



## P-Channel 40-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>d</sup>
-40	0.0042 @ V <sub>GS</sub> = -10 V	-110
	0.0062 @ V <sub>GS</sub> = -4.5 V	-110

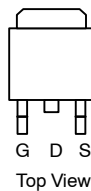
### FEATURES

- TrenchFET® Power MOSFET
- New Package with Low Thermal Resistance

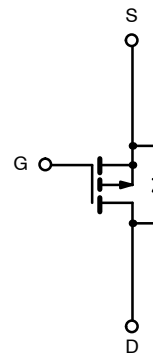
### APPLICATIONS

- Automotive
  - 12-V Boardnet
  - High-Side Switches
  - Motor Drives

TO-263



Ordering Information: SUM110P04-04L



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25°C UNLESS OTHERWISE NOTED)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	-40	V	
Gate-Source Voltage	V <sub>GS</sub>	±20		
Continuous Drain Current <sup>d</sup> (T <sub>J</sub> = 175°C)	I <sub>D</sub>	T <sub>C</sub> = 25°C	-110	A
		T <sub>C</sub> = 125°C	-110	
Pulsed Drain Current	I <sub>DM</sub>	-240		
Avalanche Current	I <sub>AS</sub>	-75		
Single Pulse Avalanche Energy <sup>a</sup>	E <sub>AS</sub>	281	mJ	
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25°C	375°	W
		T <sub>A</sub> = 25°C <sup>b</sup>	3.75	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 175	°C	

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient PCB Mount <sup>b</sup>	R <sub>thJA</sub>	40	°C/W
Junction-to-Case	R <sub>thJC</sub>	0.4	

Notes:

- Duty cycle ≤ 1%.
- When mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.
- Limited by package.

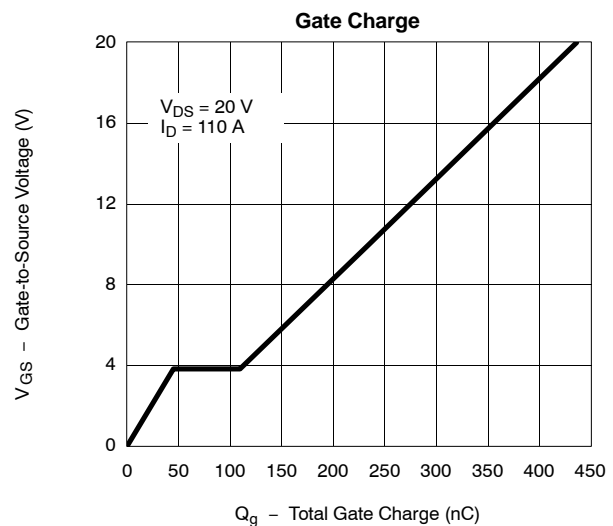
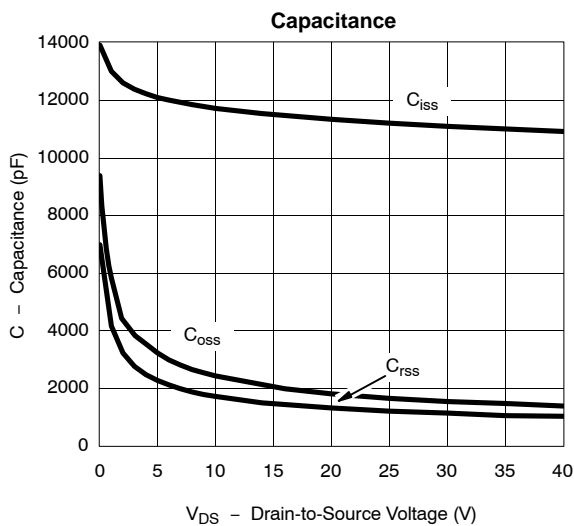
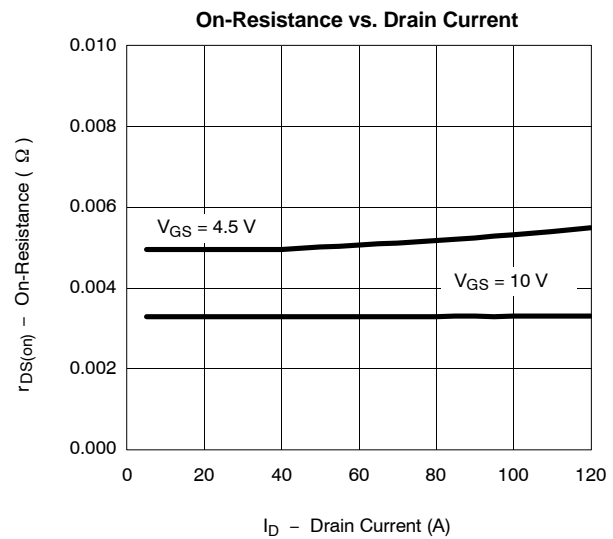
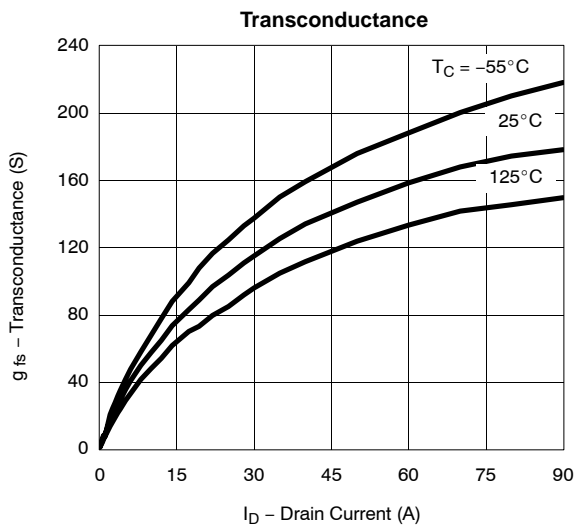
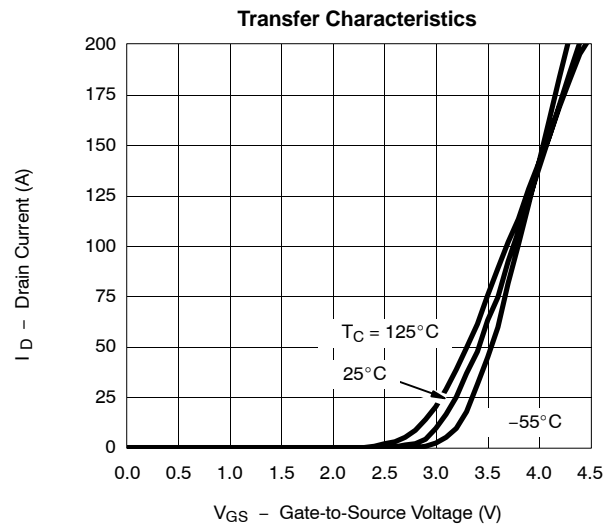
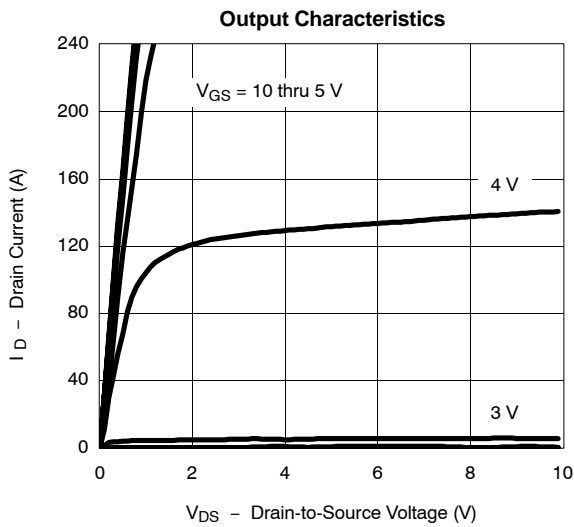
SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA	-40			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = 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> = -40 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			-50	
		V <sub>DS</sub> = -40 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	-120			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		0.0034	0.0042	Ω
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -30 A, T <sub>J</sub> = 125 °C			0.0063	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -30 A, T <sub>J</sub> = 175 °C			0.0076	
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -20 A		0.005	0.0062	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -15 V, I <sub>D</sub> = -30 A	20			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		11200		pF
Output Capacitance	C <sub>oss</sub>			1650		
Reverse Transfer Capacitance	C <sub>rss</sub>			1200		
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> = -110 A		235	350	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			45		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			65		
Gate Resistance	R <sub>g</sub>			3		Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = -20 V, R <sub>L</sub> = 0.18 Ω I <sub>D</sub> ≈ -110 A, V <sub>GEN</sub> = -10 V, R <sub>g</sub> = 2.5 Ω		25	40	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			30	45	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			190	300	
Fall Time <sup>c</sup>	t <sub>f</sub>			110	165	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>b</sup></b>						
Continuous Current	I <sub>s</sub>				-110	A
Pulsed Current	I <sub>SM</sub>				-240	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = -85 A, V <sub>GS</sub> = 0 V		-1.0	-1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -85 A, di/dt = 100 A/μs		65	100	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			-3.7	-5.6	A
Reverse Recovery Charge	Q <sub>rr</sub>				0.12	0.28

## Notes:

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

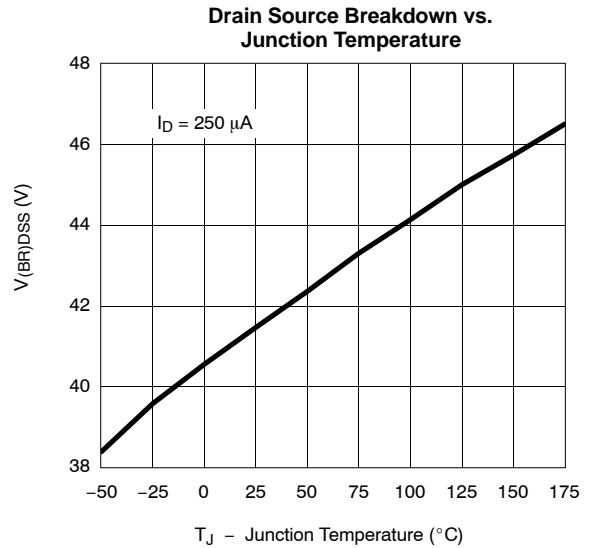
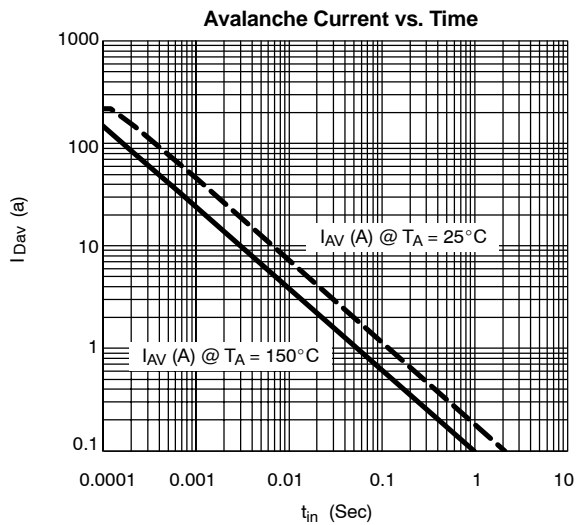
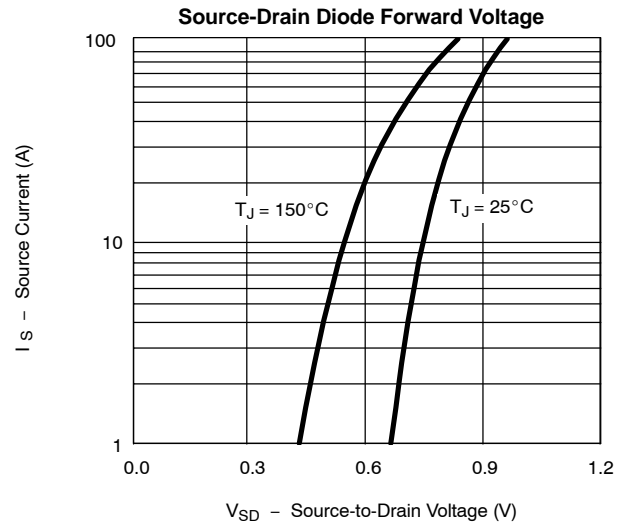
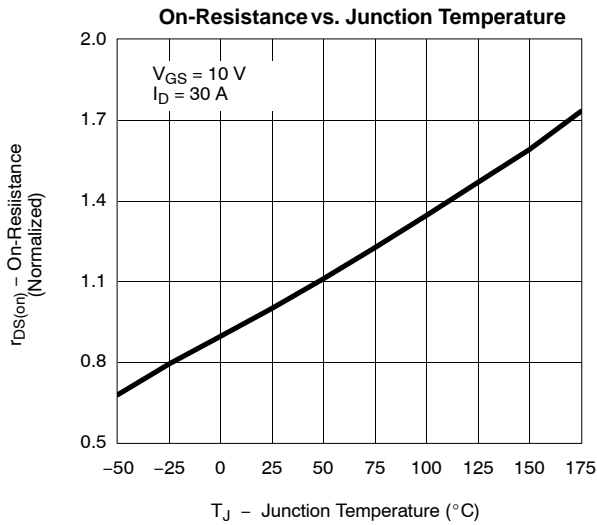


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**



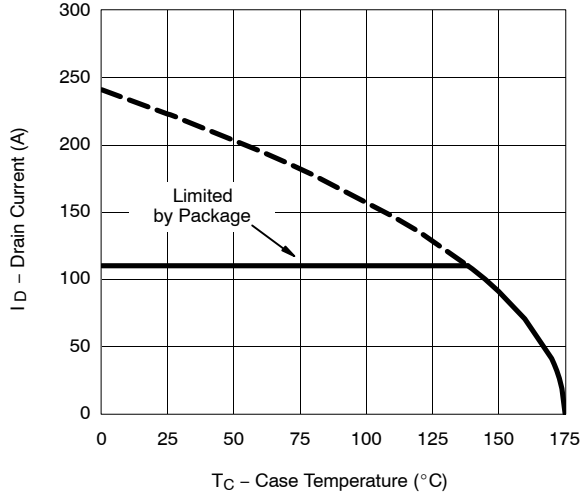


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

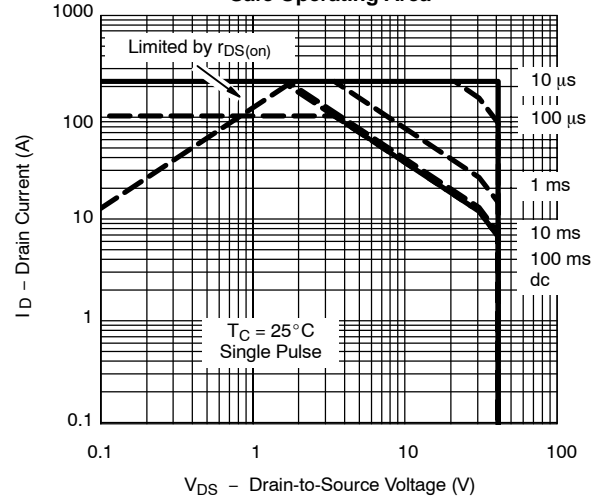


**THERMAL RATINGS**

**Maximum Avalanche and Drain Current vs. Case Temperature**



**Safe Operating Area**



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

