Siliconix

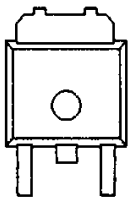
SMD/SMU30N03-30L

N-Channel Enhancement-Mode Transistors, Logic Level

Product Summary

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D[a] (A)
30	0.030	30

TO-252



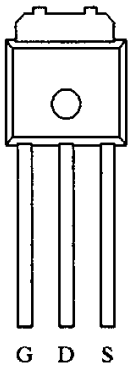
G D S

Top View

Order Number:
SMD30N03-30L

Drain Connected to Tab

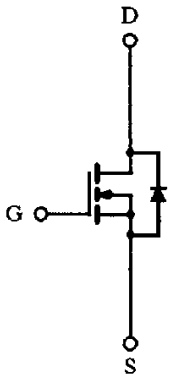
TO-251



G D S

Top View

Order Number:
SMU30N03-30L



N-Channel MOSFET

Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150°C)[b]	T_A = 25°C	I_D	6.0	A
	T_A = 100°C		3.8	
Pulsed Drain Current		I_{DM}	30	
Continuous Source Current (Diode Conduction)		I_S	6	
Avalanche Current		I_{AR}	30	
Repetitive Avalanche Energy (Duty Cycle ≤ 1%)	L = 0.1 mH	E_{AR}	45	mJ
Maximum Power Dissipation	T_C = 25°C	P_D	50	W
	T_A = 25°C		2[b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 150	°C

Thermal Resistance Ratings

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b]	R_{thJA}		60	°C/W
Maximum Junction-to-Case	R_{thJC}		2.5	
Case-to-Sink	R_{thCS}	1.0		

Notes:

a. Calculated Rating for T_C = 25°C, for comparison purposes only. This cannot be used as continuous rating (see Absolute Maximum Ratings and Typical Characteristics).

b. Surface mounted on PC board or mounted vertically in free air.

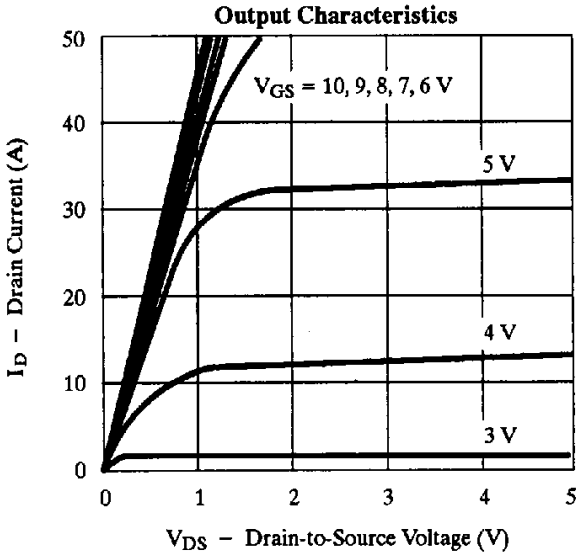
Specifications (T_J = 25°C Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ[a]	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA	30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1 mA	1.0	2.1	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±500	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24 V, V_{GS} = 0 V			25	µA
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 125°C			250	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 2 V, V_{GS} = 10V	30			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 15 A		0.023	0.030	Ω
		V_{GS} = 10 V, I_D = 15 A, T_J = 125°C		0.031	0.050	
		V_{GS} = 5 V, I_D = 15 A		0.035	0.045	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 15 A		15		S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		850		pF
Output Capacitance	C_{oss}			500		
Reverse Transfer Capacitance	C_{rss}			220		
Total Gate Charge[c]	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 30 A		30	35	nC
Gate-Source Charge[c]	Q_{gs}			5	8	
Gate-Drain Charge[c]	Q_{gd}			15	20	
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 20 V, R_L = 0.6 Ω I_D ≅ 30 A, V_{GEN} = 10 V, R_G = 7.5 Ω		9	15	ns
Rise Time[c]	t_r			25	40	
Turn-Off Delay Time[c]	$t_{d(off)}$			27	40	
Fall Time[c]	t_f			25	35	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[b]						
Pulsed Current	I_{SM}				100	A
Diode Forward Voltage	V_{SD}	I_F =6 A, V_{GS} = 0 V		1.1	1.8	V

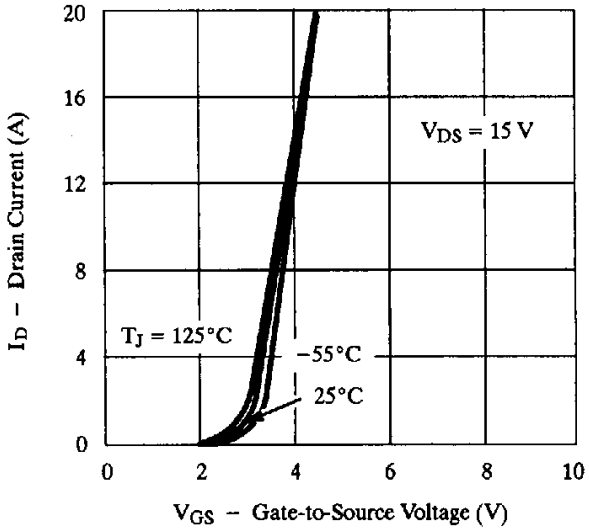
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
c. Independent of operating temperature.

Typical Characteristics (25°C Unless Otherwise Noted)

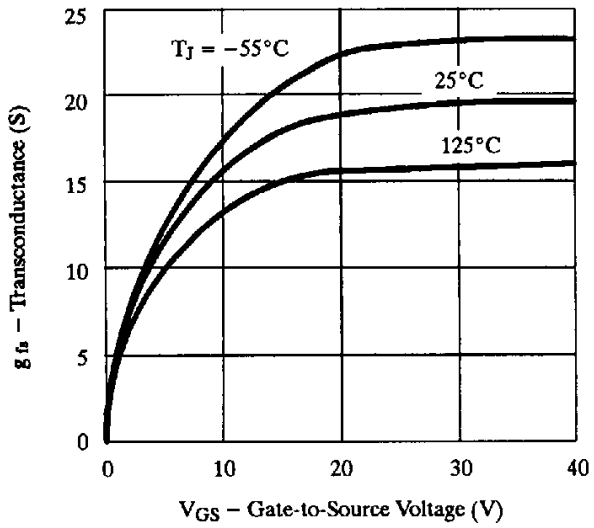
Output Characteristics



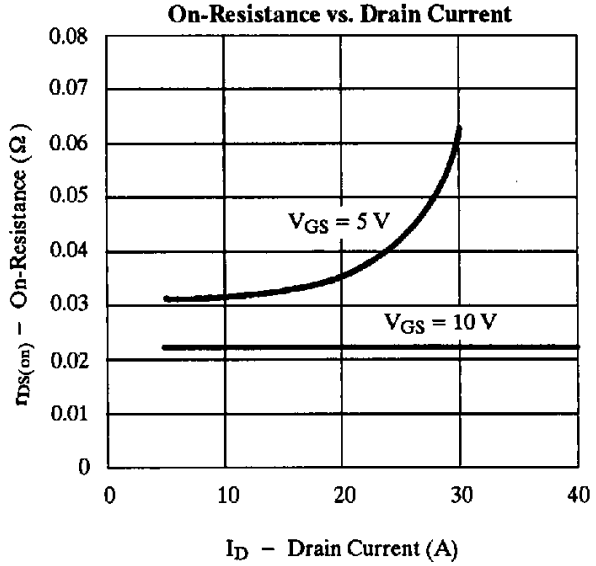
Transfer Characteristics



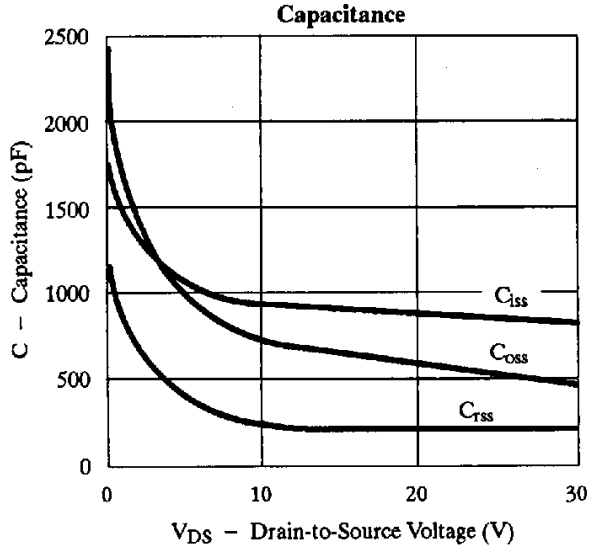
Transconductance



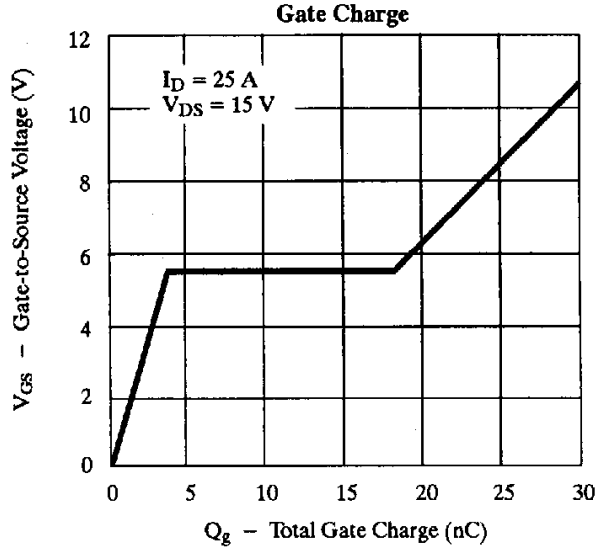
On-Resistance vs. Drain Current



Capacitance

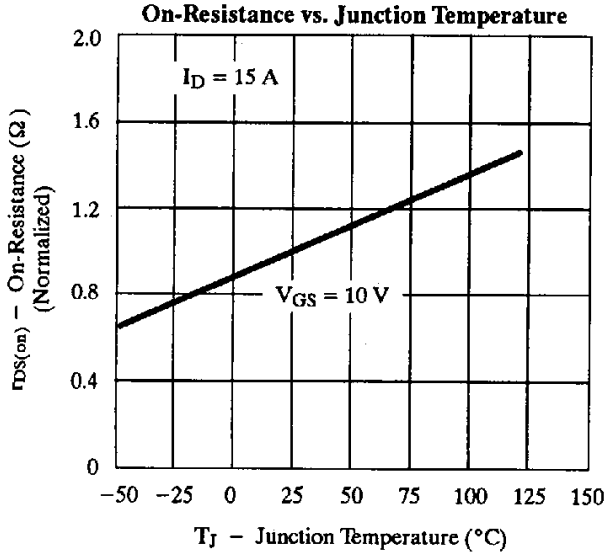


Gate Charge

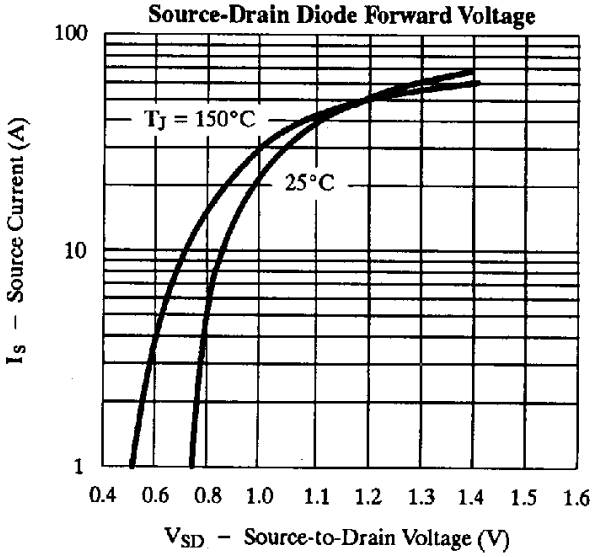


Typical Characteristics (25°C Unless Otherwise Noted)

On-Resistance vs. Junction Temperature

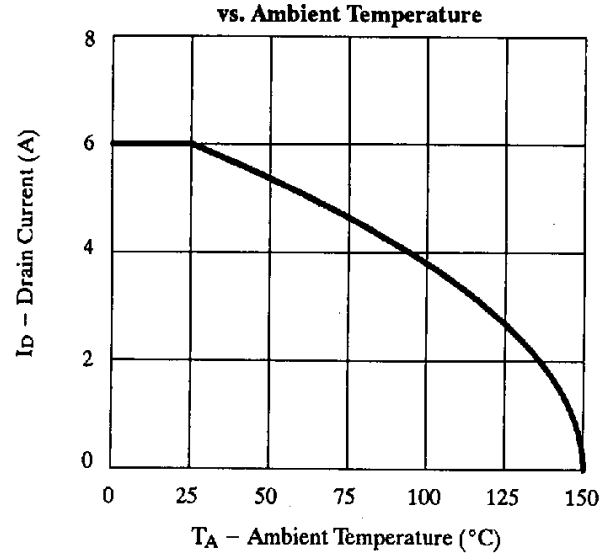


Source-Drain Diode Forward Voltage

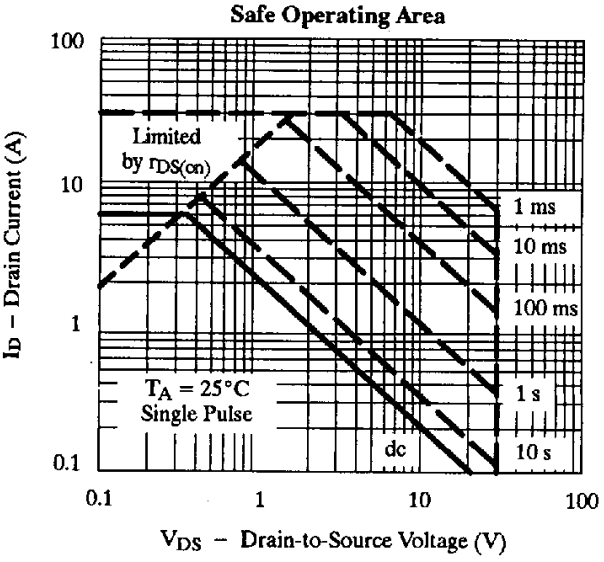


Thermal Ratings

Maximum Avalanche and Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient