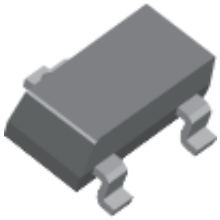
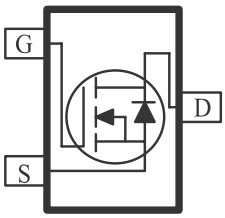
N-Channel 30-V (D-S) MOSFET

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 PWMDC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

- Low $r_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- Miniature SOT-23 Surface Mount Package Saves Board Space
- High power and current handling capability
- Low side high current DC-DC Converter applications

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ m(Ω)	I_D (A)
30	58 @ V_{GS} = 10V	3.5
	82 @ V_{GS} = 4.5V	3.0





ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current[a]	T_A=25°C	I_D	3.5	A
	T_A=70°C		2.8	
Pulsed Drain Current[b]		I_{DM}	16	
Continuous Source Current (Diode Conduction)[a]		I_S	1.25	A
Power Dissipation[a]	T_A=25°C	P_D	1.3	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 <= 10 sec	$R_{\theta JA}$	100	°C/W
	Steady-State		166	°C/W

Notes

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

b. Pulse width limited by maximum junction temperature

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = 20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24 V, V_{GS} = 0 V			1	uA
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 55°C			25	
On-State Drain Current[A]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	6			A
Drain-Source On-Resistance[A]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 3.5 A			58	mΩ
		V_{GS} = 4.5 V, I_D = 3 A			82	
Forward Tranconductance[A]	g_{fs}	V_{DS} = 15 V, I_D = 3.5 A		6.9		S
Diode Forward Voltage	V_{SD}	I_S = 2.3 A, V_{GS} = 0 V		0.8		V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 3.5 A		2.2		nC
Gate-Source Charge	Q_{gs}			0.5		
Gate-Drain Charge	Q_{gd}			0.8		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 25 V, R_L = 25 Ω , I_D = 1 A, V_{GEN} = 10 V		16		nS
Rise Time	t_r			5		
Turn-Off Delay Time	$t_{d(off)}$			23		
Fall-Time	t_f			3		

Notes

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

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

Typical Electrical Characteristics (N-Channel)

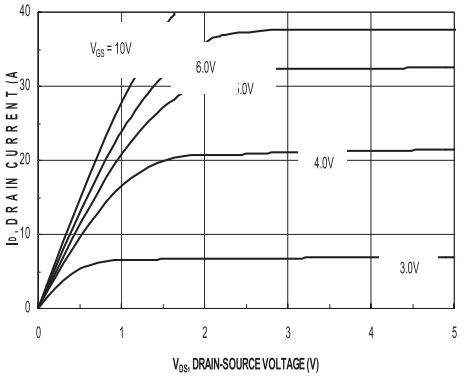


Figure 1. On-Region Characteristics

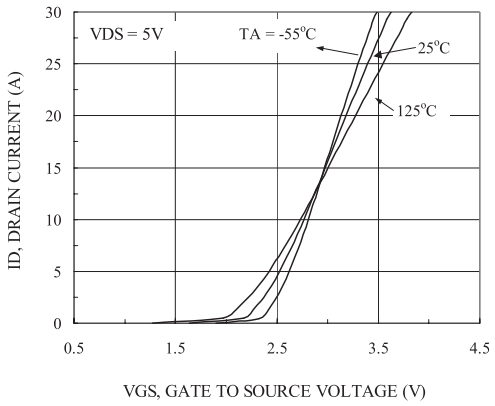


Figure 2. Body Diode Forward Voltage Variation with Source Current and Temperature

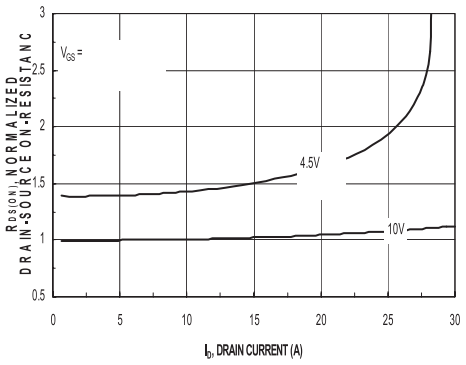


Figure 3. On Resistance Vs Vgs Voltage

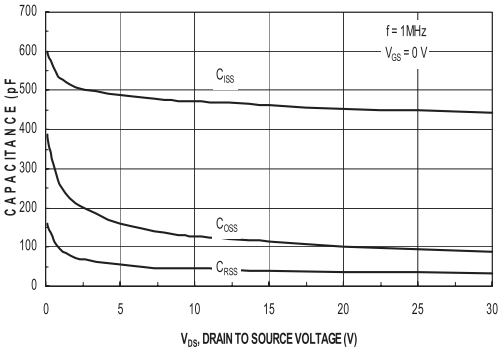


Figure 4. Capacitance Characteristics

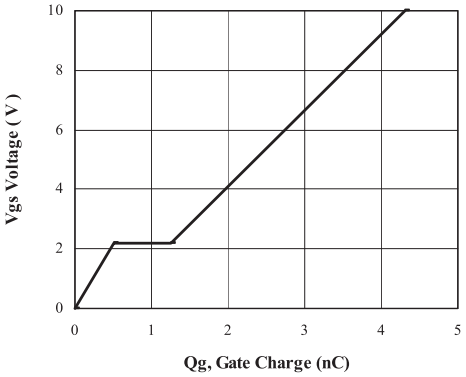


Figure 5. Gate Charge Characteristics

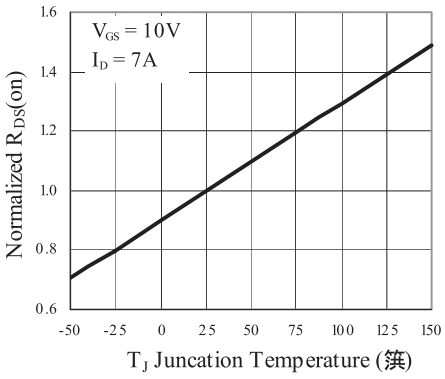


Figure 6. On-Resistance Variation with Temperature

Typical Electrical Characteristics (N-Channel)

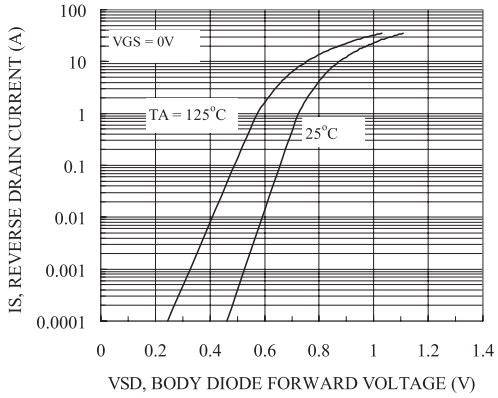


Figure 7. Transfer Characteristics

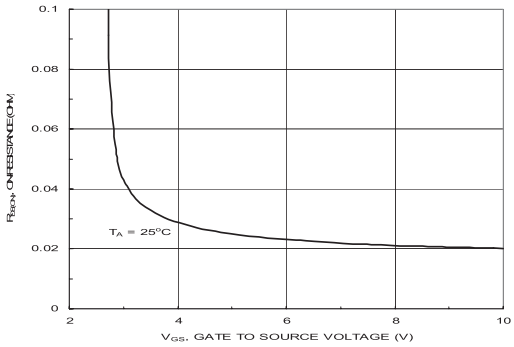


Figure 8. On-Resistance with Gate to Source Voltage

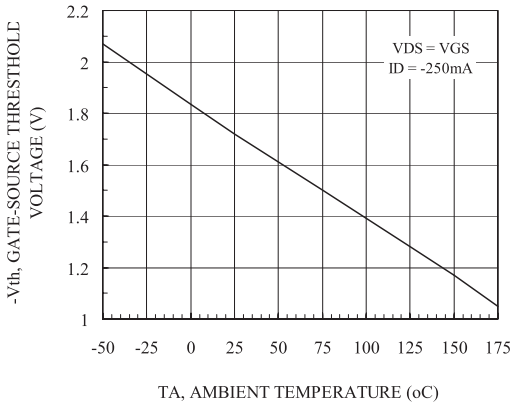


Figure 9. Vth Gate to Source Voltage Vs Temperature

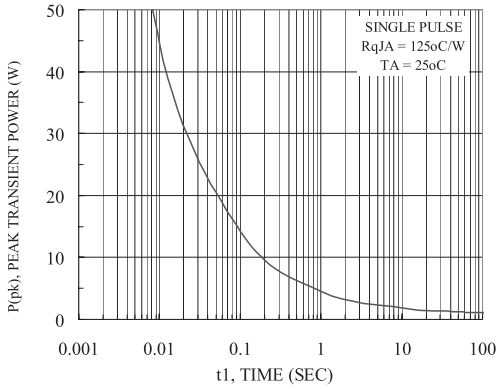


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

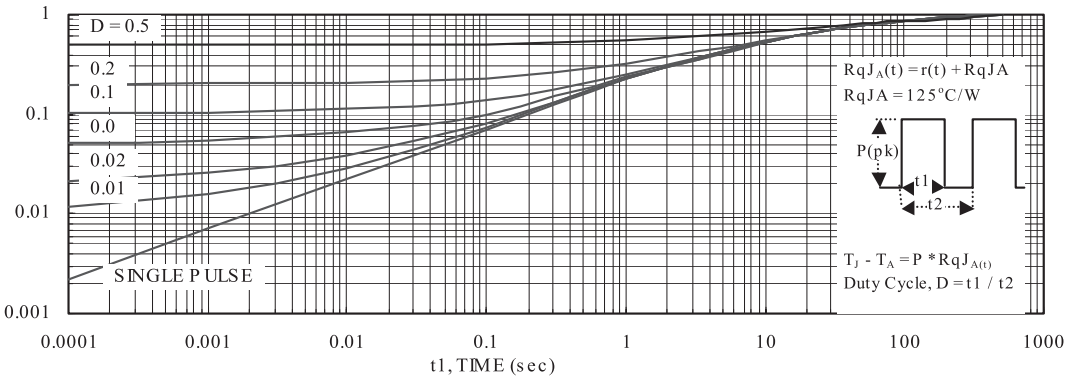
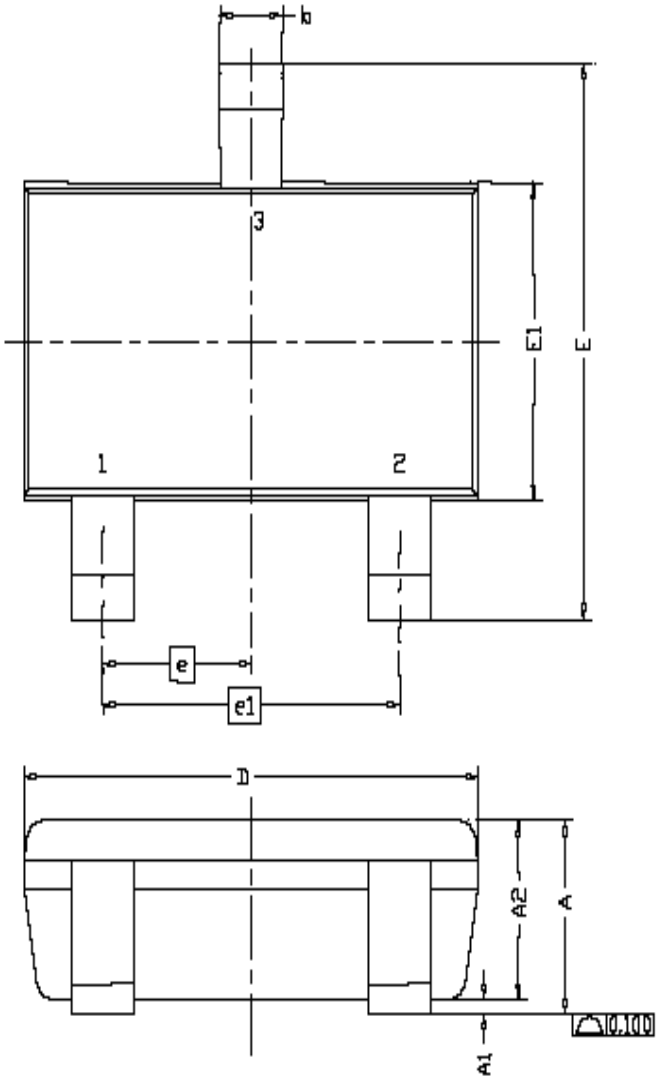
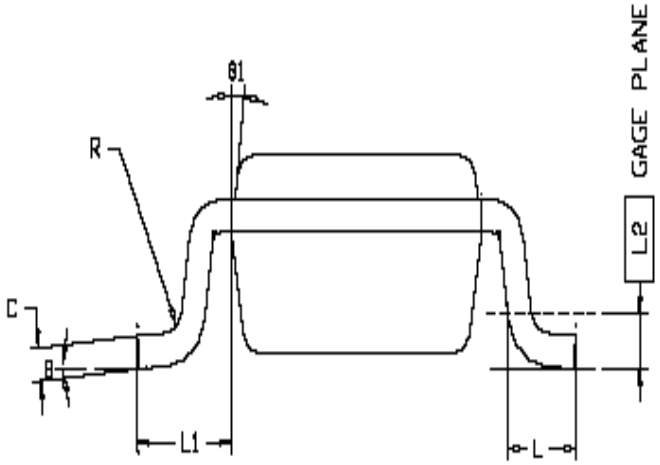


Figure 11. Transient Thermal Response Curve

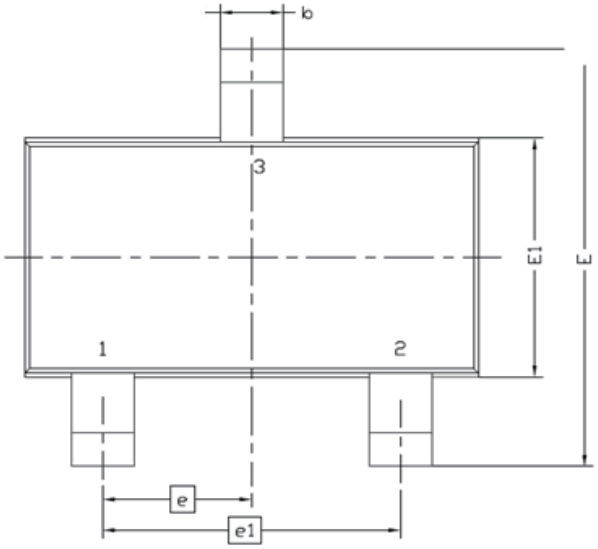
Package Information

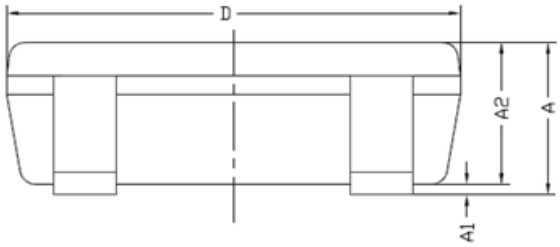


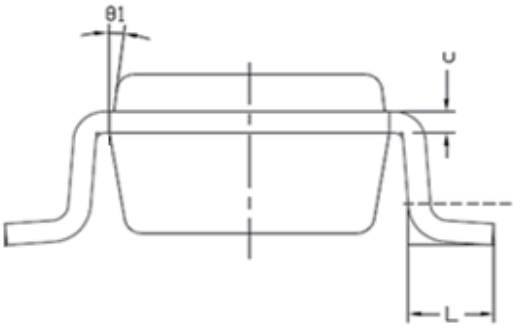
DIM.	MILLIMETERS		
	MIN	NOM	MAX
A	0.935	0.95	1.10
A1	0.01	---	0.10
A2	0.85	0.90	0.925
b	0.30	0.40	0.50
c	0.10	0.15	0.25
D	2.70	2.90	3.10
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.40	0.60
L1	0.60REF		
L2	0.25BSC		
R	0.10	---	---
θ	0°	4°	8°
θ1	7°NOM		



Package Information

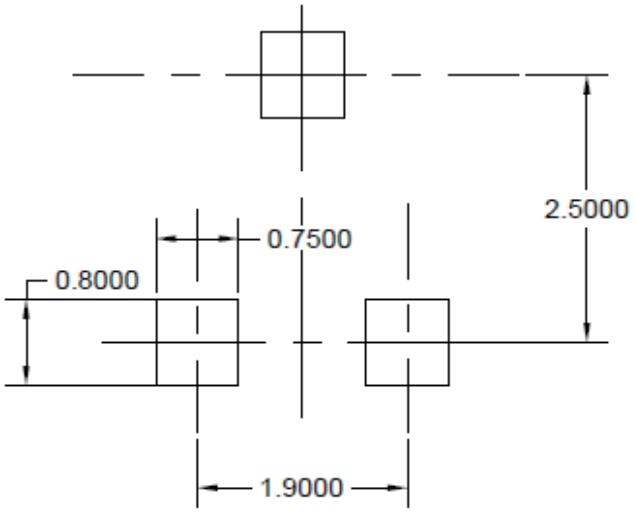






Symbol	MILLIMETERS	
	MIN	MAX
A	0.8	1.2
A1	0	0.1
A2	0.7	1.1
b	0.3	0.5
c	0.1	0.2
D	2.7	3.1
E	2.6	3
E1	1.4	1.8
e	0.95 BSC	
e1	1.9 BSC	
L	0.3	0.6
θ1	7° NOM	

Recommended Pad Layout



Note: Drain opening is recommended to be solder mask defined in a copper fill for improved thermal performance