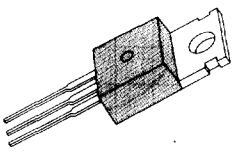
FEATURES

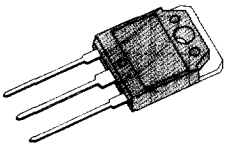
- **Lower $R_{DS\ (ON)}$**
- **Improved inductive ruggedness**
- **Fast switching times**
- **Rugged polysilicon gate cell structure**
- **Lower input capacitance**
- **Extended safe operating area**
- **Improved high temperature reliability**

TO-220



SSP6N55/6N60

TO-3P



SSH6N55/6N60

PRODUCT SUMMARY

Part Number	V_{DS}	$R_{DS(on)}$		I_D
		A	STD	
SSP6N55/SSH6N55	550V	1.2Ω	1.8Ω	6A
SSP6N60/SSH6N60	600V	1.2Ω	1.8Ω	6A

MAXIMUM RATINGS

Characteristic	Symbol	SSP6N55 SSH6N55	SSP6N60 SSH6N60	Unit
Drain-Source Voltage (1)	V_{DSS}	550	600	Vdc
Drain-Gate Voltage (R_{GS}=1.0MΩ)(1)	V_{DGR}	550	600	Vdc
Gate-Source Voltage	V_{GS}	±20		Vdc
Continuous Drain Current T_C=25°C	I_D	6.0	6.0	Adc
Continuous Drain Current T_C=100°C	I_D	4.0	4.0	Adc
Drain Current—Pulsed (3)	I_{DM}	24	24	Adc
Gate Current—Pulsed	I_{GM}	±1.5		Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	570		mJ
Avalanche Current	I_{AS}	6.0		A
Total Power Dissipation @ T_C=25°C Derate above 25°C	P_D	125 1.0		Watts W/°C
Operating and Storage Junction Temperature Range	T_J, Tstg	−55 to 150		°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300		°C

Notes: (1) T_J=25°C to 150°C
(2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%
(3) Repetitive rating: Pulse with limited by max. junction temperature
(4) L=27mH, V_{dd}=50V, R_G=25Ω, Starting T_j=25°C

ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise specified)

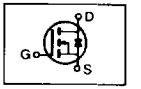
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage SSP6N55/SSH6N55/	550	—	—	V	V_{GS}=0V, I_D=250μA
	SSP6N60/SSH6N60/	600	—	—	V	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.5	V	V_{DS}=V_{GS}, I_D=1mA
I_{GSS}	Gate-Source Leakage Forward	—	—	100	nA	V_{GS}=20V
I_{GSS}	Gate-Source Leakage Reverse	—	—	−100	nA	V_{GS}=−20V
I_{DSS}	Zero Gate Voltage Drain Current	—	—	250	μA	V_{DS}=Max. Rating, V_{GS}=0V
		—	—	1000	μA	V_{DS}=Max. Rating×0.8, V_{GS}=0V, T_C=125°C
$I_{D(on)}$	On-State Drain-Source Current (2)	6.0	—	—	A	V_{DS}≥10V, V_{GS}=10V
$R_{DS(on)}$	Static Drain-Source On-State Resistance (2) A	—	—	1.2	Ω	V_{GS}=10V, I_D=3.0A
	STD	—		1.8		
g_{fs}	Forward Transconductance (2)	3.0	4.8	—	℧	V_{DS}≥50V, I_D=3.0A
C_{iss}	Input Capacitance	—	—	1800	pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
C_{oss}	Output Capacitance	—	—	350	pF	
C_{rss}	Reverse Transfer Capacitance	—	—	150	pF	
$t_{d(on)}$	Turn-On Delay Time	—	—	60	ns	V_{DD}=0.5BV_{DSS}, I_D=3.0A, Z_O=4.7Ω (MOSFET switching times are essentially independent of operating temperature)
t_r	Rise Time	—	—	150	ns	
$t_{d(off)}$	Turn-Off Delay Time	—	—	200	ns	
t_f	Fall Time	—	—	120	ns	
Q_g	Total Gate Charge (Gate-Source Plus Gate-Drain)	—	—	40	nC	V_{GS}=10V, I_D=7.5A, V_{DS}=0.8 Max. Rating (Gate charge is essentially independent of operating temperature.)
Q_{gs}	Gate-Source Charge	—	—	15	nC	
Q_{gd}	Gate-Drain ("Miller") Charge	—	—	25	nC	

THERMAL RESISTANCE

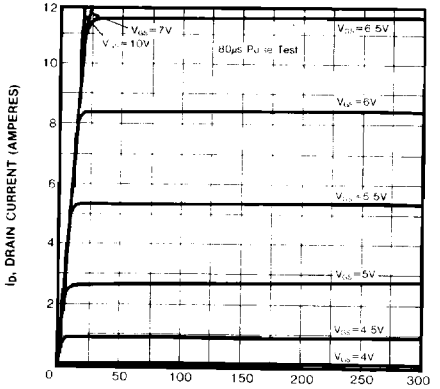
Symbol	Characteristic		SSP6N55/60	SSH6N55/60	Unit	
R_{thJC}	Junction-to-Case	MAX	1.0	1.0	K/W	
R_{thCS}	Case-to-Sink	TYP	0.5	0.24	K/W	Mounting surface flat, smooth, and greased
R_{thJA}	Junction-to-Ambient	MAX	80	40	K/W	Free Air Operation

Notes: (1) T_J=25°C to 150°C
(2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%
(3) Repetitive rating: Pulse width limited by max. junction temperature
(4) For Ultra low "A" $R_{DS(on)}$, device add "A" suffix to part number

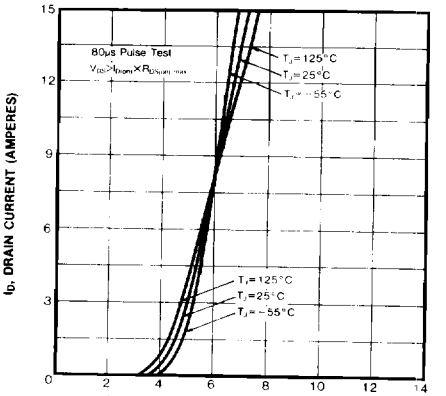
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	6.0	A	Modified MOSFET showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current(Body Diode)(3)	—	—	24.0	A	
V_{SD}	Diode Forward Voltage (2)	—	—	1.5	V	T_C=25°C, I_S=10.0A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	450	940	ns	T_j=150°C, I_F=10.0A, dI_F/dt=100A/μS

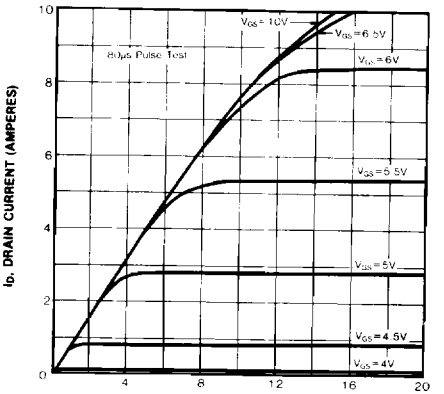
Notes: (1) T_J=25°C to 150°C (2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%
(3) Repetitive rating: Pulse with limited by max. junction temperature



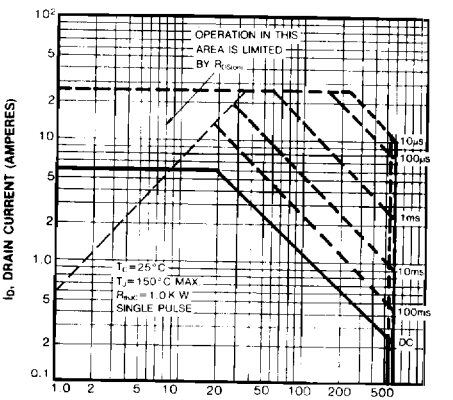
Typical Output Characteristics



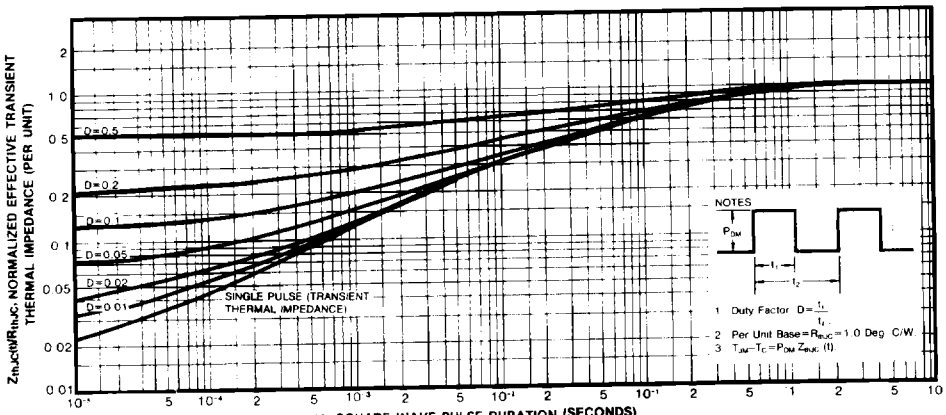
Typical Transfer Characteristics



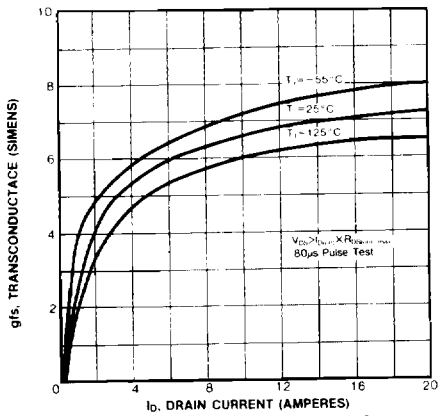
Typical Saturation Characteristics



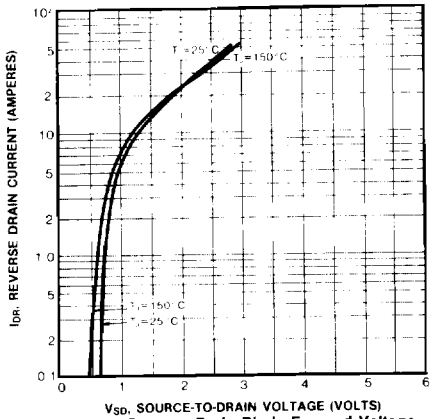
Maximum Safe Operating Area



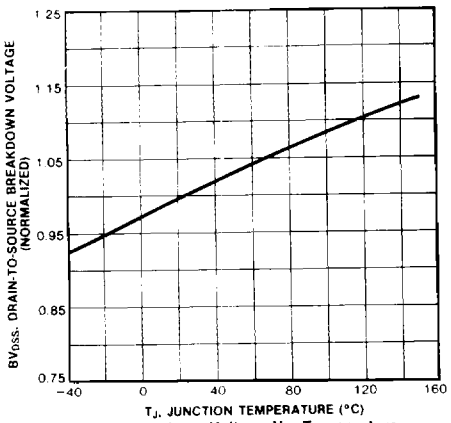
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



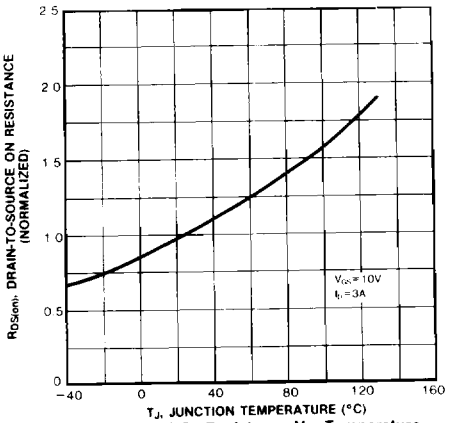
Typical Transconductance Vs. Drain Current



Typical Source—Drain Diode Forward Voltage

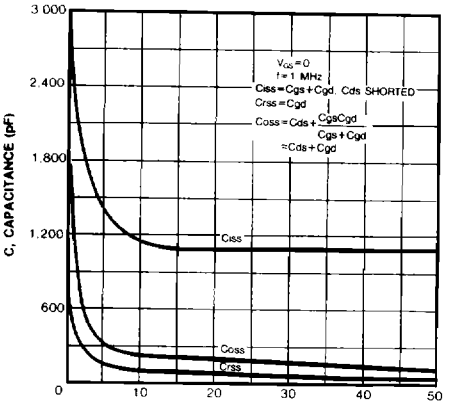


Breakdown Voltage Vs. Temperature

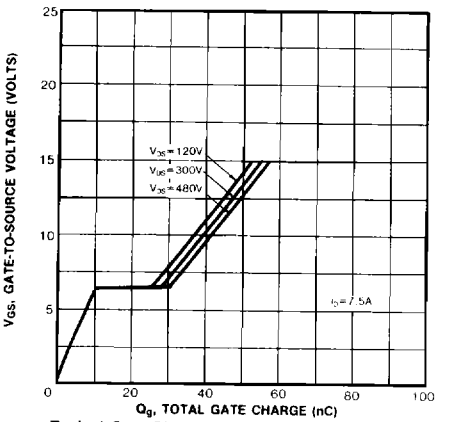


Normalized On-Resistance Vs. Temperature

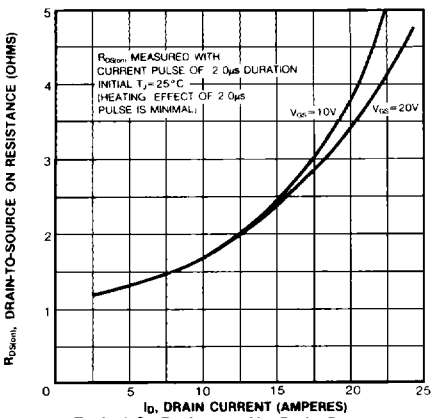
SAMSUNG ELECTRONICS



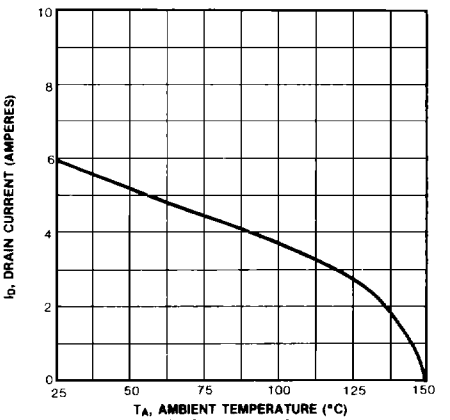
Typical Capacitance Vs. Drain to Source Voltage



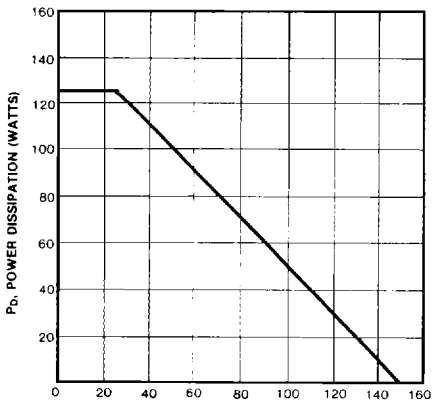
Typical Gate Charge Vs. Gate-To-Source Voltage



Typical On-Resistance Vs. Drain Current



Maximum Drain Current Vs. Case Temperature



Power Vs. Temperature Derating Curve