

# N-Channel 60-V (D-S), 175°C MOSFET

## PRODUCT SUMMARY

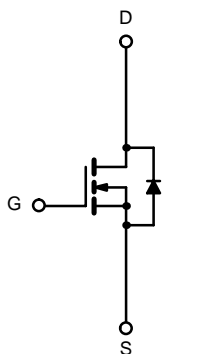
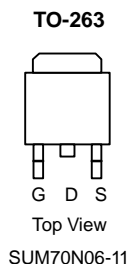
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.011	70

## FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- New Low Thermal Resistance Package

## APPLICATIONS

- Automotive and Industrial



N-Channel MOSFET

## ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$ 70	A
		$T_C = 100^\circ\text{C}$ 49	
Pulsed Drain Current	$I_{DM}$	160	
Avalanche Current	$I_{AR}$	35	
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	61	mJ
Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$ 120 <sup>b</sup>	W
		$T_A = 25^\circ\text{C}^c$ 3.75	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

## THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient—PCB Mount <sup>c</sup>	$R_{thJA}$	40	$^\circ\text{C/W}$
Junction-to-Case	$R_{thJC}$	1.25	

Notes:

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

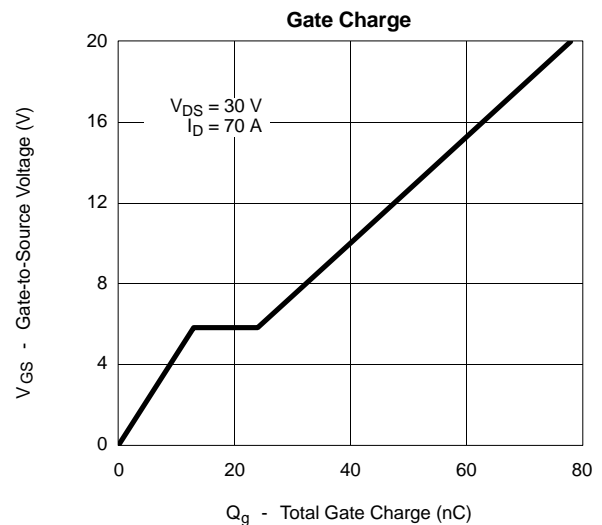
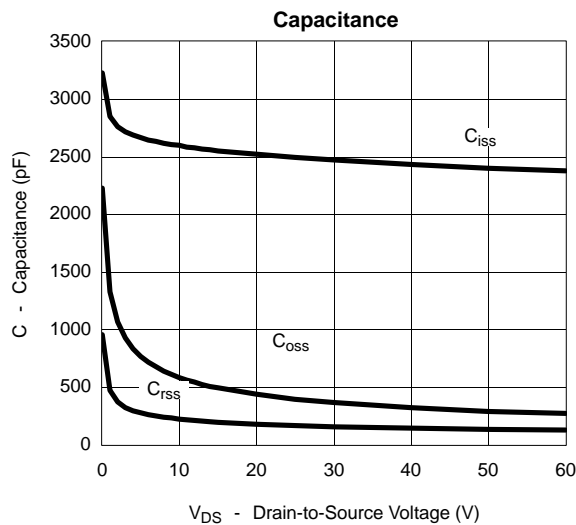
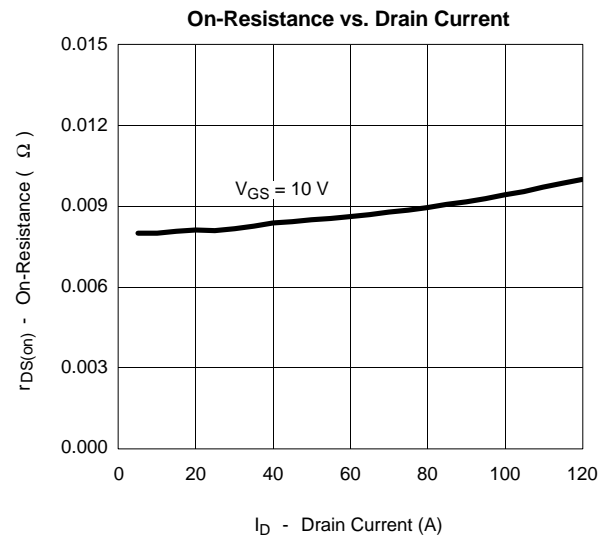
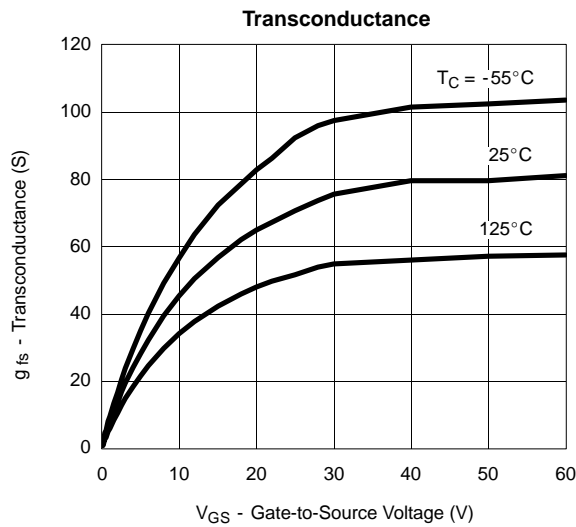
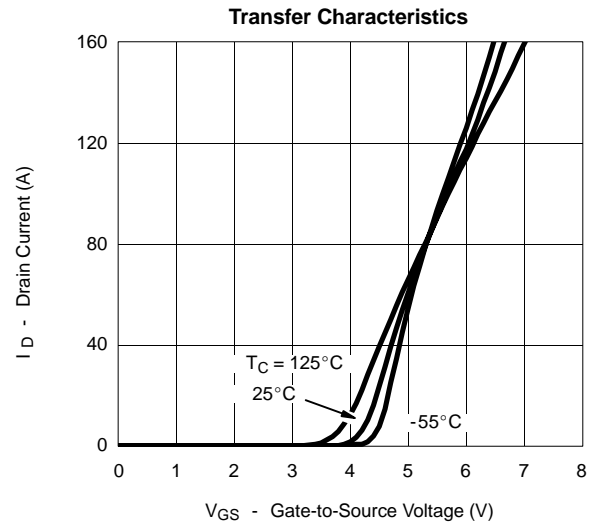
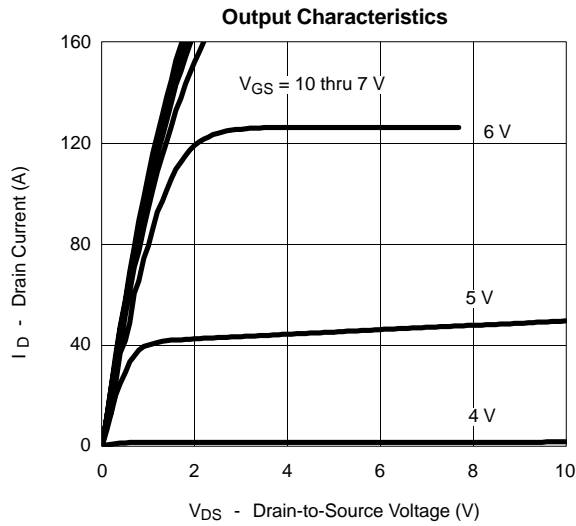
For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>

SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA	2.0	3.0	4.0	
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> = 48 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	70			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		0.0085	0.011	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125 °C			0.019	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175 °C			0.025	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A	25	50		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		2500		pF
Output Capacitance	C <sub>oss</sub>			400		
Reverse Transfer Capacitance	C <sub>rss</sub>			165		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 70 A		40	60	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			13		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			12		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 30 V, R <sub>L</sub> = 0.43 Ω I <sub>D</sub> = 70 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		15	25	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			11	20	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			30	50	
Fall Time <sup>c</sup>	t <sub>f</sub>			7	15	
Source-Drain Diode Ratings and Characteristics (T <sub>C</sub> = 25 °C) <sup>b</sup>						
Continuous Current	I <sub>s</sub>				70	A
Pulsed Current	I <sub>SM</sub>				160	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0 V		1.0	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 70 A, di/dt = 100 A/μs		40	80	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			1.7	3.5	A
Reverse Recovery Charge	Q <sub>rr</sub>			0.034	0.14	μC

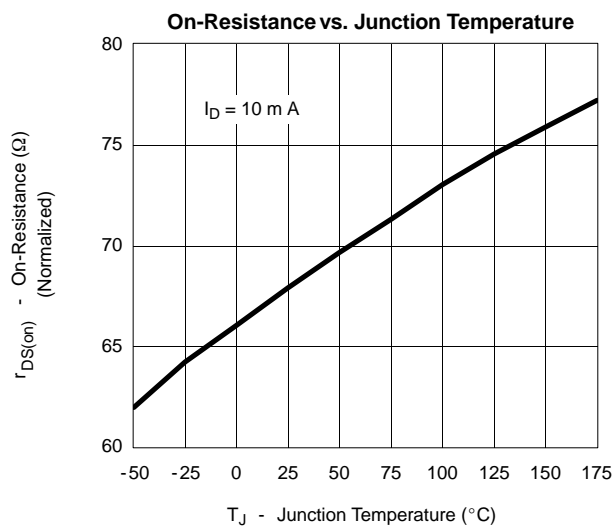
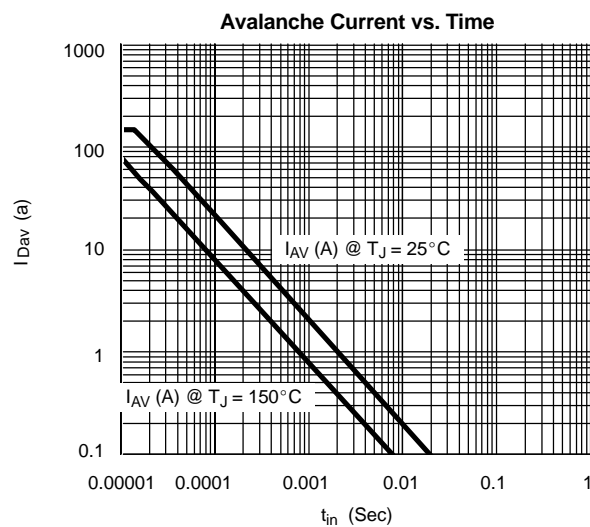
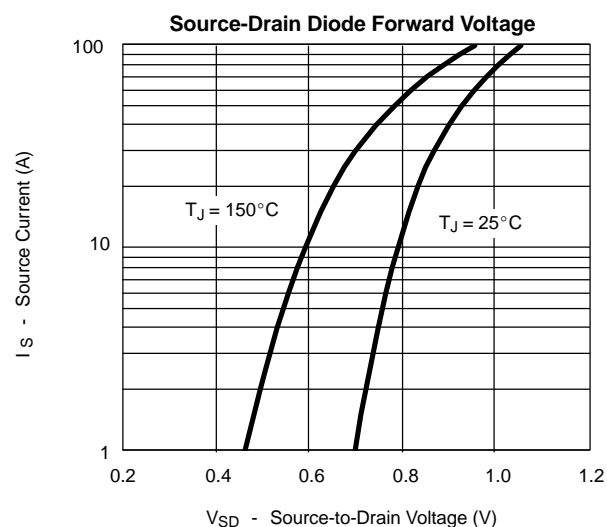
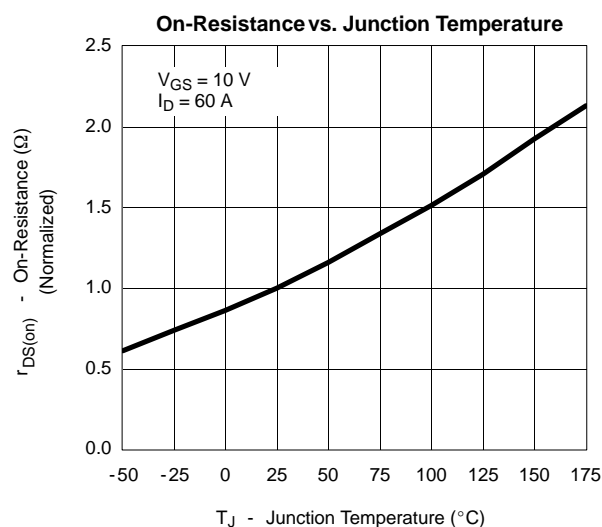
## Notes:

- 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.

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



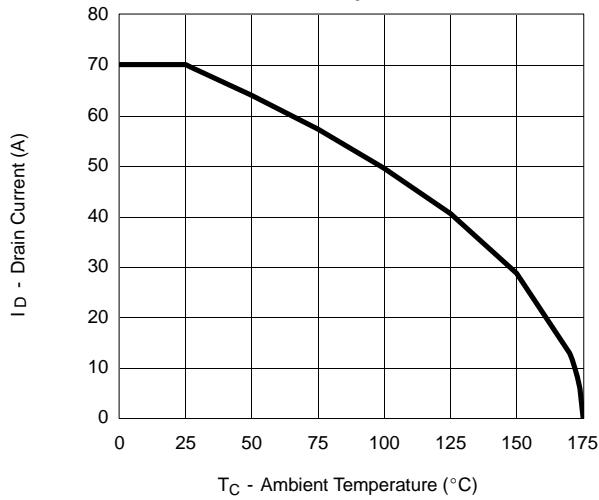
## TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



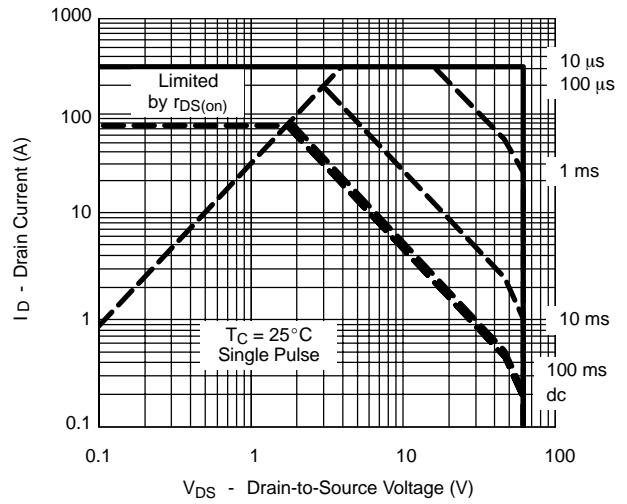


**THERMAL RATINGS**

Maximum Drain Current vs.  
Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

