



N-Channel 60-V (D-S), 175°C MOSFET

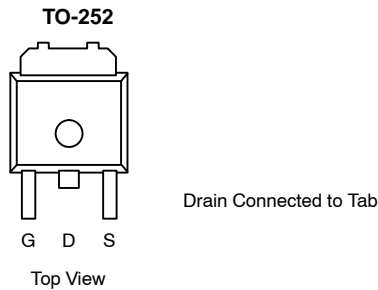
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^c
60	0.0074 @ $V_{GS} = 10$ V	96
	0.0088 @ $V_{GS} = 4.5$ V	88

FEATURES

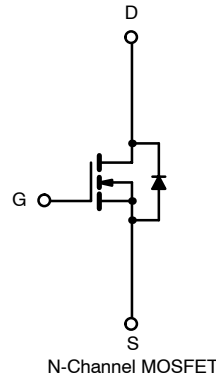
- TrenchFET® Power MOSFETS
- 175°C Junction Temperature

APPLICATIONS

- Automotive Such As:
 - High-Side Switch
 - Motor Drives
 - 12-V Battery
- Secondary Synchronous Rectification



Ordering Information: SUD50N06-07L—E3



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 ($T_J = 175^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	96 ^c
		$T_C = 100^\circ\text{C}$	67 ^c
Pulsed Drain Current	I_{DM}	100	A
Single Pulse Avalanche Current	I_{AS}	45	
Single Pulse Repetitive Avalanche Energy ^a		E_{AS}	
Power Dissipation	P_D	136	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient ^b	R_{thJA}	$t \leq 10$ sec	15	18	$^\circ\text{C/W}$
		Steady State	40	50	
Junction-to-Case	R_{thJC}	0.85	1.1		

Notes:

- Duty cycle $\leq 1\%$.
- Surface mounted on 1" FR4 board.
- Based on maximum allowable Junction Temperature. Package limitation current is 50 A.

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		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	50			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0061	0.0074	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.0122	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C			0.0148	
		V _{GS} = 4.5 V, I _D = 20 A		0.0071	0.0088	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 15 A	20	80		S
Dynamic^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		5800		pF
Output Capacitance	C _{oss}			450		
Reverse Transfer Capacitance	C _{rss}			300		
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 50 A		96	144	nC
Gate-Source Charge ^c	Q _{gs}			19		
Gate-Drain Charge ^c	Q _{gd}			20		
Gate Resistance	R _g			1.5		Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.6 Ω I _D = 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		15	25	ns
Rise Time ^c	t _r			13	20	
Turn-Off Delay Time ^c	t _{d(off)}			62	95	
Fall Time ^c	t _f			14	25	
Source-Drain Ciode Ratings and Characteristics (T_C = 25 °C)^b						
Continuous Current	I _s				50	A
Pulsed Current	I _{SM}				100	
Forward Voltage ^a	V _{SD}	I _F = 30 A, V _{GS} = 0 V		0.90	1.50	V
Reverse Recovery Time	t _{rr}	I _F = 30 A, di/dt = 100 A/μs		37	55	ns

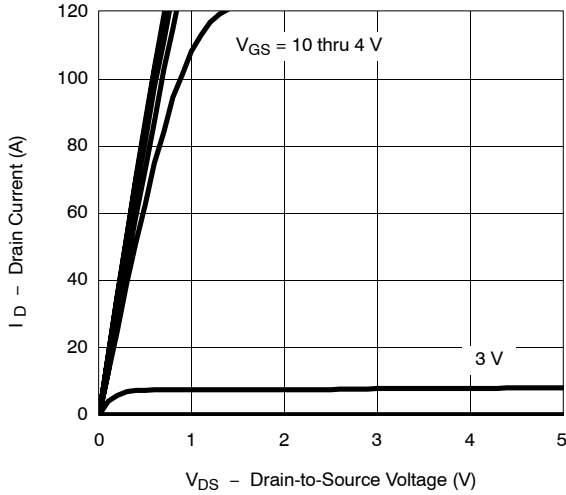
Notes:

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

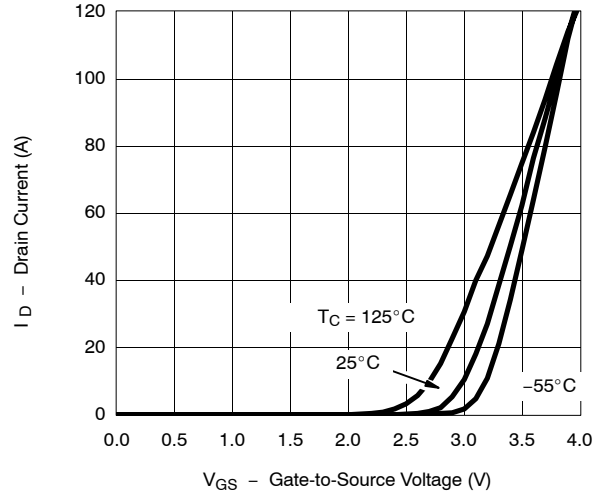


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

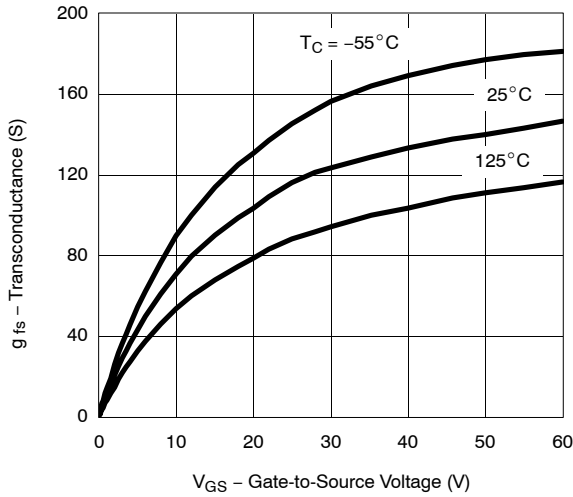
Output Characteristics



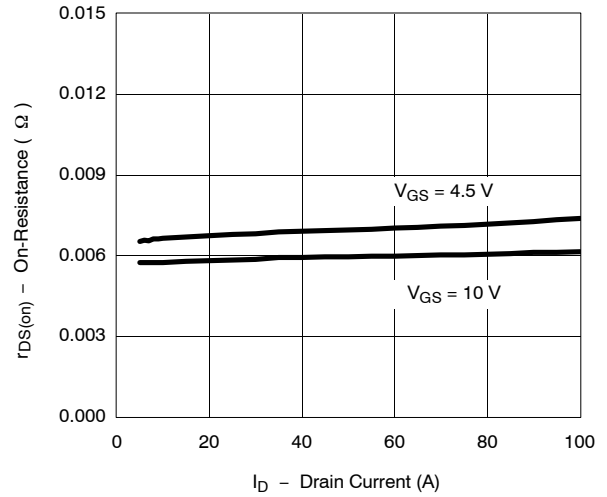
Transfer Characteristics



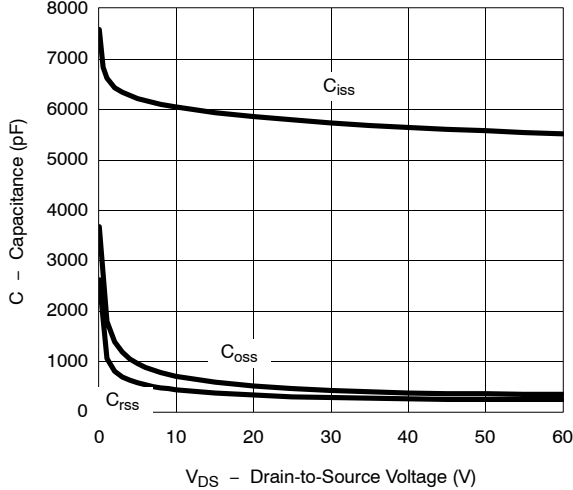
Transconductance



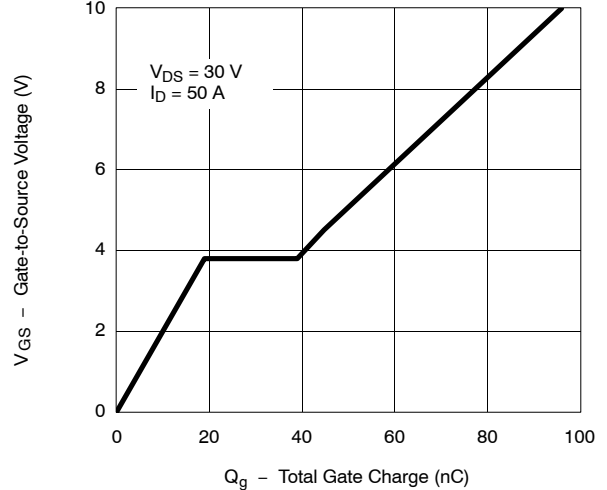
On-Resistance vs. Drain Current



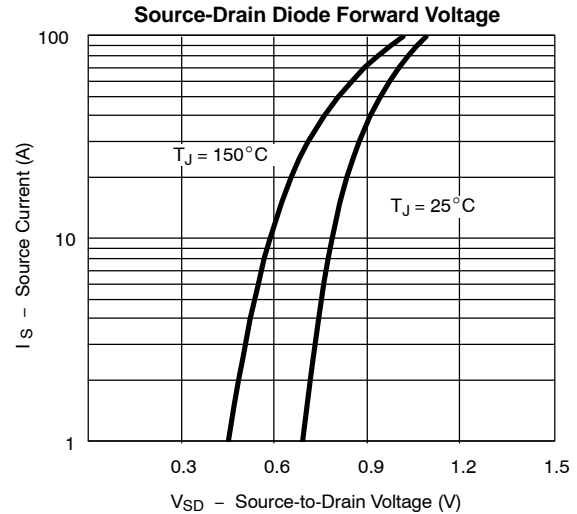
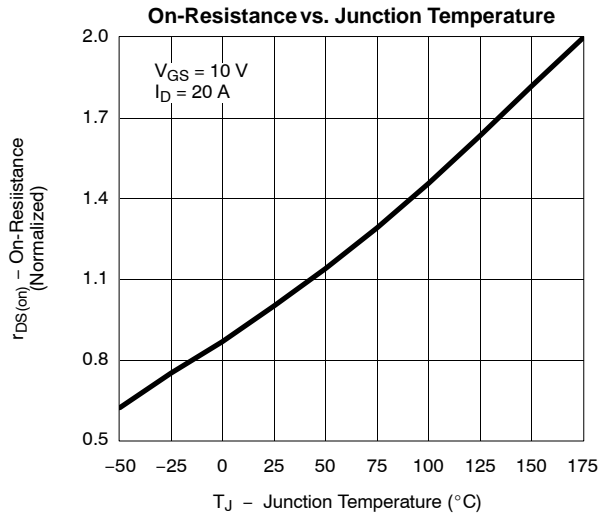
Capacitance



Gate Charge



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



THERMAL RATINGS

