

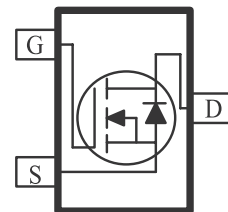
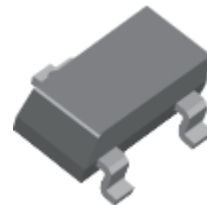
N-Channel 20-V (D-S) MOSFET

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



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

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

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$t \leq 5 \text{ sec}$ R_{THJA}	100	$^\circ\text{C/W}$
	Steady-State R_{THJA}	166	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

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

- Pulse test: $PW \leq 300\mu\text{s}$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

Typical Electrical Characteristics

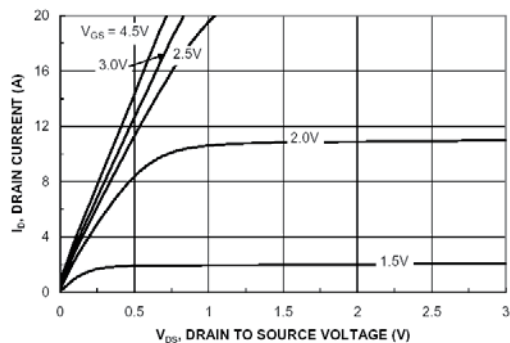


Figure 1. On-Region Characteristics

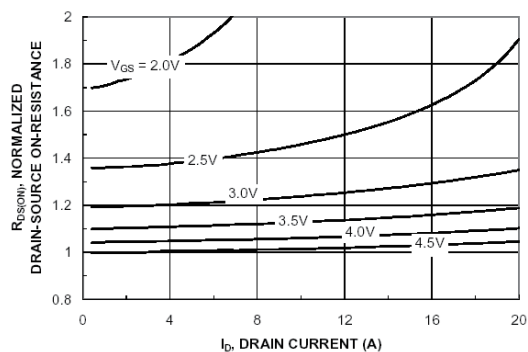


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

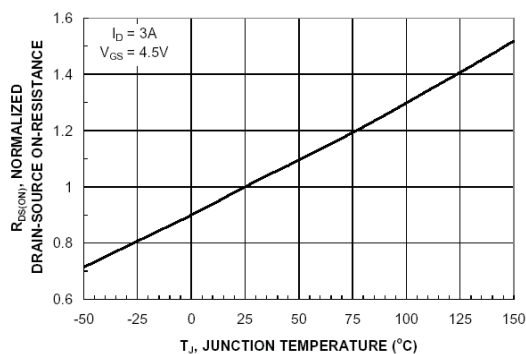


Figure 3. On-Resistance Variation with Temperature

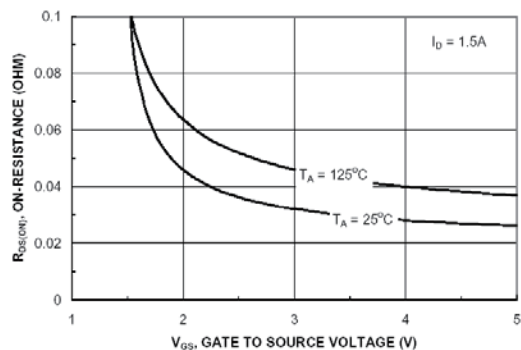


Figure 4. On-Resistance Variation with Gate to Source Voltage

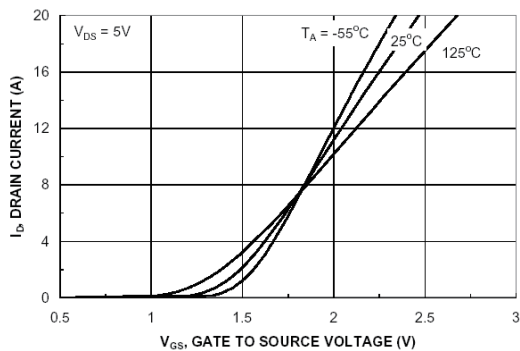


Figure 5. Transfer Characteristics

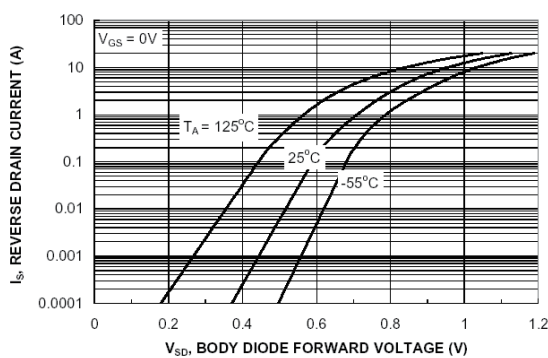


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Electrical Characteristics

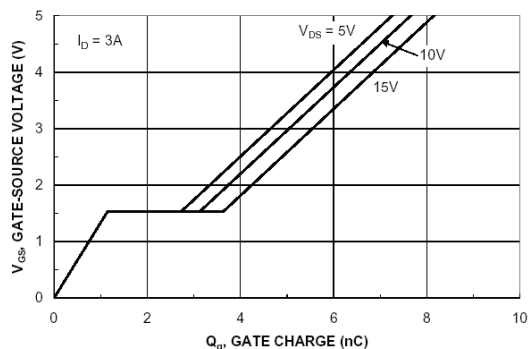


Figure 7. Gate Charge Characteristic

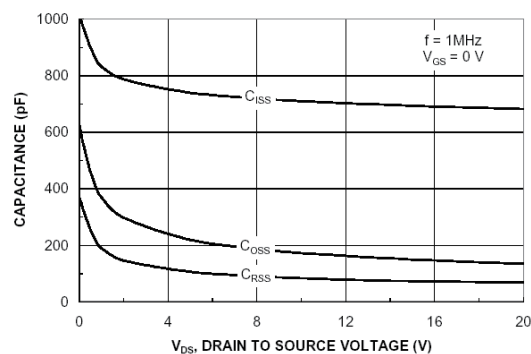


Figure 8. Capacitance Characteristic

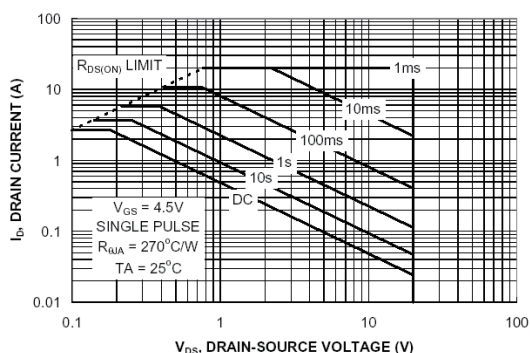


Figure 9. Maximum Safe Operating Area

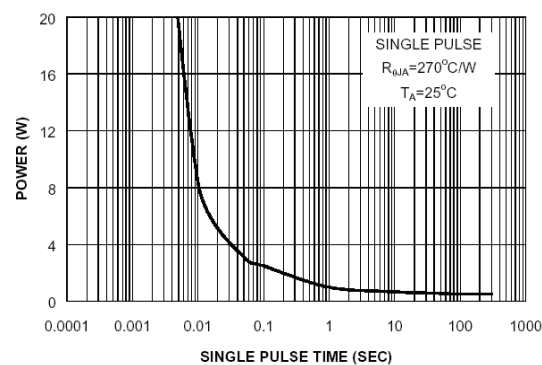


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Impedance, Junction to Ambient

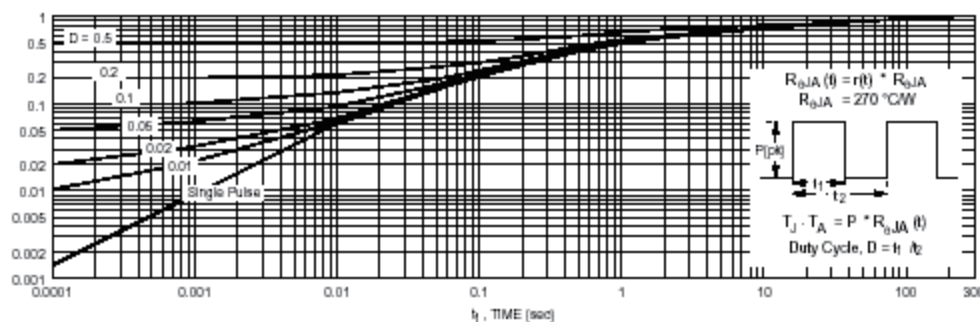
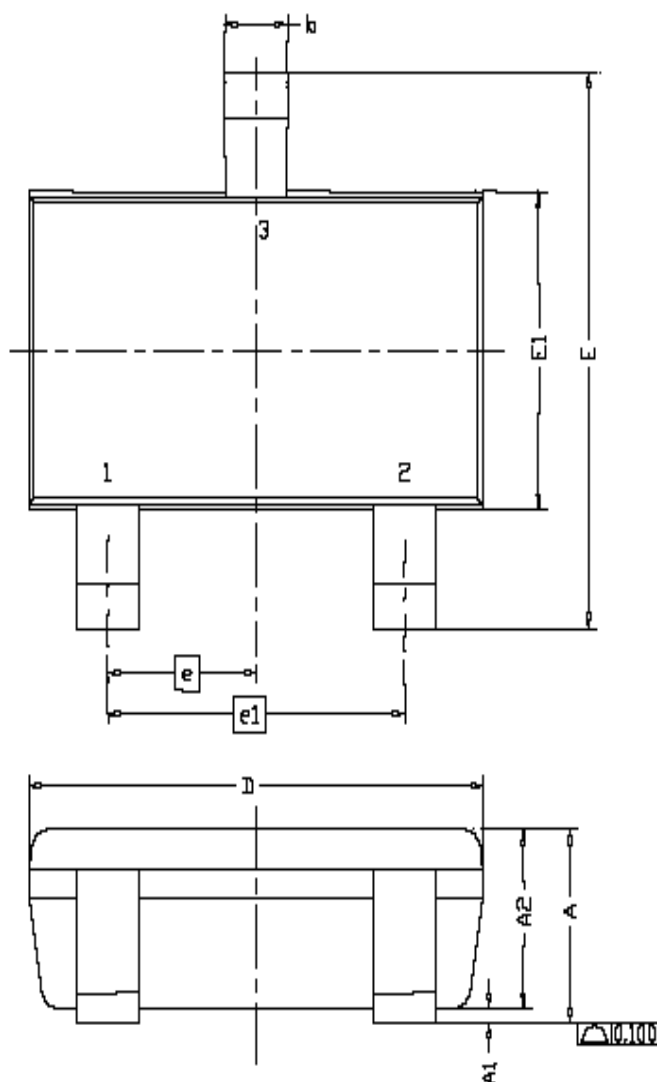


Figure 11. Transient Thermal Response Curve.

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	0.60 REF		
L2	0.25 BSC		
R	0.10	---	---
θ	0°	4°	8°
$\theta1$	7° NOM		

