

## P-Channel 40 V (D-S) MOSFEET

### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 40	0.0073 at $V_{GS} = - 10$ V	- 78 <sup>d</sup>
	0.0095 at $V_{GS} = - 4.5$ V	- 70 <sup>d</sup>

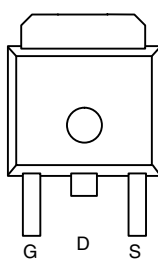
### FEATURES

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

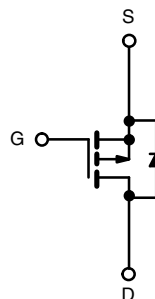

**RoHS**  
 COMPLIANT

### 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	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175$ °C)	$I_D$	$T_C = 25$ °C	A
		$T_C = 125$ °C	
Pulsed Drain Current	$I_{DM}$	- 310	
Avalanche Current	$I_{AR}$	- 70	mJ
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	155	
Power Dissipation	$P_D$	$T_C = 25$ °C	W
		$T_A = 25$ °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 <sup>b</sup>	$R_{thJA}$	$t \leq 10$ s	20	°C/W
		Steady State	40	
Junction-to-Case	$R_{thJC}$	-	2.0	

Notes:

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

SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = - 250 μA	- 40			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = - 250 μA	- 1		- 3	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = - 40 V, V <sub>GS</sub> = 0 V			- 1	μA
		V <sub>DS</sub> = - 32 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			- 50	
		V <sub>DS</sub> = - 32 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 150 °C			- 100	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = - 5 V, V <sub>GS</sub> = - 10 V	- 78			A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 30 A		0.0073	0.009	Ω
		V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 20 A		0.0095	0.012	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = - 15 V, I <sub>D</sub> = - 30 A		69		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = - 20 V, f = 1 MHz		10810		pF
Output Capacitance	C <sub>oss</sub>			482		
Reverse Transfer Capacitance	C <sub>rss</sub>			101		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = - 20 V, V <sub>GS</sub> = - 10 V, I <sub>D</sub> = -30 A		59		nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			20		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			7		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = - 20 V, R <sub>L</sub> = 0.6 Ω I <sub>D</sub> ≅ - 5 A, V <sub>GEN</sub> = - 10 V, R <sub>G</sub> = 6Ω		15		ns
Rise Time <sup>c</sup>	t <sub>r</sub>			30		
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			82		
Fall Time <sup>c</sup>	t <sub>f</sub>			25		
Source-Drain Diode Ratings and Characteristics T <sub>C</sub> = 25 °C <sup>b</sup>						
Continuous Current	I <sub>S</sub>				- 78	A
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = - 1 A, V <sub>GS</sub> = 0 V		- 0.7	- 1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = - 10 A, dI/dt = 100 A/μs		49		ns
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = - 10 A, dI/dt = 100 A/μs		52		nC

Notes:

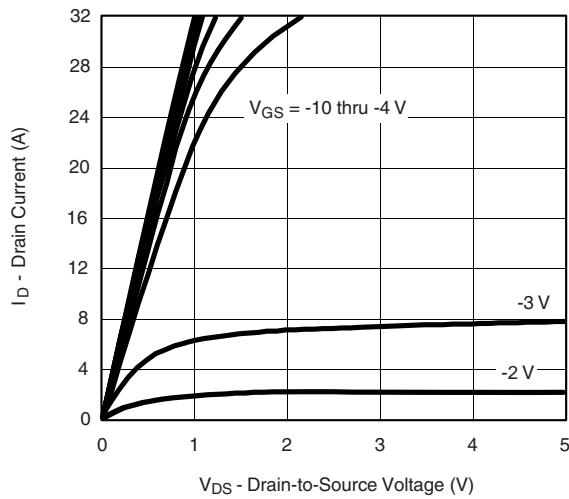
a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

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

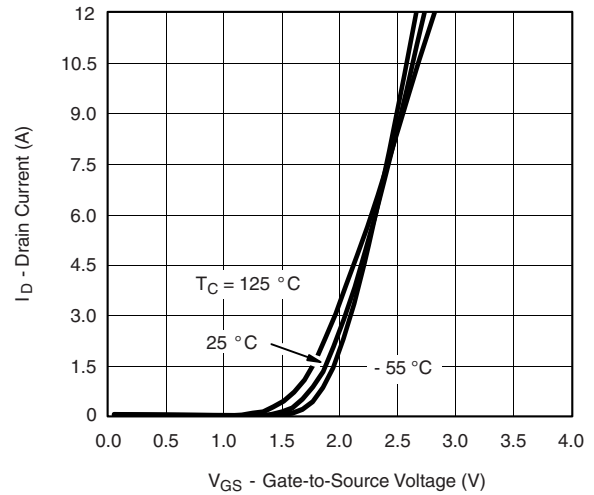
c. Independent of operating temperature.

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.

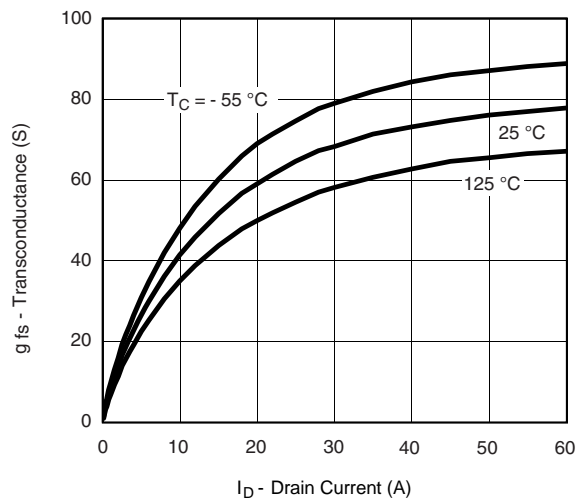
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



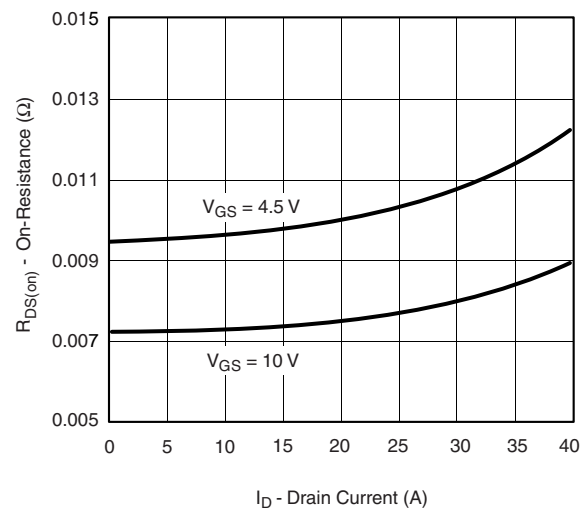
**Output Characteristics**



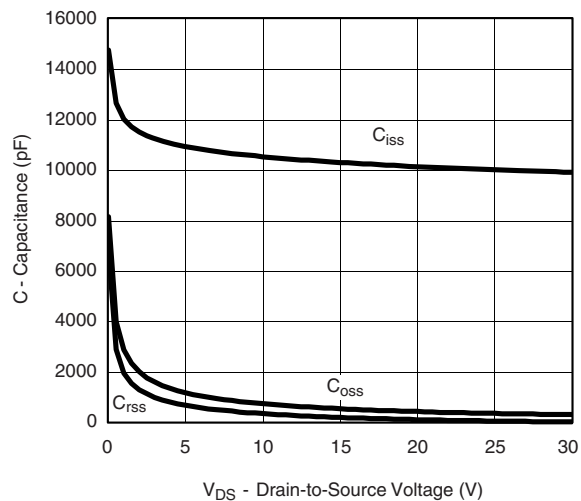
**Transfer Characteristics**



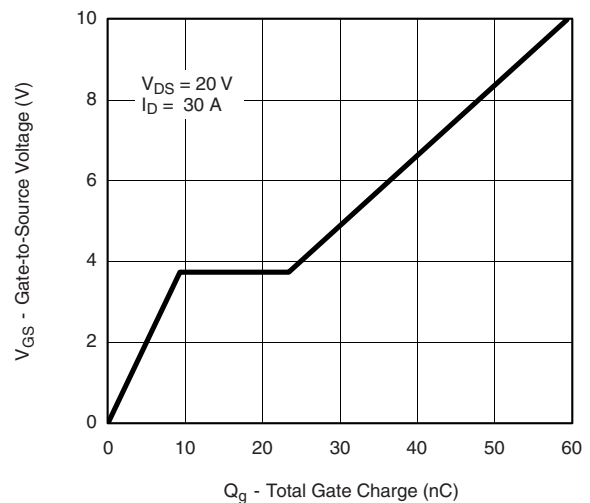
**Transconductance**



**On-Resistance vs. Drain Current**

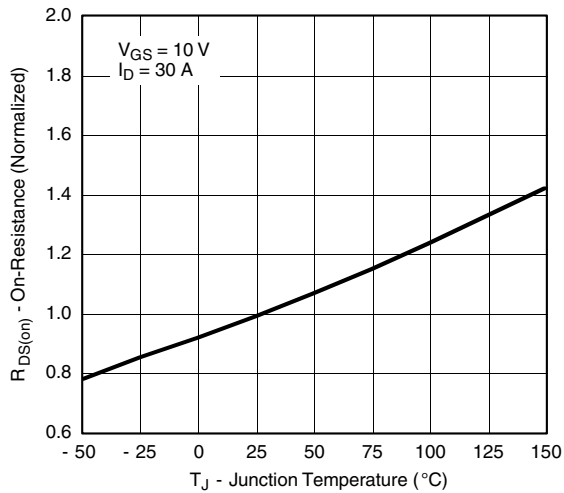


**Capacitance**

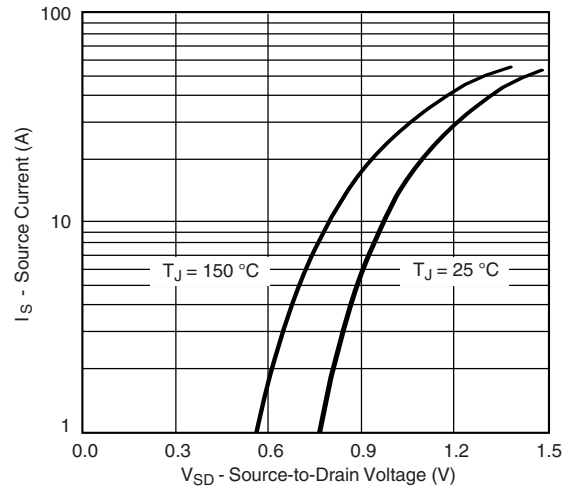


**Gate Charge**

## TYPICAL CHARACTERISTICS

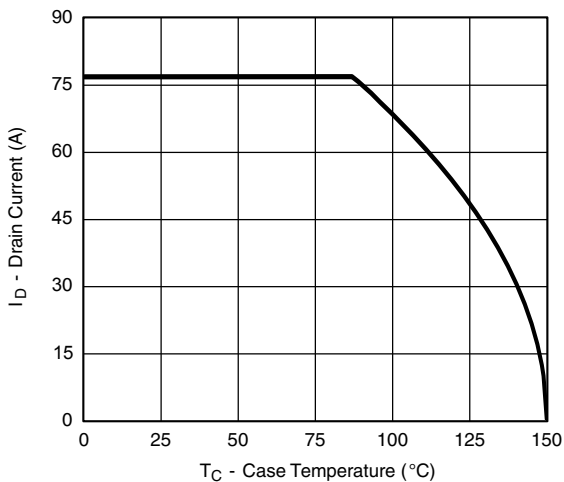


On-Resistance vs. Junction Temperature

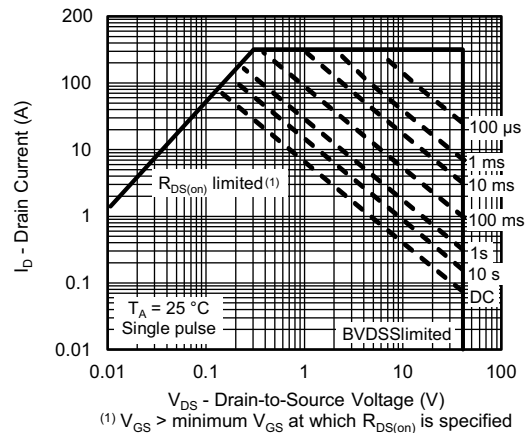


Source-Drain Diode Forward Voltage

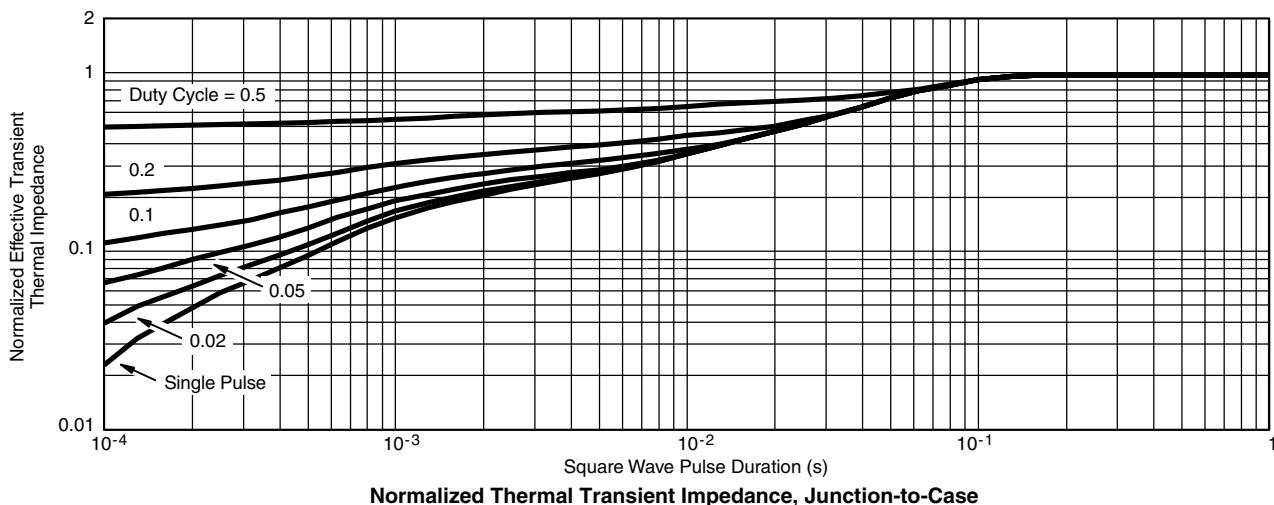
## THERMAL RATINGS (25 $^{\circ}\text{C}$ , unless otherwise noted)



Drain Current vs. Case Temperature



Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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