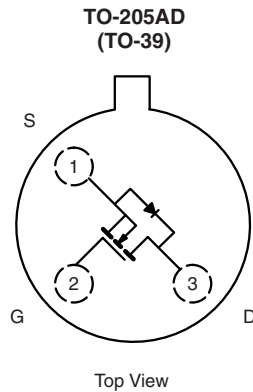


## N-Channel 35 V (D-S) MOSFET



PRODUCT SUMMARY	
$V_{DS}$ (V)	35
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	1.8
Configuration	Single



### FEATURES

- Military Qualified
- Low On-Resistance: 1.3  $\Omega$
- Low Threshold: 1.7 V
- Low Input Capacitance: 35 pF
- Fast Switching Speed: 8 ns
- Low Input and Output Leakage

### BENEFITS

- Guaranteed Reliability
- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

### APPLICATIONS

- Hi-Rel Systems
- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

ORDERING INFORMATION			
PART	PACKAGE	DESCRIPTION/DSCC PART NUMBER	VISHAY ORDERING PART NUMBER
2N6659	TO-205AD (TO-39)	Commercial	2N6659
2N6659-2		Commercial, Lead (Pb)-free	2N6659-E3
		See -2 Flow Document	2N6659-2

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		$V_{DS}$	35	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C)	$T_C = 25$ °C	$I_D$	1.4	A
	$T_C = 100$ °C		1	
Pulsed Drain Current <sup>a</sup>		$I_{DM}$	3	
Maximum Power Dissipation	$T_C = 25$ °C	$P_D$	6.25	W
	$T_C = 100$ °C		2.5	
Thermal Resistance, Junction-to-Ambient <sup>b</sup>		$R_{thJA}$	170	°C/W
Thermal Resistance, Junction-to-Case		$R_{thJC}$	20	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	- 55 to 150	°C

### Notes

- Pulse width limited by maximum junction temperature.
- Not required by military spec.



SPECIFICATIONS ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT	
			MIN.	TYP. <sup>a</sup>	MAX.		
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{DS} = 0\text{ V}$ , $I_D = 10\text{ }\mu\text{A}$	35	75	-	V	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1\text{ mA}$	0.8	1.7	2		
Gate-Body Leakage	$I_{GSS}$	$V_{GS} = \pm 15\text{ V}$	$V_{DS} = 0\text{ V}$	-	-	$\pm 100$	nA
			$T_C = 125\text{ }^\circ\text{C}$	-	-	$\pm 500$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 35\text{ V}$	-	-	10	$\mu\text{A}$
			$V_{DS} = 28\text{ V}$ , $T_C = 125\text{ }^\circ\text{C}$	-	-	500	
On-State Drain Current	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} = 10\text{ V}$	1.5	3	-	A
Drain-Source On-State Resistance <sup>b</sup>	$R_{DS(on)}$	$V_{GS} = 5\text{ V}$	$I_D = 0.3\text{ A}$	-	2	5	$\Omega$
			$I_D = 1\text{ A}$	-	1.3	1.8	
			$T_C = 125\text{ }^\circ\text{C}$	-	2.4	3.6	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 7.5\text{ V}$ , $I_D = 0.525\text{ A}$	170	350	-	mS	
Diode Forward Voltage	$V_{SD}$	$I_S = 0.99\text{ A}$ , $V_{GS} = 0\text{ V}$	-	0.8	-	V	
<b>Dynamic</b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	-	35	50	pF
Output Capacitance	$C_{oss}$			-	25	40	
Reverse Transfer Capacitance	$C_{rss}$			-	7	10	
Drain-Source Capacitance	$C_{ds}$			-	30	40	
<b>Switching<sup>c</sup></b>							
Turn-On Time	$t_{ON}$	$I_D \cong 1\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 25\text{ }\Omega$	$V_{DD} = 25\text{ V}$ , $R_L = 23\text{ }\Omega$	-	8	10	ns
Turn-Off Time	$t_{OFF}$		-	-	8.5	10	

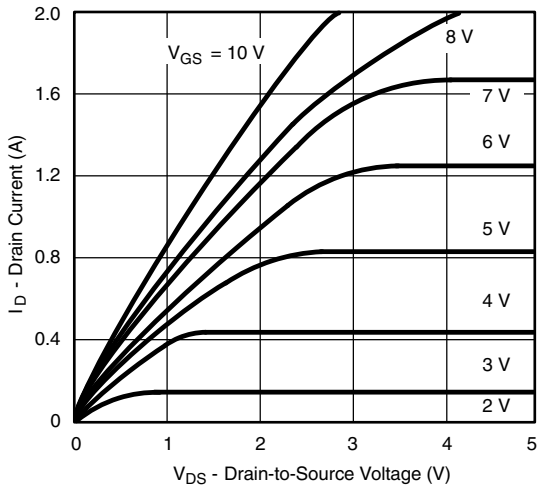
**Notes**

- a. FOR DESIGN AID ONLY, not subject to production testing.  
b. Pulse test:  $PW \leq 300\text{ }\mu\text{s}$  duty cycle  $\leq 2\%$ .  
c. Switching time is essentially independent of operating temperature.

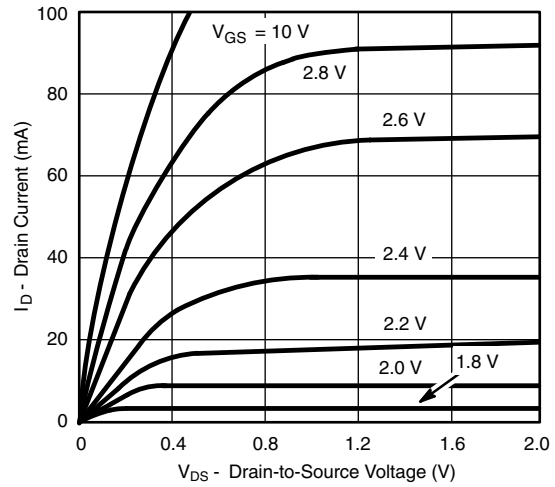
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



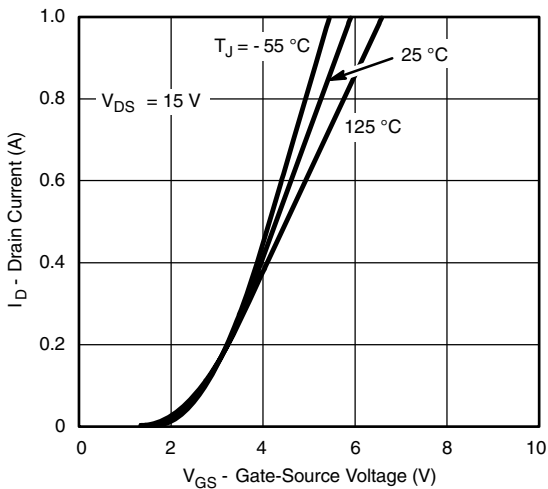
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



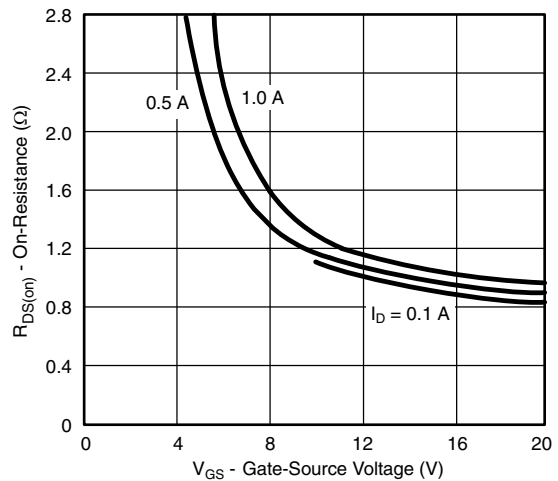
Ohmic Region Characteristics



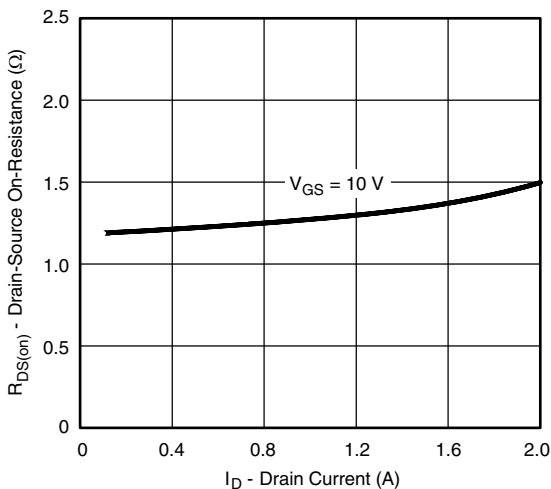
Output Characteristics for Low Gate Drive



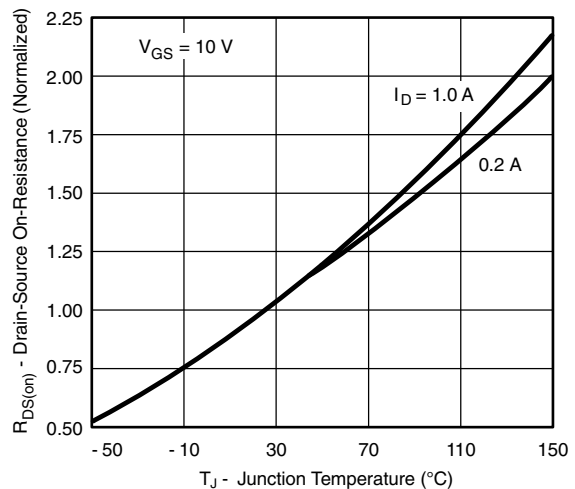
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage



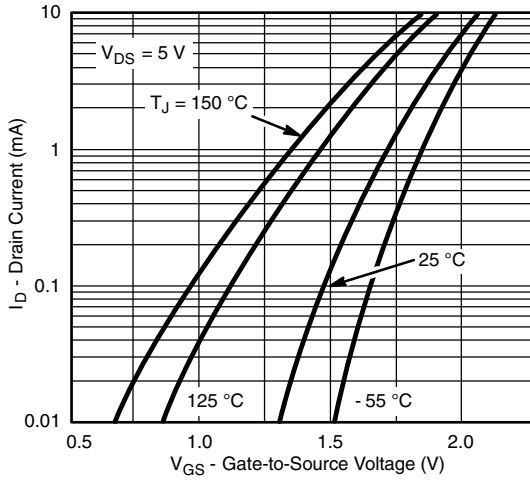
On-Resistance vs. Drain Current



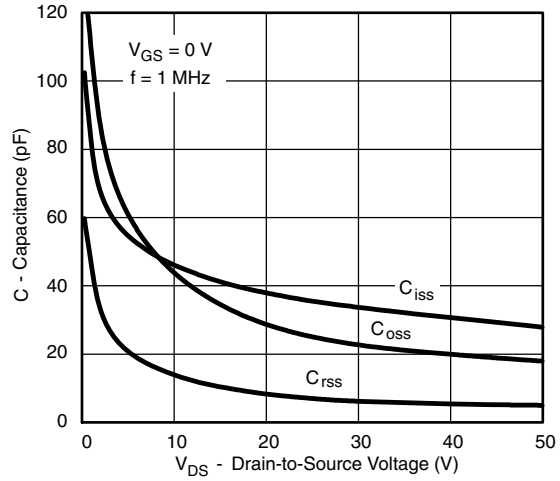
Normalized On-Resistance vs. Junction Temperature



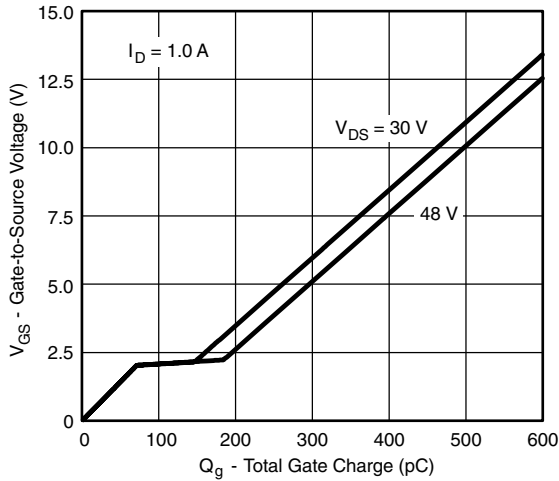
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



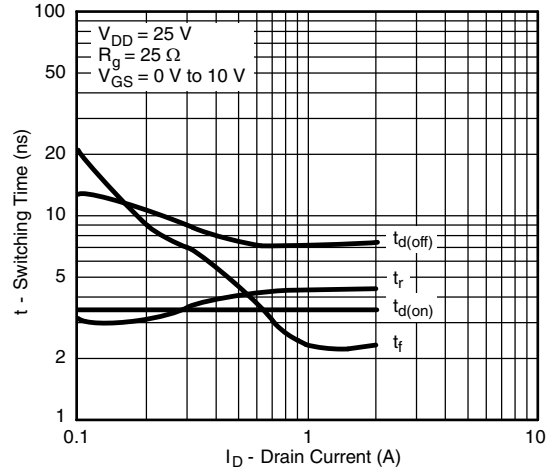
**Threshold Region**



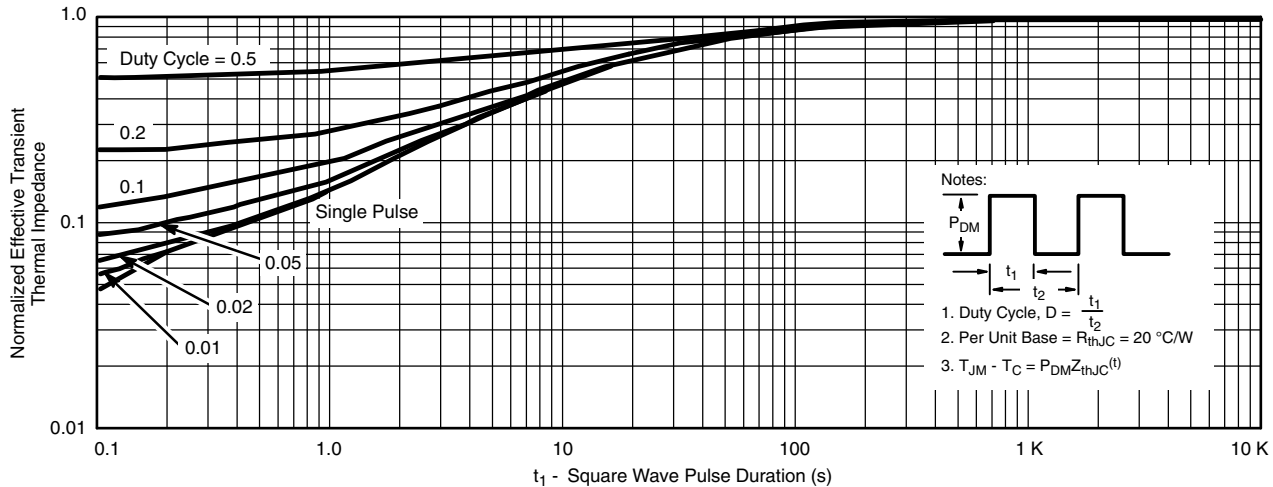
**Capacitance**



**Gate Charge**



**Load Condition Effects on Switching**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

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