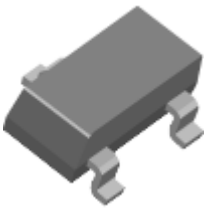
N-Channel 20-V (D-S) MOSFET

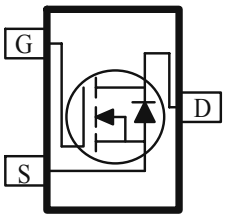
These miniature surface mount MOSFETs utilize High Cell Density process. Low $r_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are DC-DC converters, power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

- Low $r_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- Low gate charge 7nC
- High performance
- High current handling
- Miniature SOT-23 Surface Mount Package Saves Board Space

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
20	0.035 @ V_{GS} = 4.5V	4.3
	0.050 @ V_{GS} = 2.5V	3.5

2.5 V Rated





ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current[a]	T_A=25°C	I_D	4.3	A
	T_A=70°C		3.3	
Pulsed Drain Current[b]		I_{DM}	10	
Continuous Source Current (Diode Conduction)[a]		I_S	0.46	A
Power Dissipation[a]	T_A=25°C	P_D	1.25	W
	T_A=70°C		0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient[a]	t <= 5 sec	R_{THJA}	100	°C/W
	Steady-State		166	

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

b. Pulse width limited by maximum junction temperature

July, 2002 - Rev. A
PRELIMINARY

Publication Order Number:
DS-AM2300_D

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)						
Parameter	**Symbol**	**Test Conditions**	**Limits**			**Unit**
			Min	**Typ**	**Max**	
Static						
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	0.7			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = 8 V			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V			1	uA
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 55°C			10	
On-State Drain Current[A]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	10			A
Drain-Source On-Resistance[A]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 4.3 A		30	35	mΩ
		V_{GS} = 2.5 V, I_D = 3.5 A		40	50	
Forward Tranconductance[A]	g_{fs}	V_{DS} = 5 V, I_D = 3.0 A		11		S
Diode Forward Voltage	V_{SD}	I_S = 0.46 A, V_{GS} = 0 V		0.65	1.20	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 3.0 A		7.0		nC
Gate-Source Charge	Q_{gs}			1.20		
Gate-Drain Charge	Q_{gd}			1.90		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1MHz		700		pF
Output Capacitance	C_{oss}			175		
Reverse Transfer Capacitance	C_{rss}			85		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, I_D = 1 A, R_G = 6 Ω, V_{GEN} = 4.5 V		9		ns
Rise Time	t_r			11		
Turn-Off Delay Time	$t_{d(off)}$			18		
Fall-Time	t_f			5		

Notes

a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

Typical Electrical Characteristics

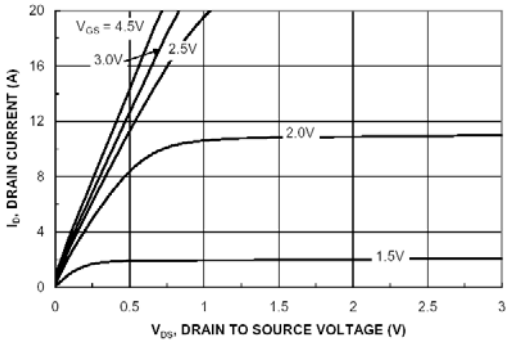


Figure 1. On-Region Characteristics

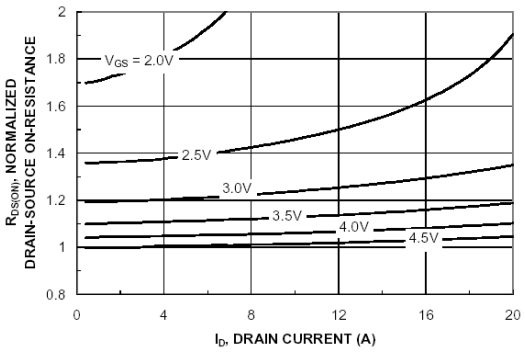


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

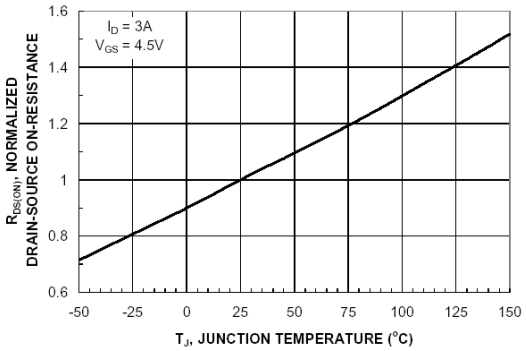


Figure 3. On-Resistance Variation with Temperature

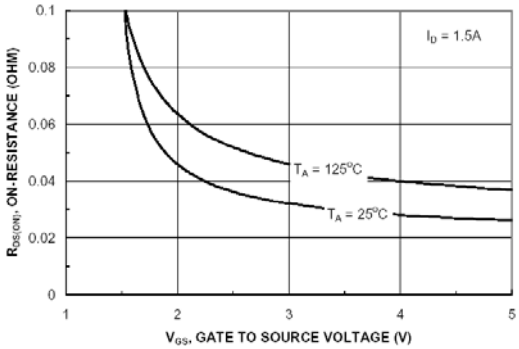


Figure 4. On-Resistance Variation with Gate to Source Voltage

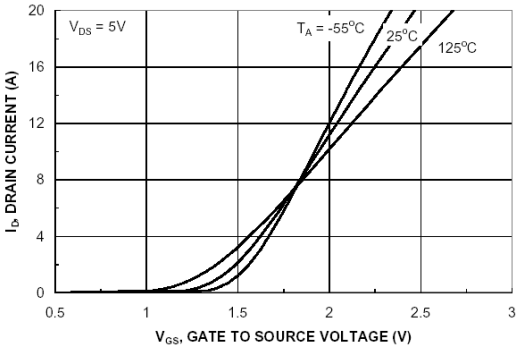


Figure 5. Transfer Characteristics

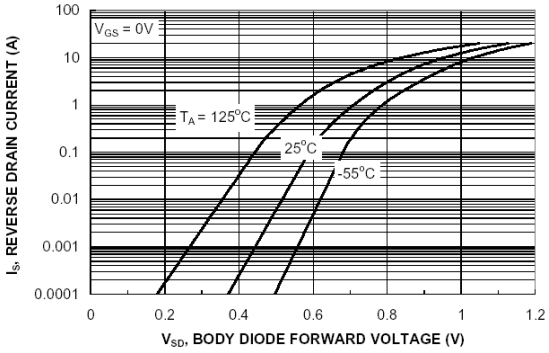


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Electrical Characteristics

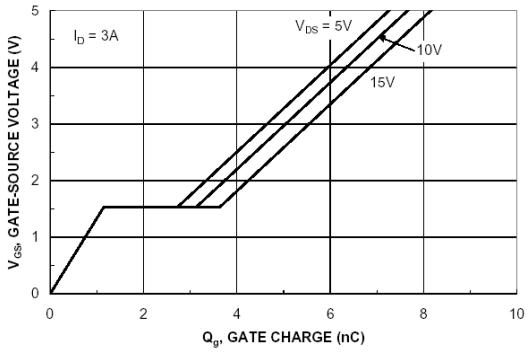


Figure 7. Gate Charge Characteristic

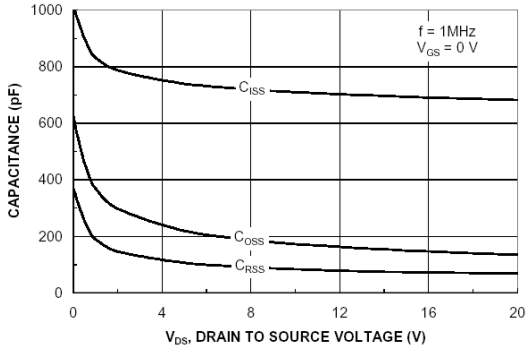


Figure 8. Capacitance Characteristic

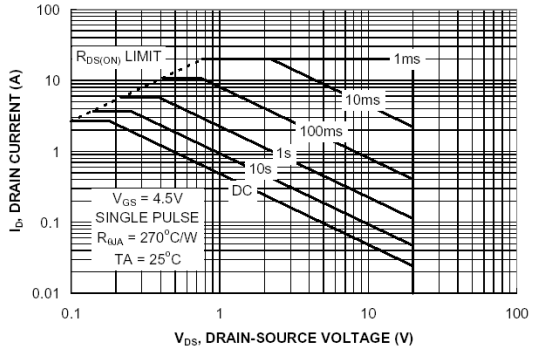


Figure 9. Maximum Safe Operating Area

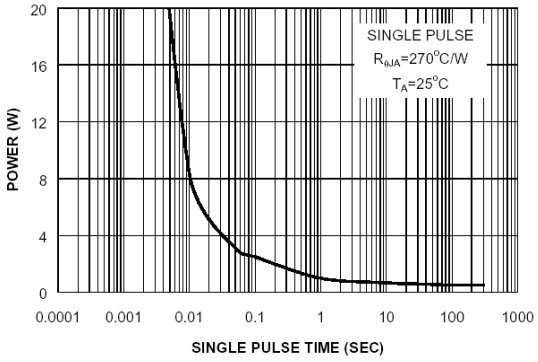


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Impedance, Junction to Ambient

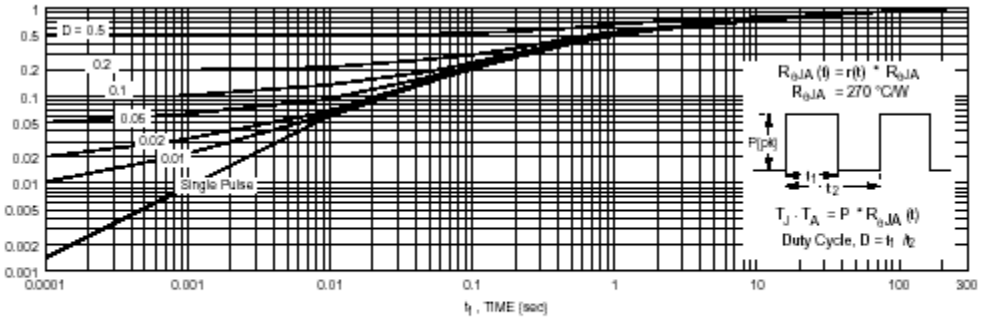
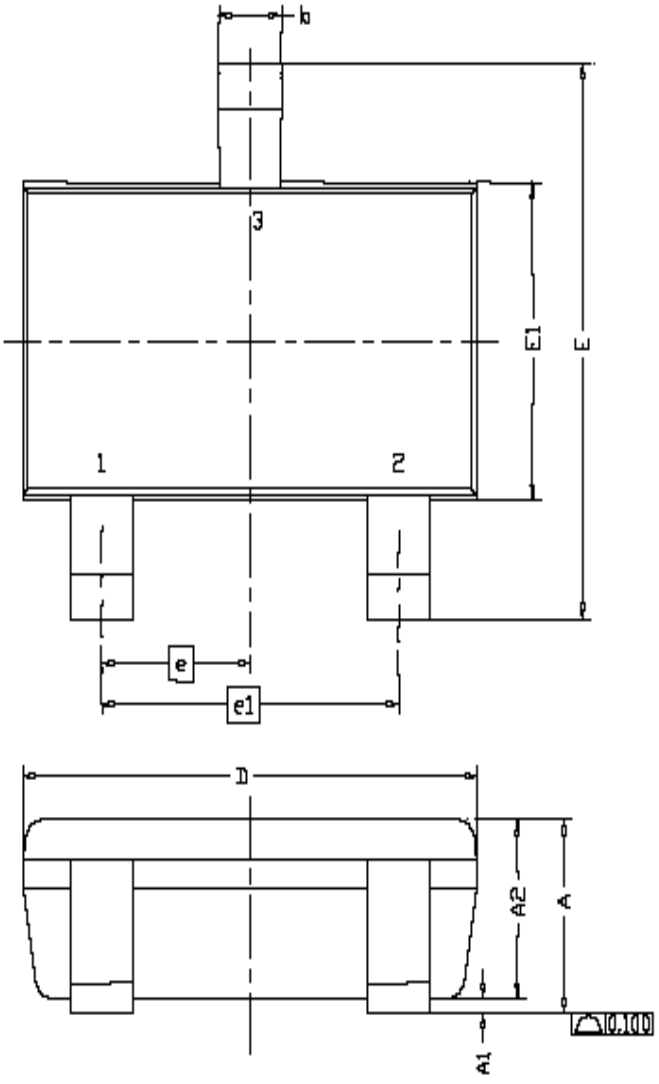


Figure 11. Transient Thermal Response Curve.
Thermal characterization performed using the conditions described in Note 1b.
Transient thermal response will change depending on the circuit board design.

Package Information



DIM.	MILLIMETERS		
	MIN	NOM	MAX
A	0.935	0.95	1.10
A1	0.01	---	0.10
A2	0.85	0.90	0.925
b	0.30	0.40	0.50
c	0.10	0.15	0.25
D	2.70	2.90	3.10
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.40	0.60
L1	0.60REF		
L2	0.25BSC		
R	0.10	---	---
θ	0°	4°	8°
θ1	7°NOM