



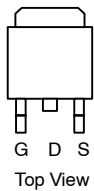
## N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY			
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)	$Q_g$ (Typ)
30	0.030 @ $V_{GS} = 10$ V	40	18
	0.045 @ $V_{GS} = 4.5$ V	33	

### FEATURES

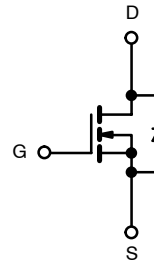
- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- 100%  $R_g$  Tested

TO-263



DRAIN connected to TAB

Ordering Information: SUM40N03-30L—E3



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
Pulsed Drain Current	$I_{DM}$	40	
Single Pulse Avalanche Current	$I_{AS}$	30	
Repetitive Avalanche Energy <sup>a</sup>	$E_{AS}$	$L = 0.1$ mH	mJ
Maximum Power Dissipation <sup>a</sup>		$T_C = 25^\circ\text{C}$	100 <sup>b</sup>
	$T_A = 25^\circ\text{C}$ <sup>c</sup>	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	$R_{thJA}$	40	$^\circ\text{C/W}$
Junction-to-Case			

Notes

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

SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>DS</sub> = 0 V, I <sub>D</sub> = 250 μA	30			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> = 30 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			150	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	30			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A		0.020	0.030	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 125 °C			0.050	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 175 °C			0.054	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 12.5 A		0.030	0.045	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A	10	22		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		1170		pF
Output Capacitance	C <sub>oss</sub>			320		
Reverse Transfer Capacitance	C <sub>rss</sub>			60		
Total Gate Charge <sup>b</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A		18	26	nC
Gate-Source Charge <sup>b</sup>	Q <sub>gs</sub>			5.5		
Gate-Drain Charge <sup>b</sup>	Q <sub>gd</sub>			2		
Gate Resistance	R <sub>g</sub>		0.9	1.8	2.7	Ω
Turn-On Delay Time <sup>b</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.5 Ω I <sub>D</sub> ≅ 30 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 2.5 Ω		10	20	ns
Rise Time <sup>b</sup>	t <sub>r</sub>			10	20	
Turn-Off Delay Time <sup>b</sup>	t <sub>d(off)</sub>			25	40	
Fall Time <sup>b</sup>	t <sub>f</sub>			15	30	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>c</sup></b>						
Continuous Current	I <sub>S</sub>				40	A
Pulsed Current	I <sub>SM</sub>				40	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 30 A, V <sub>GS</sub> = 0 V		1.1	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 30 A, di/dt = 100 A/μs		50	100	ns
Peak Reverse Recovery Current	I <sub>RM</sub>			3.9	7.8	A
Reverse Recovery Charge	Q <sub>rr</sub>			98	390	nC

## Notes

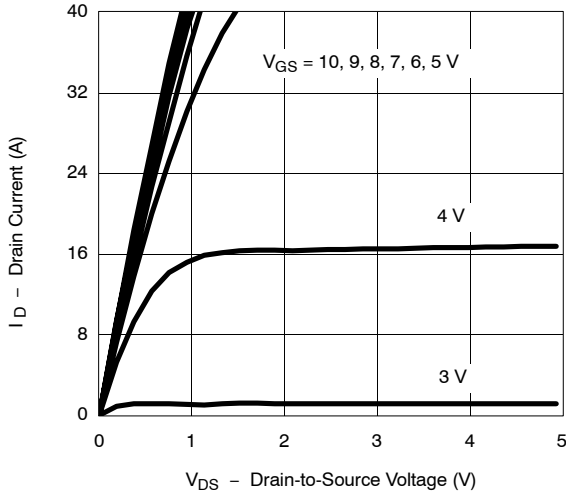
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Independent of operating temperature.
- Guaranteed by design, not subject to production testing.

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.

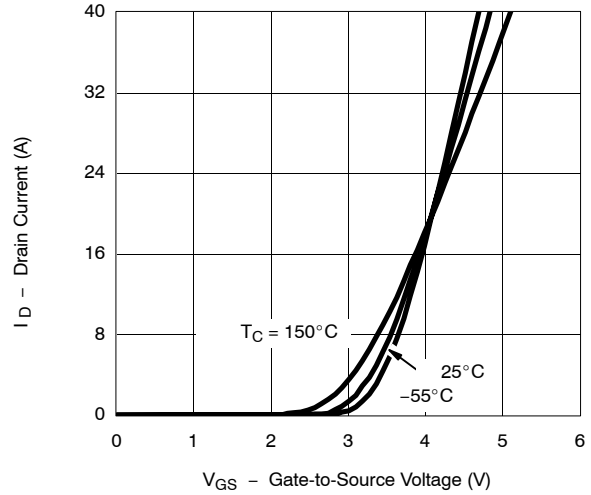


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

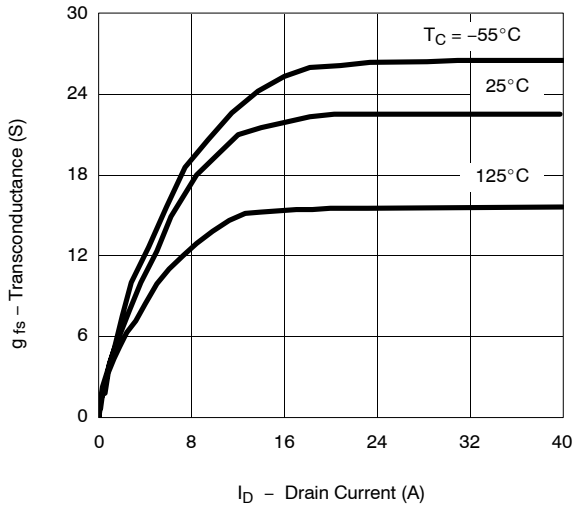
**Output Characteristics**



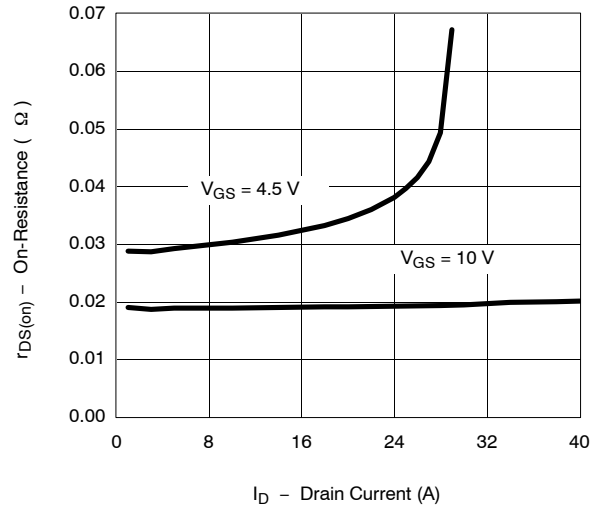
**Transfer Characteristics**



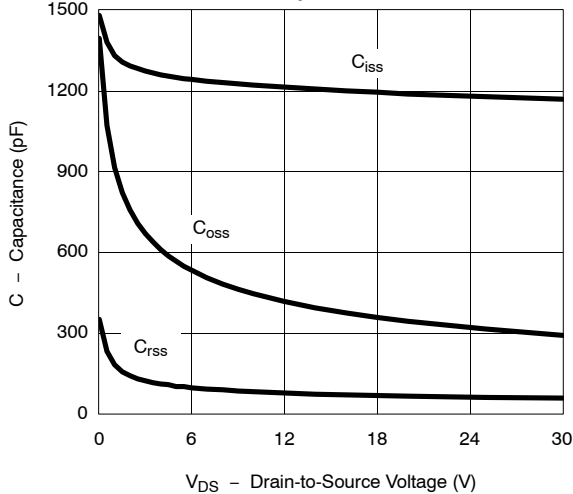
**Transconductance**



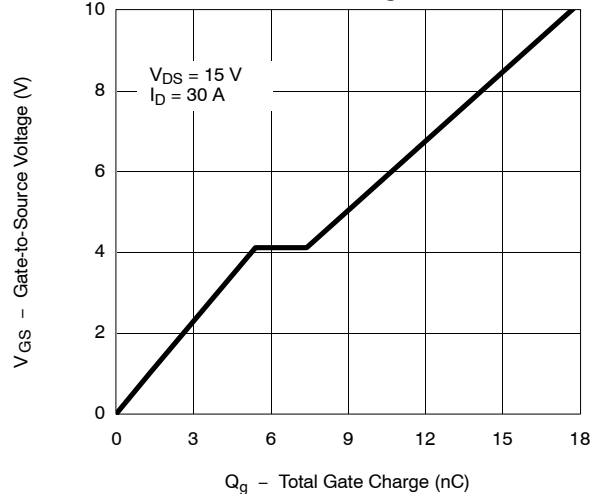
**On-Resistance vs. Drain Current**



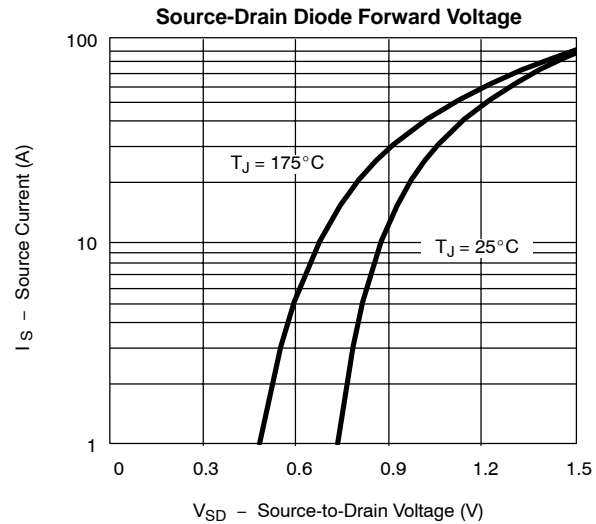
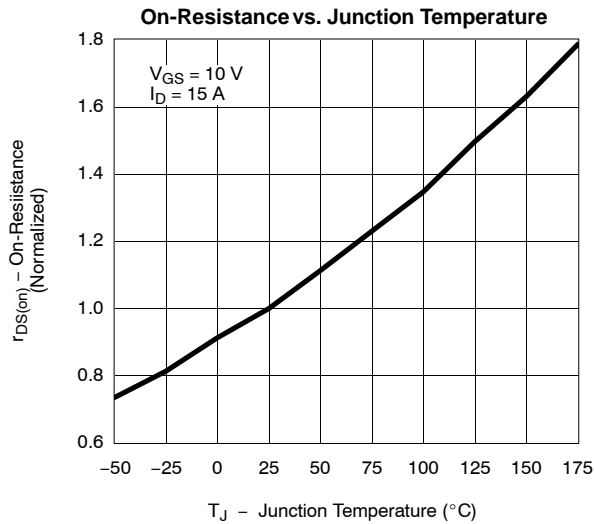
**Capacitance**



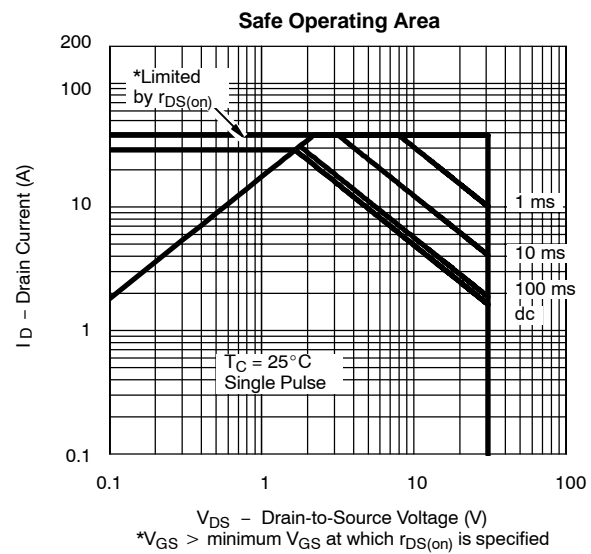
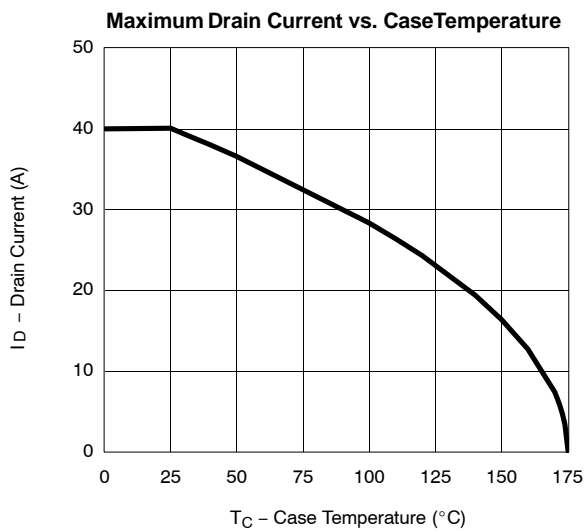
**Gate Charge**



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

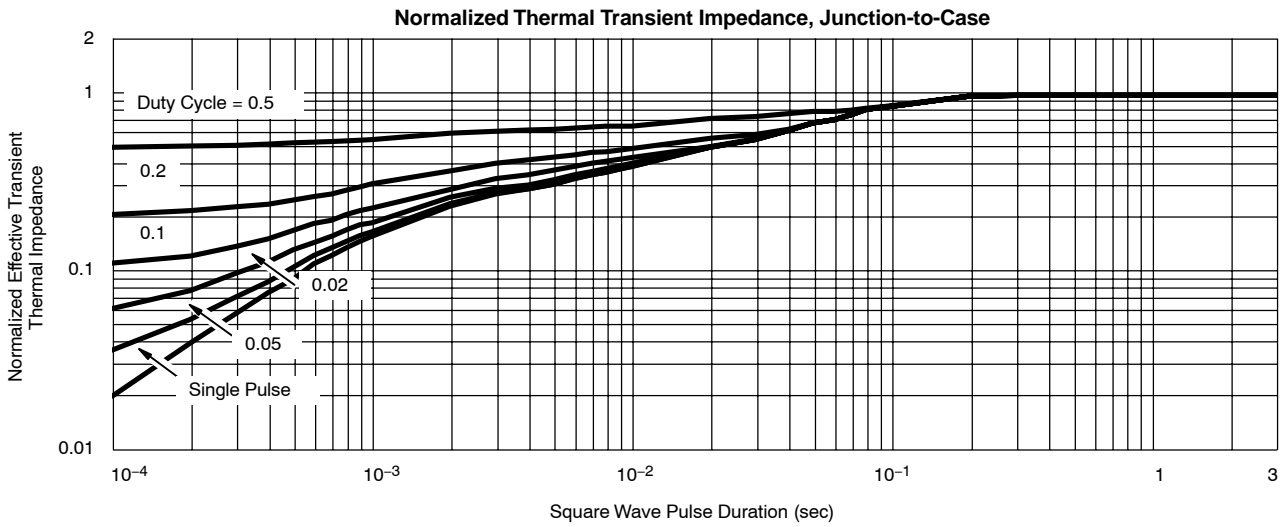


### THERMAL RATINGS





**THERMAL RATINGS**



Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?73245>.