



N-Channel 60-V (D-S), 175°C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	0.0093 @ $V_{GS} = 10$ V	90
	0.0135 @ $V_{GS} = 4.5$ V	62

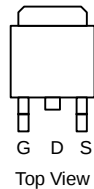
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature

APPLICATIONS

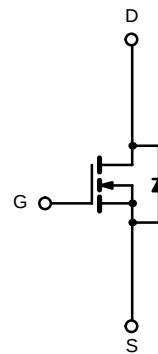
- 12-V Automotive Systems
 - Load Switch
 - Motor Drive
 - DC/DC

TO-263



SUM75N06-09L

DRAIN connected to TAB



N-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	I_D	90	A
	$T_C = 100^\circ\text{C}$		53	
Pulsed Drain Current		I_{DM}	160	
Avalanche Current		I_{AR}	50	
Repetitive Avalanche Energy ^a	$L = 0.1$ mH	E_{AR}	125	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	125 ^b	W
	$T_A = 25^\circ\text{C}^c$	P_D	3.75 ^c	
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) ^c	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case	R_{thJC}	1.2	

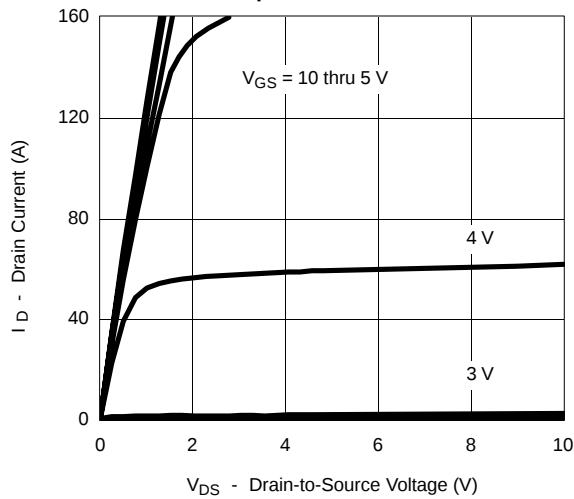
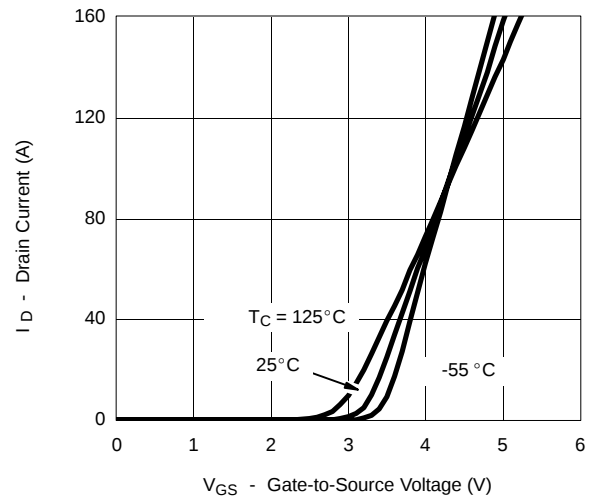
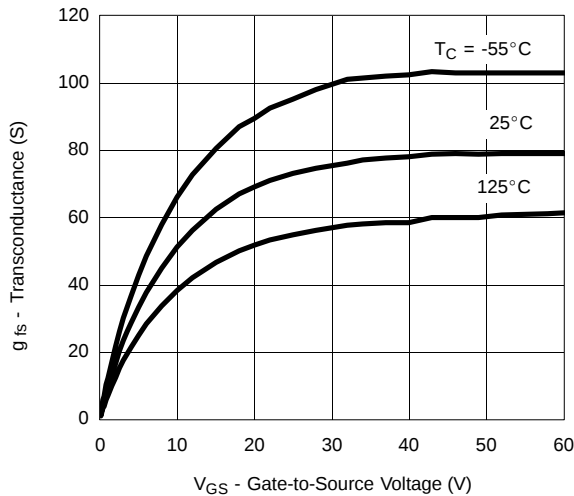
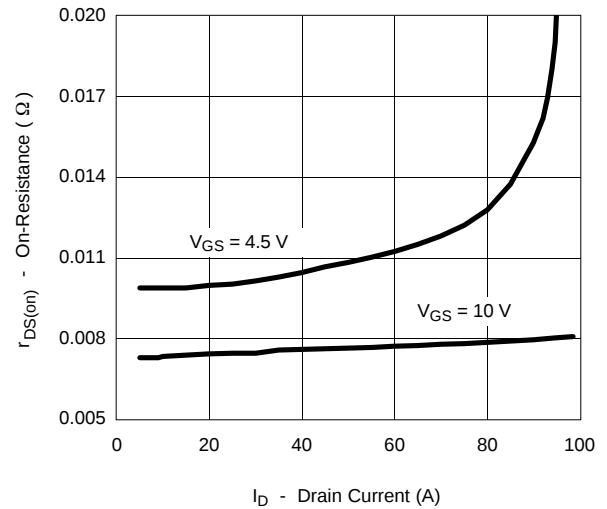
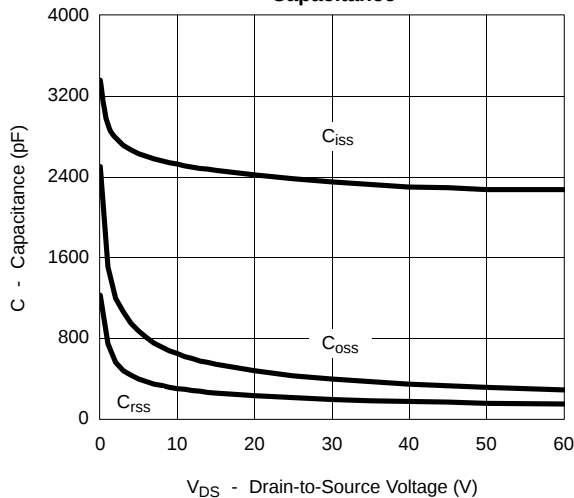
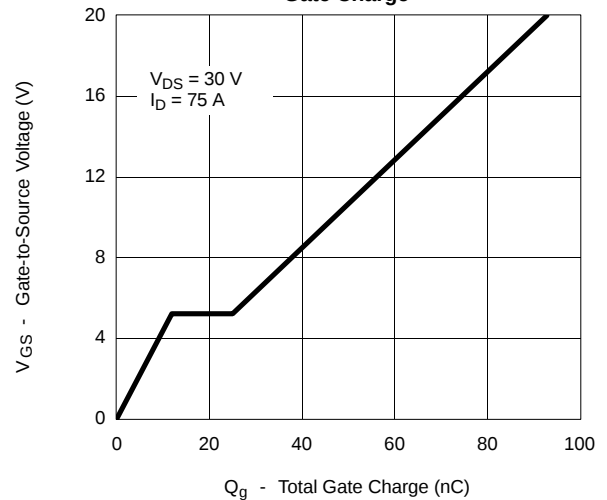
Notes:

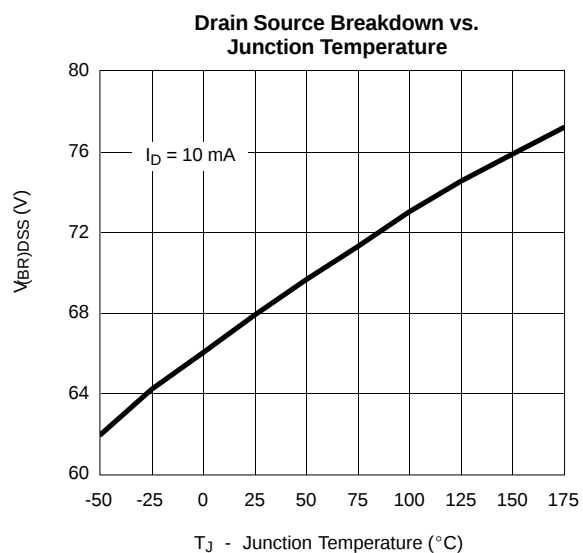
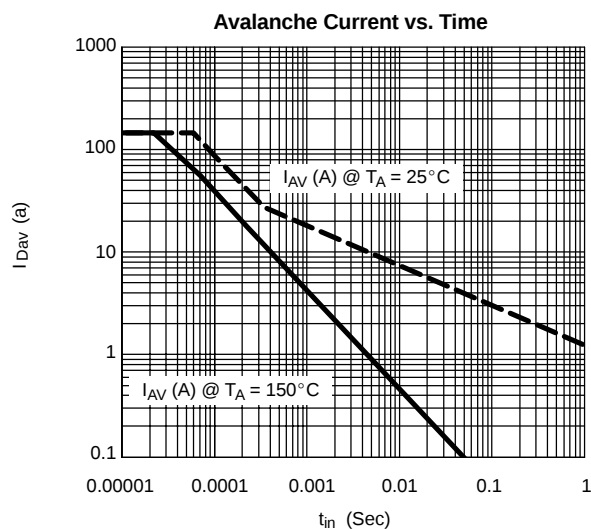
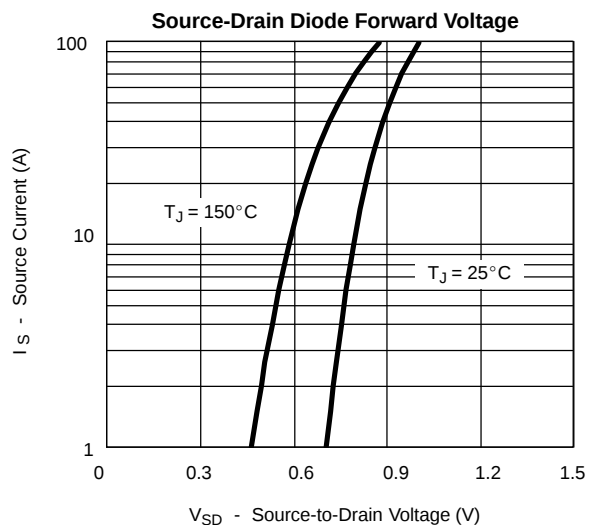
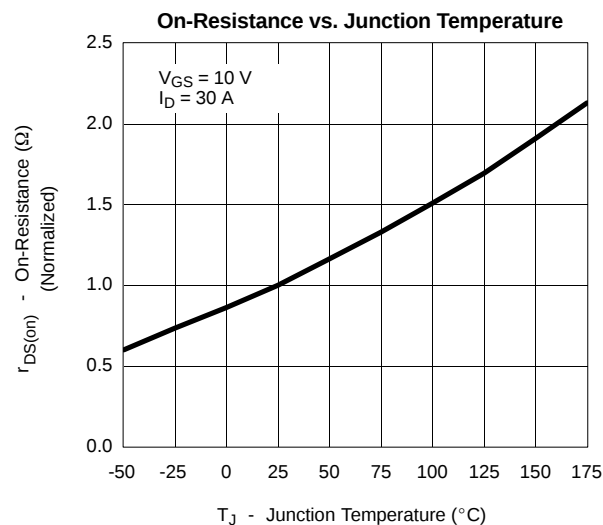
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

MOSFET SPECIFICATIONS (T _J =25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _{DS} = 250 μA	1	2	3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			1	μA
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 175 °C			150	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	75			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 30 A		0.0075	0.0093	Ω
		V _{GS} = 10 V, I _D = 30 A, T _J = 125 °C			0.0163	
		V _{GS} = 10 V, I _D = 30 A, T _J = 175 °C			0.024	
		V _{GS} = 4.5 V, I _D = 30 A		0.0105	0.0135	
		V _{GS} = 4.5 V, I _D = 30 A, T _J = 125 °C			0.0224	
		V _{GS} = 4.5 V, I _D = 30 A, T _J = 175 °C			0.030	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	25	75		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		2400		pF
Output Capacitance	C _{oss}			430		
Reverse Transfer Capacitance	C _{rss}			210		
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 90 A		47	75	nC
Gate-Source Charge ^c	Q _{gs}			12		
Gate-Drain Charge ^c	Q _{gd}			13		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.4 Ω I _D ≈ 90 A, V _{GEN} = 10 V, R _G = 2.5 Ω		7	12	ns
Rise Time ^c	t _r			30	50	
Turn-Off Delay Time ^c	t _{d(off)}			25	40	
Fall Time ^c	t _f			12	20	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C) ^b						
Continuous Current	I _S				90	A
Pulsed Current	I _{SM}			160	180	
Forward Voltage ^a	V _{SD}	I _F = 90 A, V _{GS} = 0 V			1.4	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		40	80	ns
Peak Reverse Recovery Current	I _{RM(REC)}			2	4	A
Reverse Recovery Charge	Q _{rr}				0.040	0.16

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.

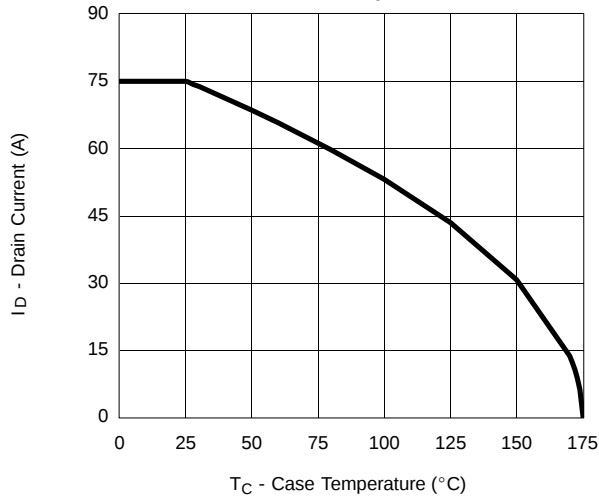
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)****Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

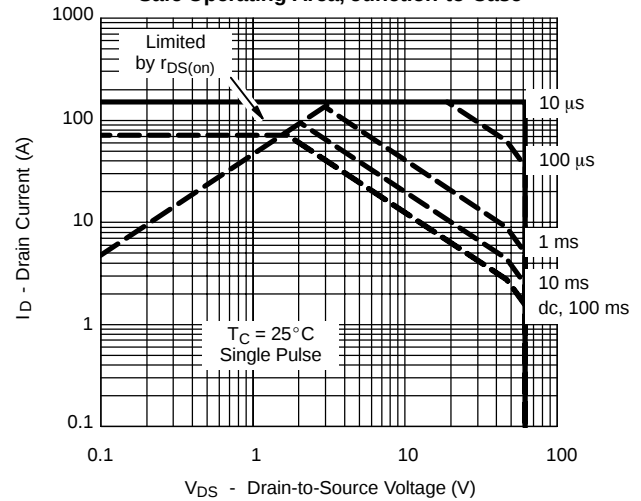


THERMAL RATINGS

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



Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case

