Siliconix

SMP60N06-14

N-Channel Enhancement-Mode Transistor

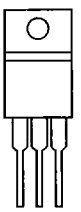
175°C Maximum Junction Temperature

Product Summary

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	0.014	60

See lower-cost version: SUP60N06-14

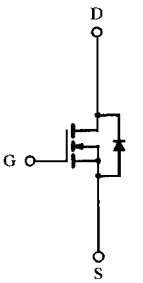
TO-220AB



DRAIN connected to TAB

G D S

Top View



N-Channel MOSFET

Absolute Maximum Ratings (T_C = 25°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 = 150°C)	T_C = 25°C	I_D	60	A
	T_C = 100°C		50	
Pulsed Drain Current		I_{DM}	240	
Avalanche Current[a]		I_{AR}	60	
Repetitive Avalanche Energy	L = 0.1 mH	E_{AR}	180	mJ
Power Dissipation	T_C = 25°C	P_D	150	W
	T_C = 100°C		75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 175	°C
Lead Temperature (1/16" from case for 10 sec.)		T_L	300	

Thermal Resistance Ratings

Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient	R_{thJA}		80	°C/W
Junction-to-Case	R_{thJC}		1.0	
Case-to-Sink	R_{thCS}	1.0		

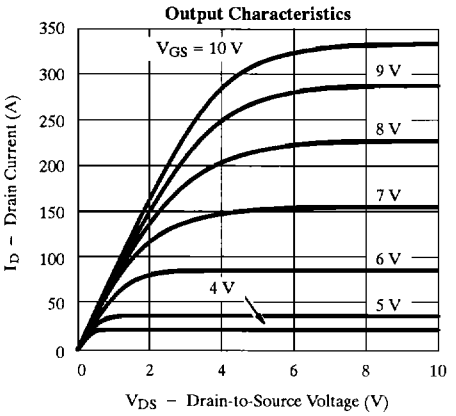
Notes:
a. Duty cycle ≤ 1%

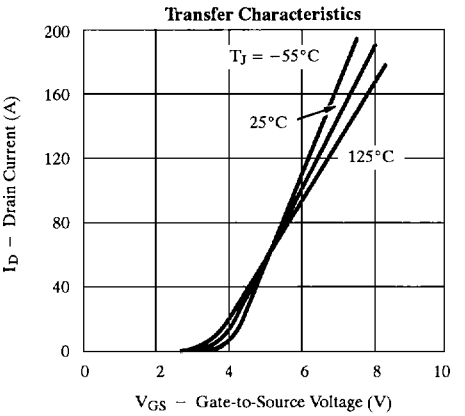
Specifications (T_J = 25°C Unless Otherwise Noted)

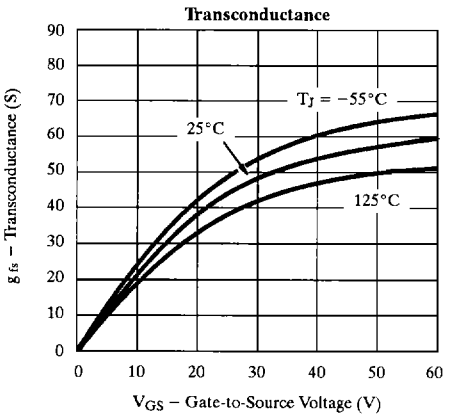
Parameter	Symbol	Test Condition	Min	Typ[a]	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_{DS} = 1 mA	2.0	3.0	4.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±500	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48 V, V_{GS} = 0 V			25	µA
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 125°C			250	
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 175°C			500	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 10 V, V_{GS} = 10 V	60			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A		0.012	0.014	Ω
		V_{GS} = 10 V, I_D = 30 A, T_J = 125°C		0.020	0.023	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175°C		0.025	0.028	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 30 A	30	48		S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		3450		pF
Output Capacitance	C_{oss}			1000		
Reversen Transfer Capacitance	C_{rss}			230		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 60 A		95	130	nC
Gate-Source Charge[c]	Q_{gs}			20		
Gate-Drain Charge[c]	Q_{gd}			45		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.47 Ω I_D ≅ 60 A, V_{GEN} = 10 V, R_G = 2.5 Ω		15	30	ns
Rise Time[c]	t_r			130	180	
Turn-Off Delay Time[c]	$t_{d(off)}$			50	100	
Fall Time[c]	t_f			20	50	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)						
Continuous Current	I_s				60	A
Pulsed Current	I_{SM}				240	
Forward Voltage[b]	V_{SD}	I_F = 60 A, V_{GS} = 0 V		1.0	1.8	V
Reverse Recovery Time	t_{rr}	I_F = 60 A, dI_F/dt = 100 A/µs		130	200	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			9		A
Reverse Recovery Charge	Q_{rr}			0.6		µC

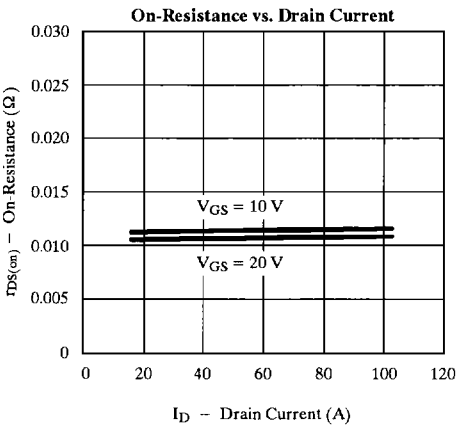
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
c. Independent of operating temperature.

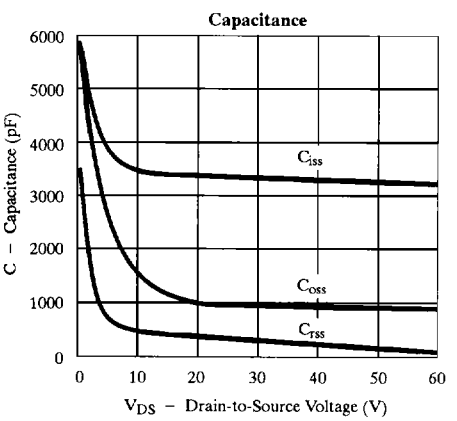
Typical Characteristics (25°C Unless Otherwise Noted)

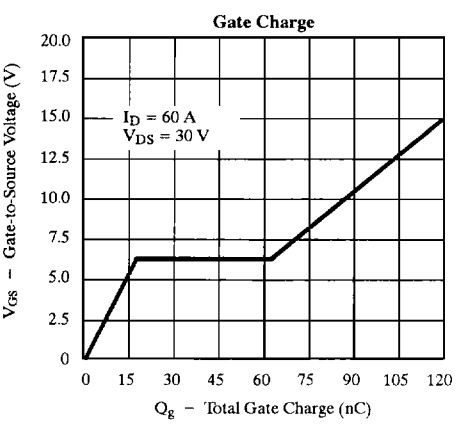






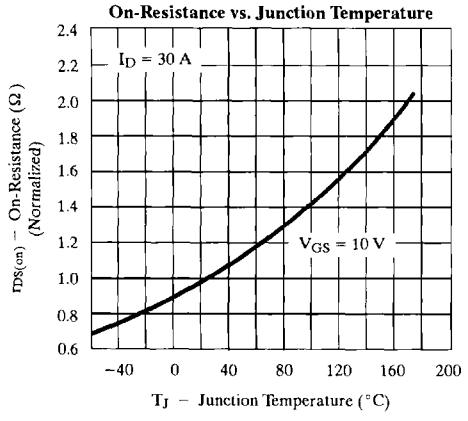




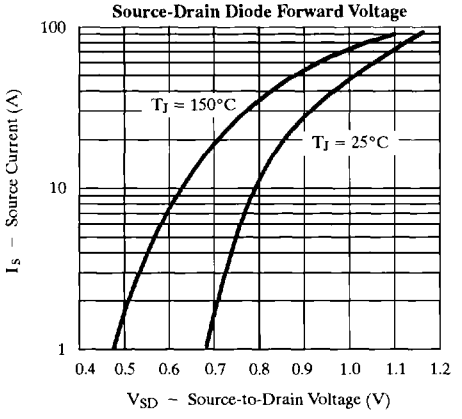


Typical Characteristics (25°C Unless Otherwise Noted)

On-Resistance vs. Junction Temperature

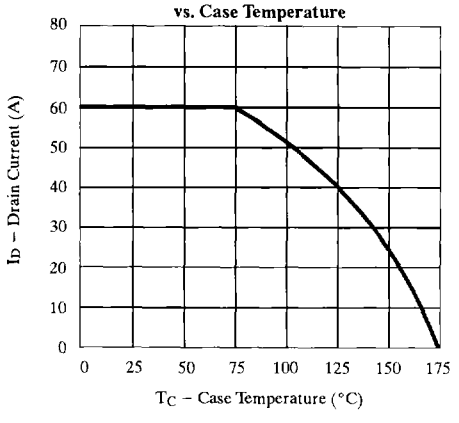


Source-Drain Diode Forward Voltage

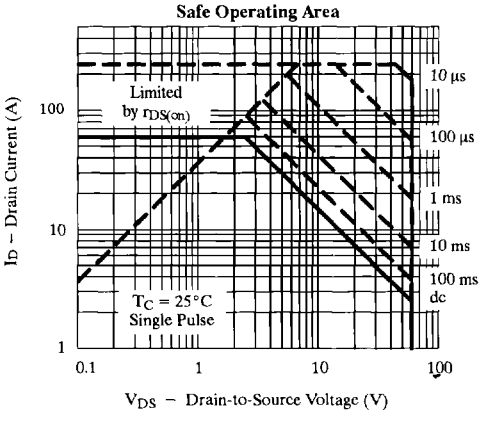


Thermal Ratings

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case