

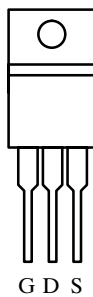
### N-Channel Enhancement-Mode MOSFET, 25-mΩ $r_{DS(on)}$

175°C Maximum Junction Temperature

#### Product Summary

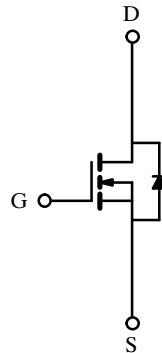
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	$I_D$ (A)
60	0.025	50

TO-220AB



Top View

DRAIN connected to TAB



N-Channel MOSFET

#### Absolute Maximum Ratings ( $T_C = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
Pulsed Drain Current	$I_{DM}$	130	A
Continuous Source Current (Diode Conduction)	$I_S$	50	
Avalanche Current	$I_{AR}$	50	
Avalanche Energy	$E_{AS}$	$L = 0.1 \text{ mH}$	mJ
		$L = 0.05 \text{ mH}$	
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	62.5	W
Maximum Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	
		$T_C = 100^\circ\text{C}$	65
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	$-55$ to $175$	$^\circ\text{C}$
Lead Temperature ( $1/16''$ from case for 10 sec.)	$T_L$	300	

#### Thermal Resistance Ratings

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	$R_{thJA}$		80	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{thJC}$		1.14	
Case-to-Sink	$R_{thCS}$	1.0		

Notes:

a. Duty cycle  $\leq 1\%$

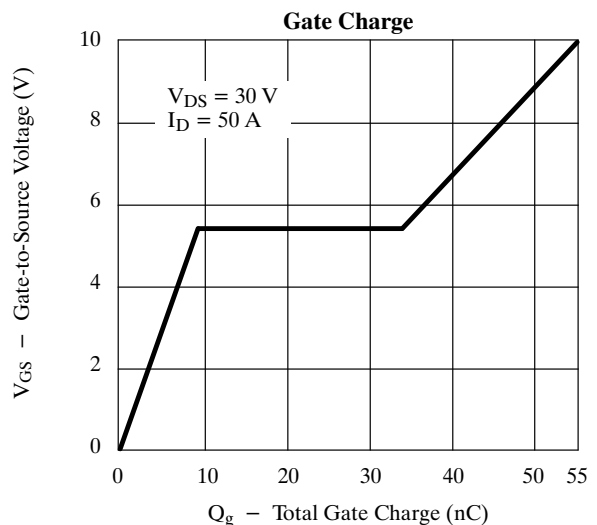
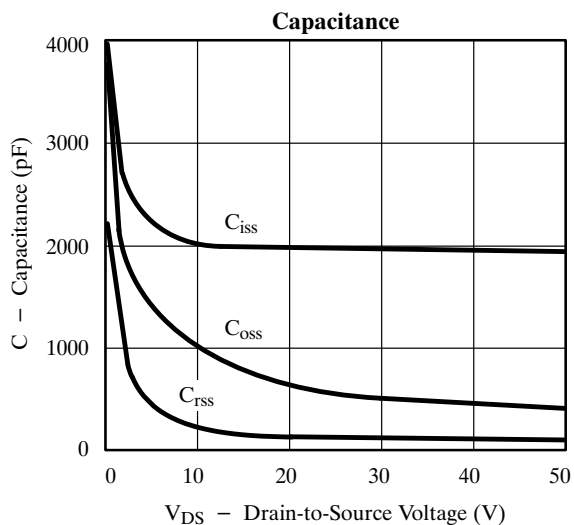
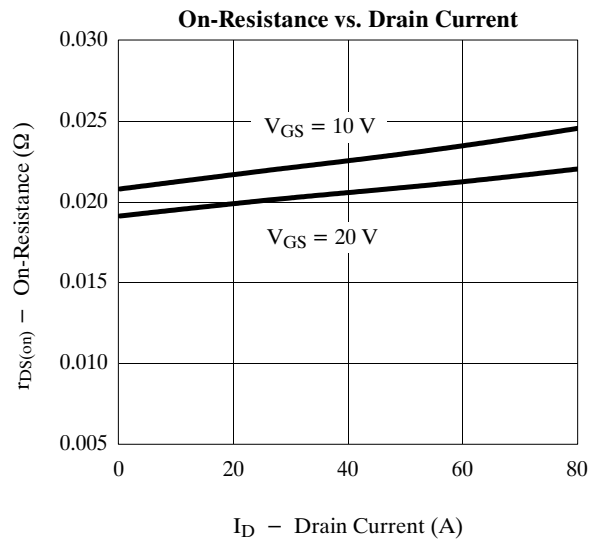
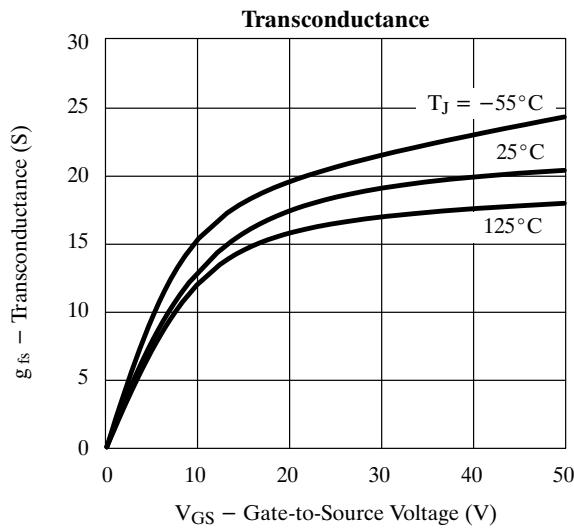
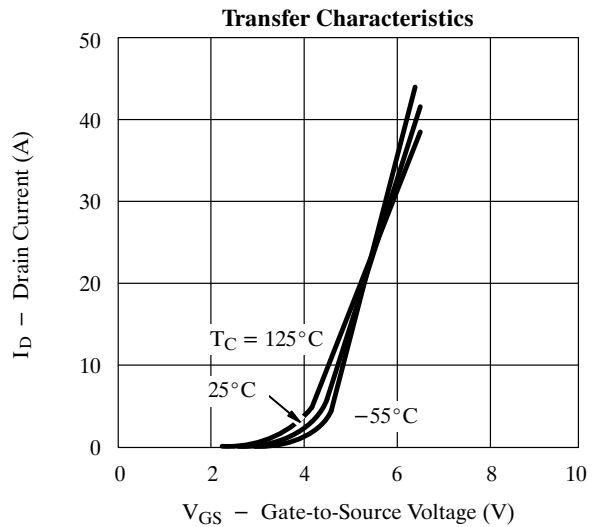
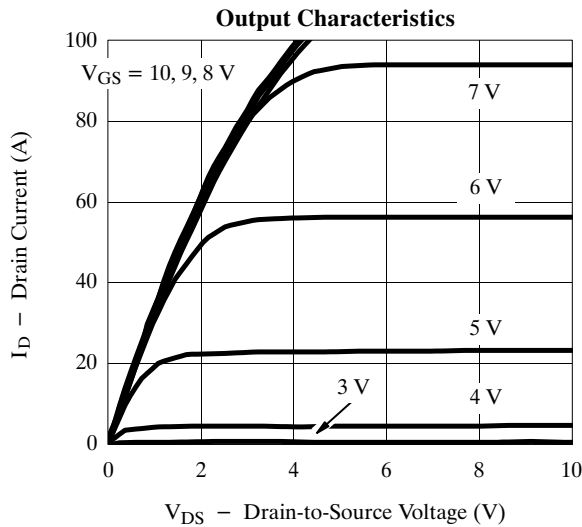
### Specifications ( $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\text{ mA}$	2		4	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 500$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$			25	$\mu\text{A}$
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			250	
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$			500	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 25\text{ A}$		0.020	0.025	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 25\text{ A}, T_J = 125^\circ\text{C}$		0.033	0.042	
		$V_{GS} = 10\text{ V}, I_D = 25\text{ A}, T_J = 175^\circ\text{C}$		0.043	0.0525	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 25\text{ A}$		20		S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2000		nC
Output Capacitance	$C_{oss}$			570		
Reverse Transfer Capacitance	$C_{rss}$			120		
Total Gate Charge	$Q_g$	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 50\text{ A}$		55	80	nC
Gate-Source Charge	$Q_{gs}$			9	15	
Gate-Drain Charge	$Q_{gd}$			24	40	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.6\ \Omega$ $I_D \cong 50\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\ \Omega$		15	30	ns
Rise Time	$t_r$			20	35	
Turn-Off Delay Time	$t_{d(off)}$			40	65	
Fall Time	$t_f$			15	30	
<b>Source-Drain Diode Ratings and Characteristics</b>						
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_F = 50\text{ A}, V_{GS} = 0\text{ V}$			2.0	V
Reverse Recovery Time	$t_{rr}$	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		130		ns
Peak Reverse Recovery Current	$I_{RM(rec)}$			10		A
Reverse Recovery Charge	$Q_{rr}$			0.7		$\mu\text{C}$

Notes:

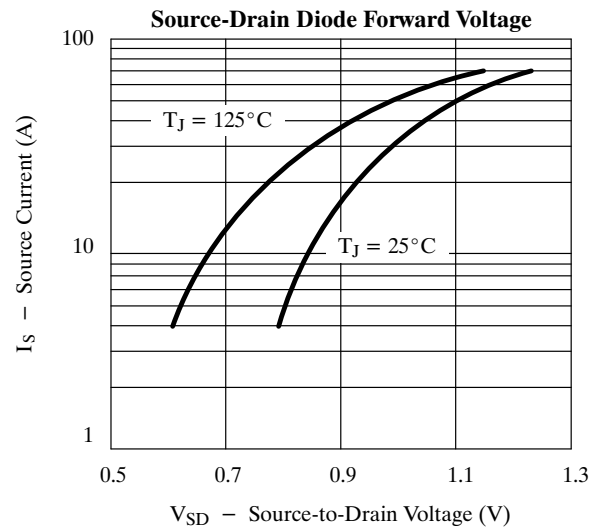
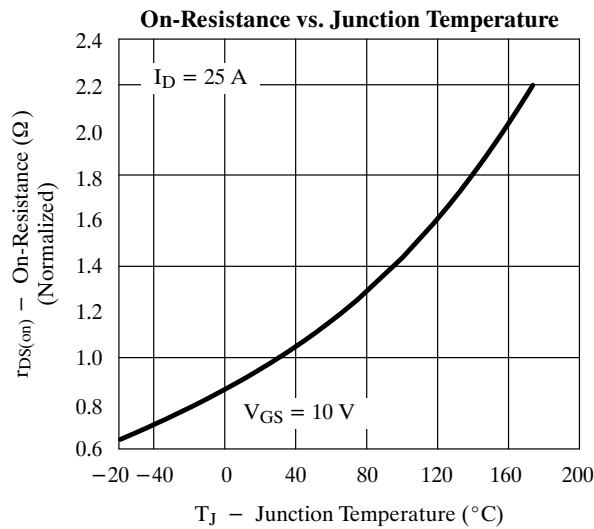
- For design aid only; not subject to production testing.
- Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

## Typical Characteristics (25°C Unless Otherwise Noted)



## SMP50N06-25

### Typical Characteristics (25°C Unless Otherwise Noted)



### Thermal Ratings

