD}	$I_F = -10\text{ A}, V_{GS} = 0\text{ V}$		- 0.7	- 1.2	V
Reverse Recovery Time	t_{rr}	$I_F = -10\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$		45	70	ns

Notes:

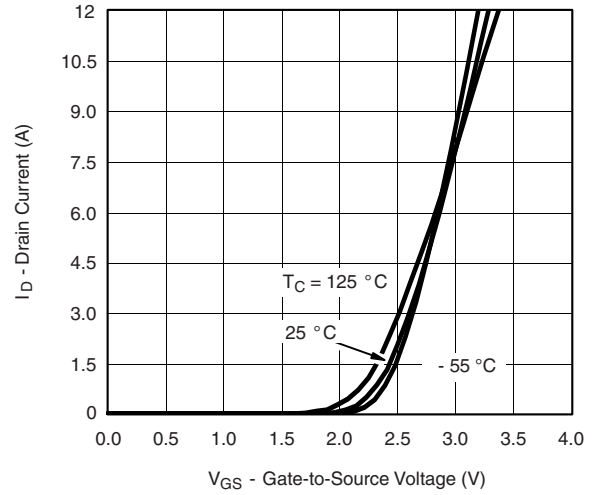
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

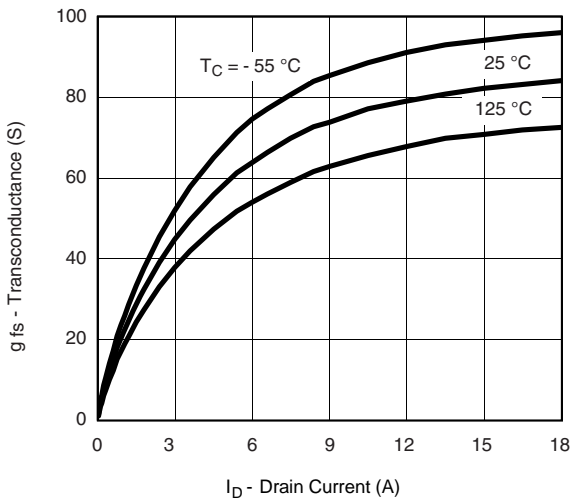
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



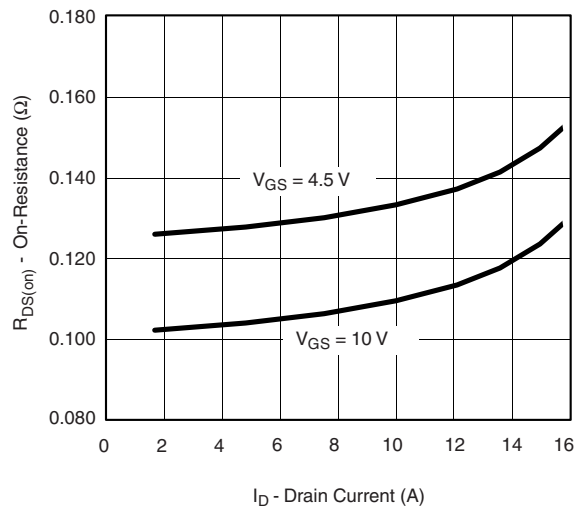
Output Characteristics



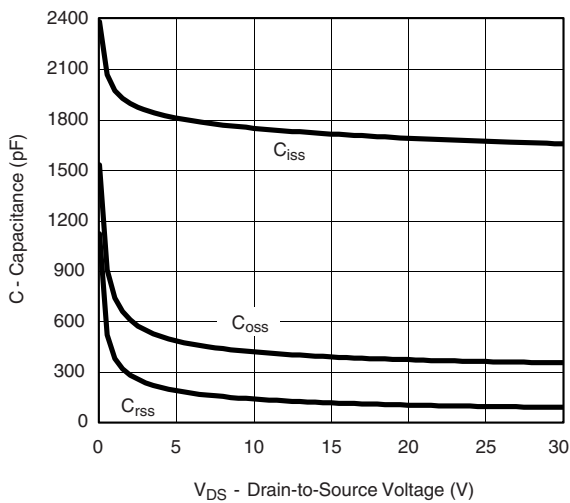
Transfer Characteristics



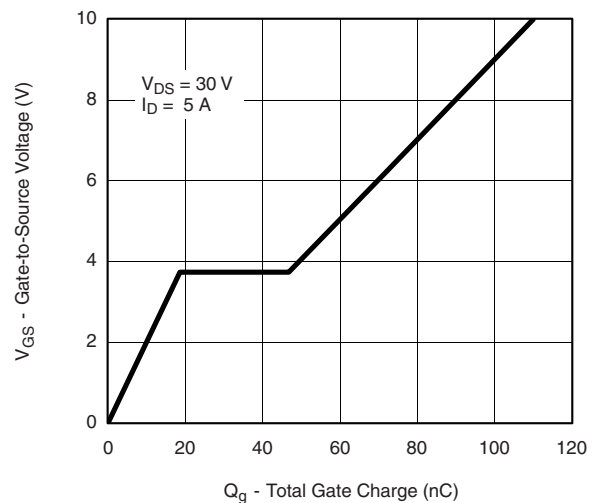
Transconductance



On-Resistance vs. Drain Current

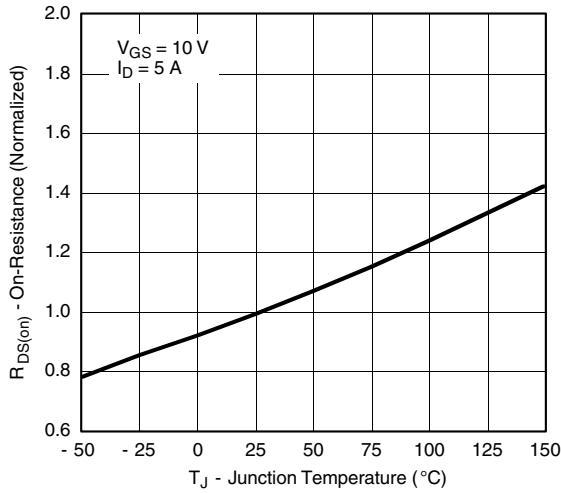


Capacitance

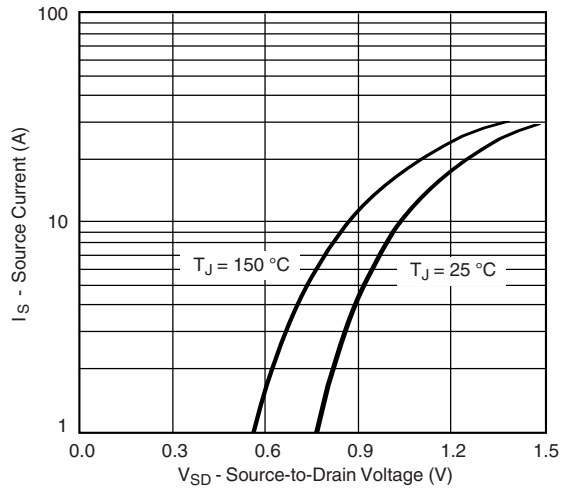


Gate Charge

TYPICAL CHARACTERISTICS

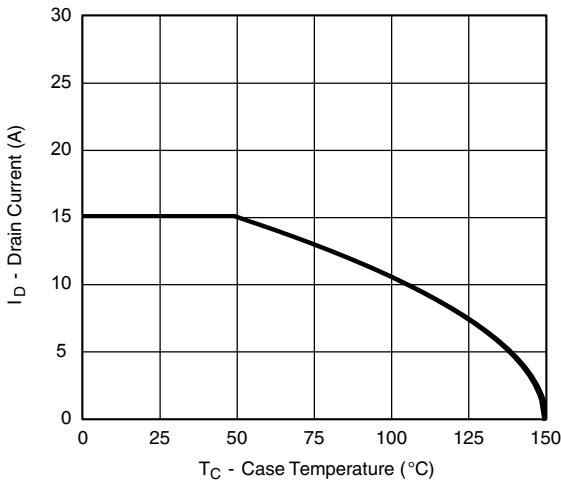


On-Resistance vs. Junction Temperature

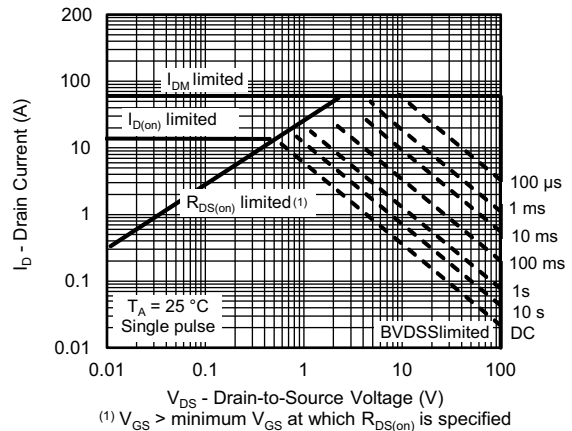


Source-Drain Diode Forward Voltage

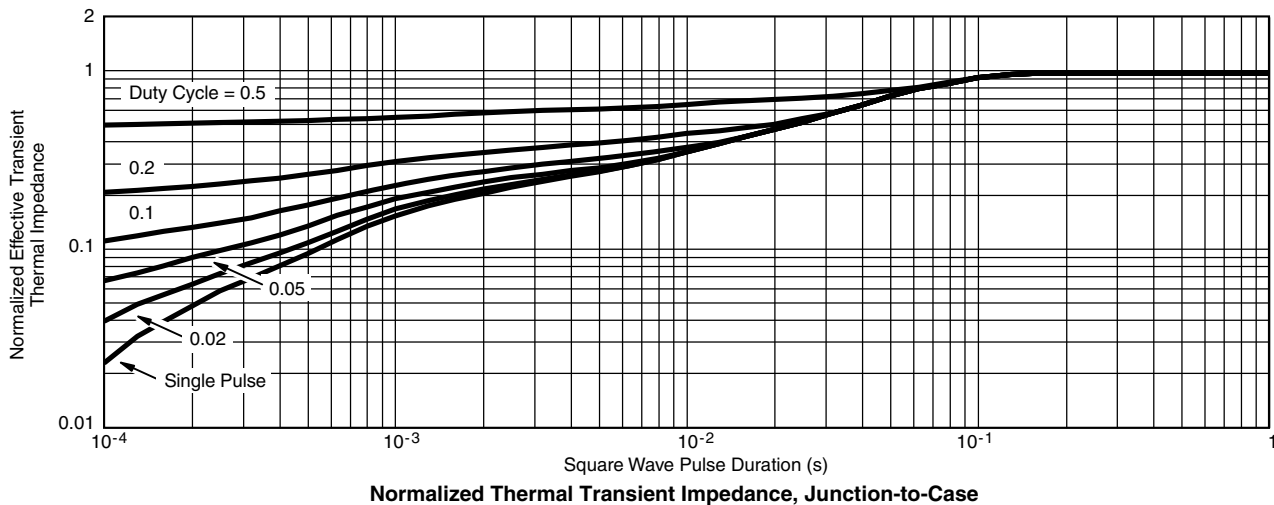
THERMAL RATINGS (25 °C, unless otherwise noted)



Drain Current vs. Case Temperature



Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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