



# N-Channel 55-V (D-S) 175°C MOSFET

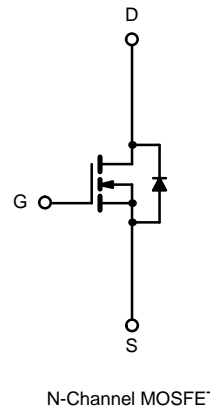
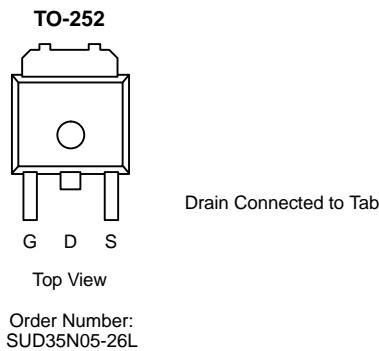
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a</sup>
55	0.020 @ V <sub>GS</sub> = 10 V	35
	0.026 @ V <sub>GS</sub> = 4.5 V	30

## FEATURES

- TrenchFET® Power MOSFETS
- 175°C Rated Maximum Junction Temperature
- Low Input Capacitance

## APPLICATIONS

- Automotive Fuel Injection Systems
- Automotive Wipers
- Automotive Door Modules



ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	55	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 175°C) <sup>b</sup>	I <sub>D</sub>	T <sub>C</sub> = 25°C	35
		T <sub>C</sub> = 100°C	25
Pulsed Drain Current	I <sub>DM</sub>	80	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	35	
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25°C	50 <sup>c</sup>
		T <sub>A</sub> = 25°C	7.5 <sup>b</sup>
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient <sup>b</sup>	R <sub>thJA</sub>	t ≤ 10 sec	17	20	°C/W
		Steady State	50	60	
Junction-to-Case	R <sub>thJC</sub>	2.5	3.0		
Junction-to-Lead	R <sub>thJL</sub>	5.0	6.0		

- Notes
- Package Limited.
  - Surface Mounted on 1" x 1" FR4 Board, t ≤ 10 sec.
  - See SOA curve for voltage derating.

SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	55			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1			
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 44\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 44\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			50	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 5\text{ V}$	35			A
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.0165	0.020	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125^\circ\text{C}$			0.035	
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$		0.0215	0.026	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		25		S
<b>Dynamic<sup>a</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, F = 1\text{ MHz}$		885		pF
Output Capacitance	$C_{oss}$			185		
Reverse Transfer Capacitance	$C_{rss}$			80		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 25\text{ V}, V_{GS} = 5\text{ V}, I_D = 35\text{ A}$		10.5	13	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			4		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			4.8		
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 25\text{ V}, R_L = 0.3\ \Omega$ $I_D \cong 35\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\ \Omega$		5	8	ns
Rise Time <sup>c</sup>	$t_r$			18	30	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			20	30	
Fall Time <sup>c</sup>	$t_f$			100	150	
<b>Source-Drain Diode Ratings and Characteristic (<math>T_C = 25^\circ\text{C}</math>)</b>						
Continuous Current	$I_S$				35	A
Pulsed Current	$I_{SM}$				80	
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_F = 80\text{ A}, V_{GS} = 0\text{ V}$			1.5	V
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 35\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		25	40	ns

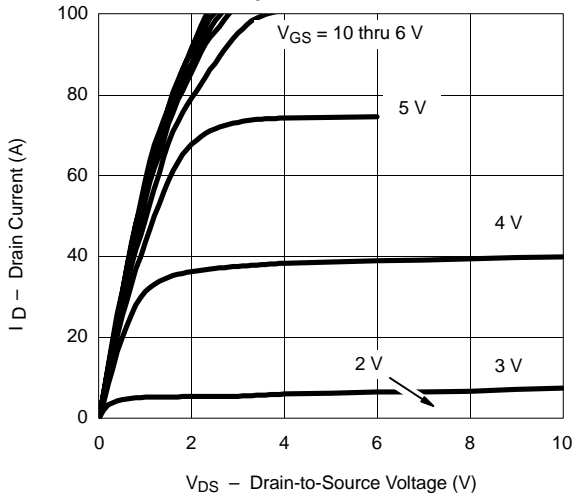
## Notes

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

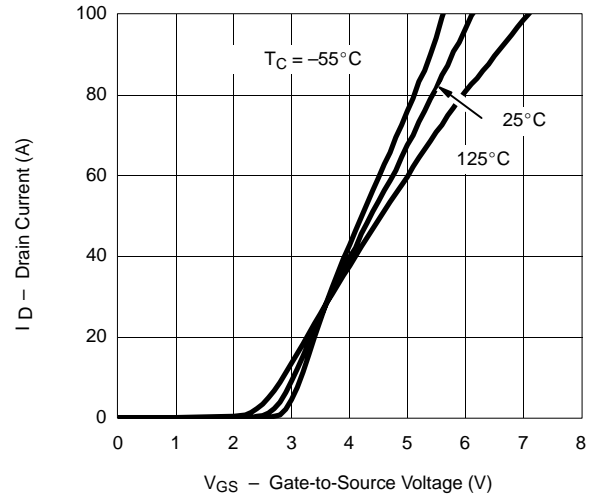


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

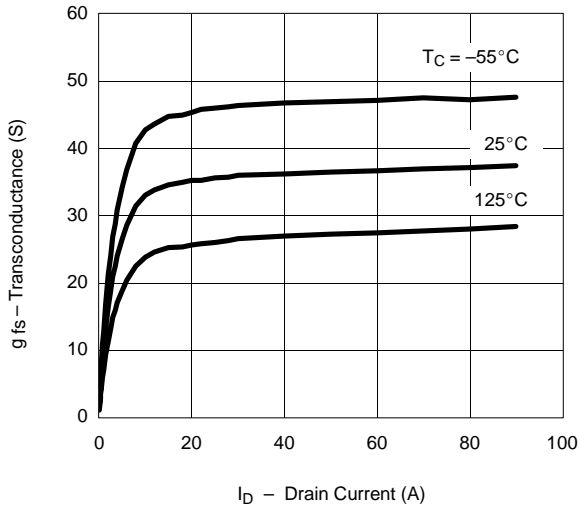
**Output Characteristics**



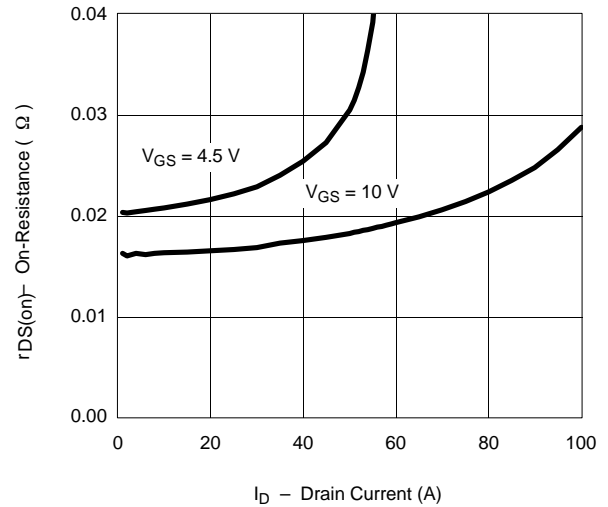
**Transfer Characteristics**



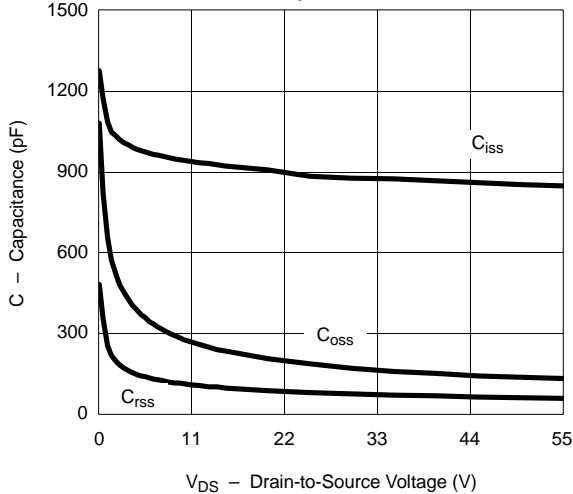
**Transconductance**



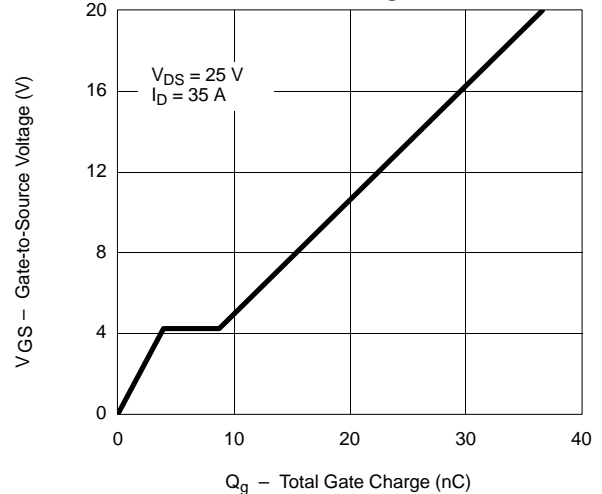
**On-Resistance vs. Drain Current**



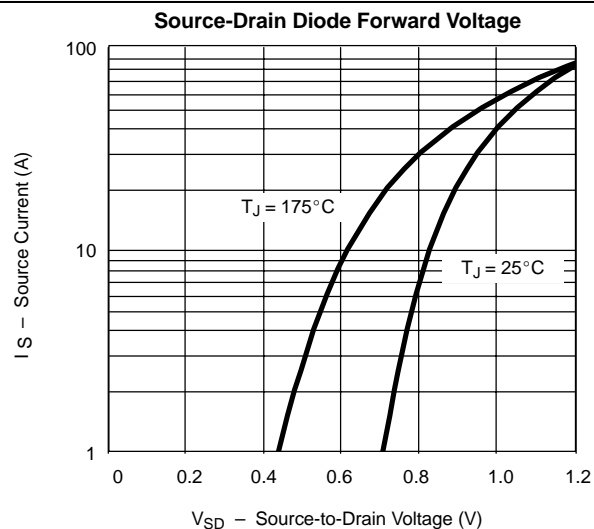
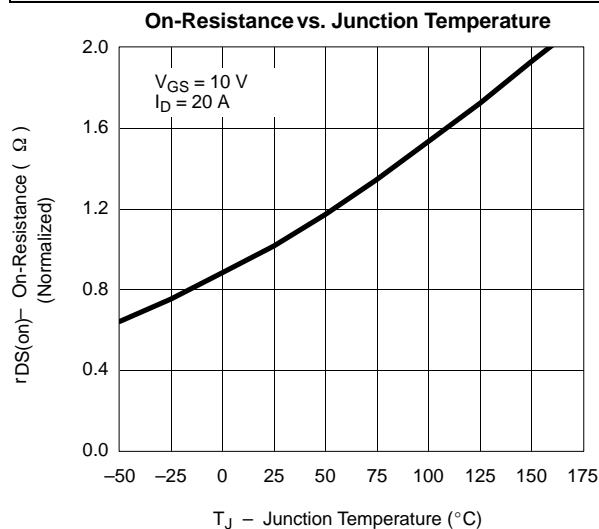
**Capacitance**



**Gate Charge**



### TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



### THERMAL RATINGS

