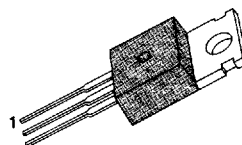


FEATURES

- 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



1. Gate 2. Drain 3. Source

PRODUCT SUMMARY

Part Number	V _{DS}	R _{DS(on)}	I _D
SSP6N60	600V	1.8Ω	6A
SSP6N55	550V	1.8Ω	6A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	SSP6N60	SSP6N55	Unit
Drain-Source Voltage (1)	V _{DSS}	600	550	V _{DC}
Drain-Source Voltage (R _{GS} =1.0MΩ)(1)	V _{DGR}	600	550	V _{DC}
Gate-Source Voltage	V _{GS}	±20		V _{DC}
Continuous Drain Current T _C =25 °C	I _D	6.0		A _{DC}
Continuous Drain Current T _C =100 °C	I _D	4.0		A _{DC}
Drain Current - Pulsed (3)	I _{DM}	24		A _{DC}
Gate Current - Pulsed	I _{GM}	±1.5		A _{DC}
Single Pulsed Avalanche Energy (4)	E _{AS}	570		mJ
Avalanche Current	I _{AS}	6.0		A
Total Power Dissipation at T _C =25 °C	P _D	125		Watts
Derate above 25 °C		1.0		W/°C
Operating and Storage Junction Temperature Range	T _J , T _{STG}	-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 width limited by max. junction temperature

(4) L=27mH, V_{GS}=50V, R_G=25Ω, Starting T_J=25°C

ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage					
	SSP6N60	600	-	-	V	V _{GS} =0V, I _D =250 μ A
	SSP6N55	550	-	-	V	
V _{GS(th)}	Gate Threshold Voltage	2.0	-	4.0	V	V _{DS} =V _{GS} , I _D =250 μ A
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	μ A	V _{DS} =Max. Rating, V _{GS} =0V
		-	-	1000	μ A	V _{DS} =0.8 Max. Rating, V _{GS} =0V, T _C =125 $^\circ$ C
I _{D(on)}	On-State Drain-Source Current(2)	6.0	-	-	A	V _{DS} \geq 10V, I _D =10V
R _{DS(on)}	Static Drain-Source On Resistance(4)	-	-	1.8	Ω	V _{GS} =10V, I _D =3.0A
				1.2	Ω	V _{GS} =10V, I _D =3.0A
g _{fs}	Forward Transconductance (2)	3.0	4.8	-	S	V _{DS} \geq 50V, I _D =3.0A
C _{iss}	Input Capacitance	-	1800	-	pF	
C _{oss}	Output Capacitance	-	350	-	pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
C _{rss}	Reverse Transfer Capacitance	-	150	-	pF	
t _{d(on)}	Turn-On Delay Time	-	30	-	ns	V _{DD} =0.5 BV _{DSS} , I _D =6.0A, Z ₀ =9.1 Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	-	75	-	ns	
t _{d(off)}	Turn-Off Delay Time	-	100	-	ns	
t _f	Fall Time	-	60	-	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	77	nC	V _{GS} =10V, I _D =6.0A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q _{gs}	Gate-Source Charge	-	9.3	-	nC	
Q _{gd}	Gate-Drain ("Miller") Charge	-	29.3	-	nC	

THERMAL RESISTANCE


Symbol	Characteristics		All	Units	Remark
R _{thJC}	Junction-to-Case	MAX	1.0	K/W	
R _{thCS}	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat smooth, and greased
R _{thJA}	Junction-to-Ambient	MAX	62.5	K/W	Free Air Operation

Notes : (1) T_J=25 $^\circ$ C to 150 $^\circ$ C(2) Pulse test : Pulse width \leq 300 μ s, Duty Cycle \leq 2%

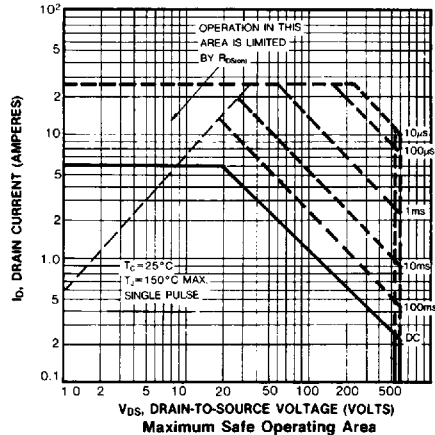
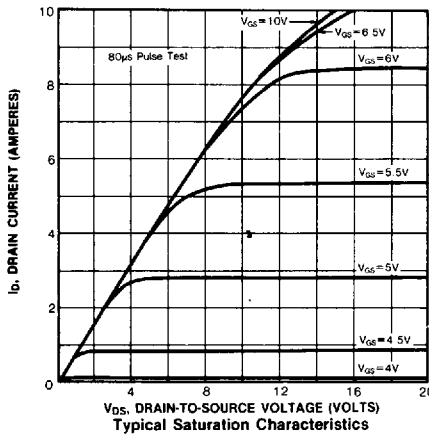
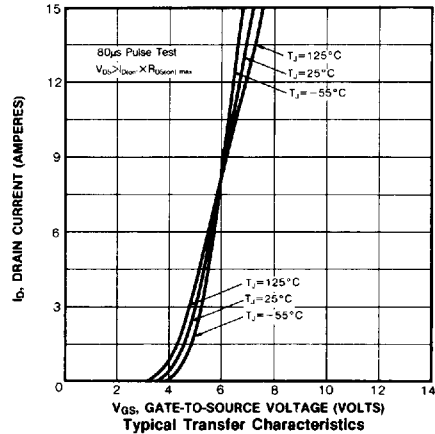
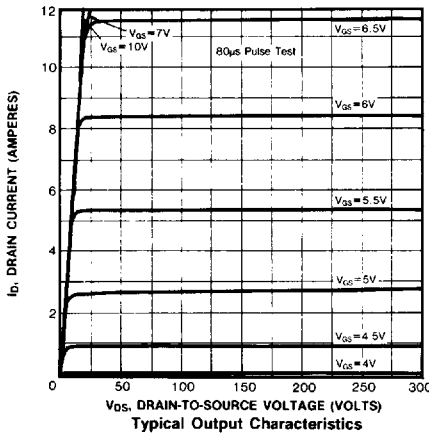
(3) Repetitive rating : Pulse width limited by max. junction temperature

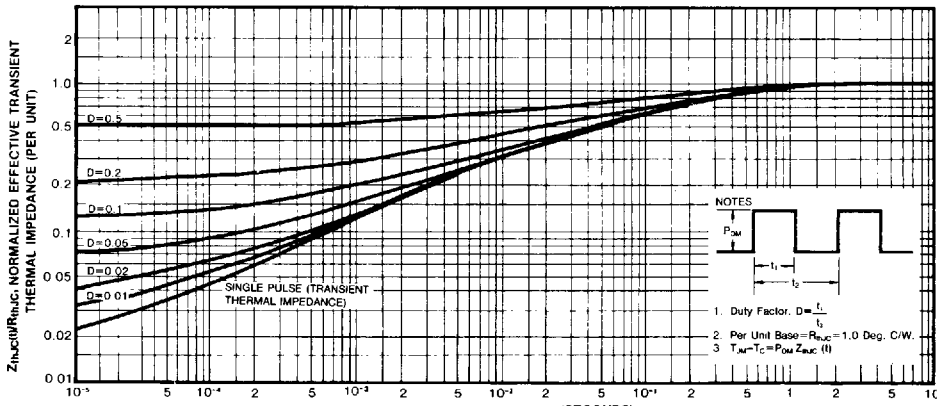
(4) For Ultra low "A" R_{DS(on)}, device add "A" suffix to part number

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

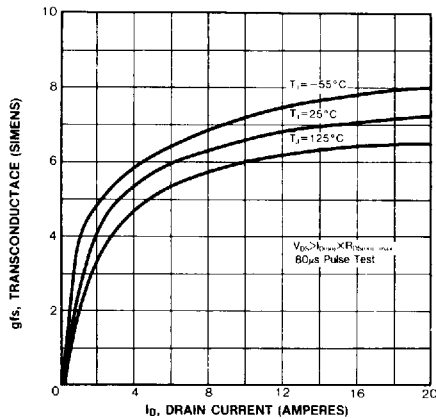
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	6.0	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	-	-	24.0	A	
V_{SD}	Diode Forward Voltage (2)	-	-	1.5	V	$T_J=25^\circ\text{C}$,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

- Notes : (1) $T_J=25^\circ\text{C}$ to 150°C
 (2) Pulse test : Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating : Pulse width limited by max. junction temperature

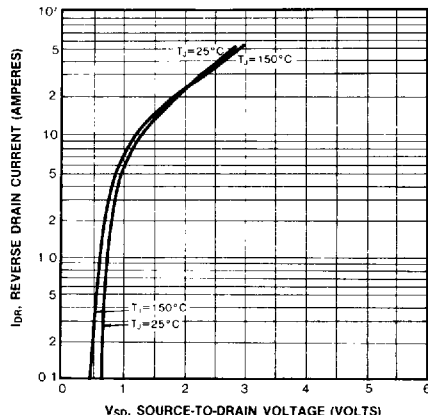




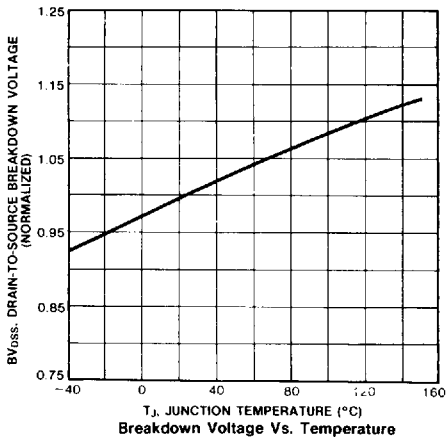
11. SQUARE WAVE PULSE DURATION (SECONDS)
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



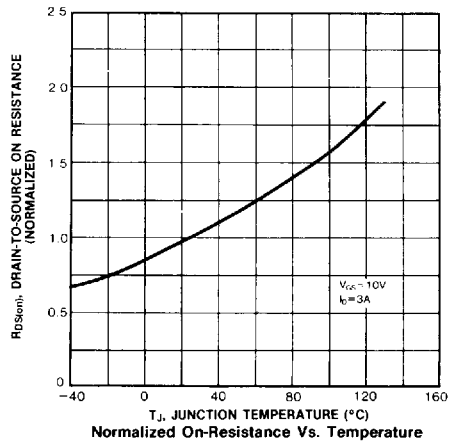
Typical Transconductance Vs. Drain Current



Typical Source-Drain Diode Forward Voltage



Breakdown Voltage Vs. Temperature



Normalized On-Resistance Vs. Temperature

4

