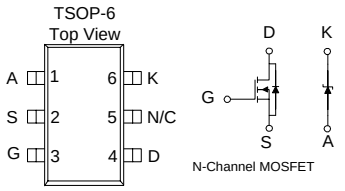
N-Channel 30-V (D-S) MOSFET With Schottky Diode

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ m(Ω)	I_D (A)
30	63 @ V_{GS} = 4.5V	3.5
	110 @ V_{GS} = 2.5V	3.0

SCHOTTKY PRODUCT SUMMARY		
V_{KA} (V)	V_f (V) Diode Forward Voltage	I_F (A)
30	0.48V @ 1.0A	1.0

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe TSOP-6 saves board space
- Fast switching speed
- High performance trench technology



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Units**
Drain-Source Voltage (MOSFET)		V_{DS}	30	V
Reverse Voltage (Schottky)		V_{KA}	30	
Gate-Source Voltage (MOSFET)		V_{GS}	±12	
Continuous Drain Current (T_J=150°C) (MOSFET)[a]	T_A=25°C	I_D	± 3.5	A
	T_A=70°C		± 2.8	
Pulsed Drain Current (MOSFET)[b]		I_{DM}	± 16	
Continuous Source Current (MOSFET Diode Conduction)[a]		I_S	1.25	
Average Forward Current (Schottky)		I_F	0.5	
Pulsed Forward Current (Schottky)		I_{FM}	8	
Maximum Power Dissipation (MOSFET)[a]	T_A=25°C	P_D	1.3	W
	T_A=70°C		0.8	
Maximum Power Dissipation (Schottky)[a]	T_A=25°C		1.0	
	T_A=70°C		0.6	
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

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			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = 12 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} = 4.5 V	6			A
Drain-Source On-Resistance[A]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 3.5 A			63	mΩ
		V_{GS} = 2.5 V, I_D = 3 A			110	
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		6.3		nC
Gate-Source Charge	Q_{gs}			0.9		
Gate-Drain Charge	Q_{gd}			1.9		
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		

SCHOTTKY SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Forward Voltage Drop	V_F	I_F = 0.5 A			0.48	V
		I_F = 0.5 A, T_J = 125°C			0.4	V
Maximum Reverse Leakage Current	I_{rm}	V_r = 30 V			0.1	mA
		V_r = 30 V, T_J = 75°C			1	
		V_r = 30 V, T_J = 125°C			10	
Junction Capacitance	C_T	V_r = 10 V		31		pF

Notes

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

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

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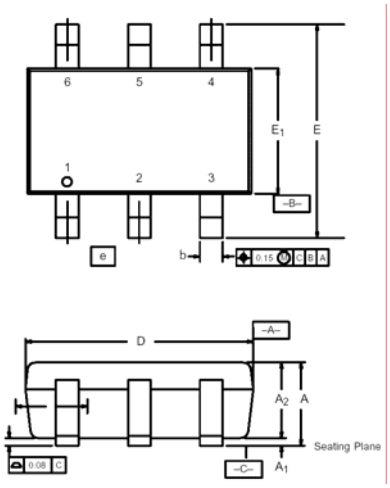
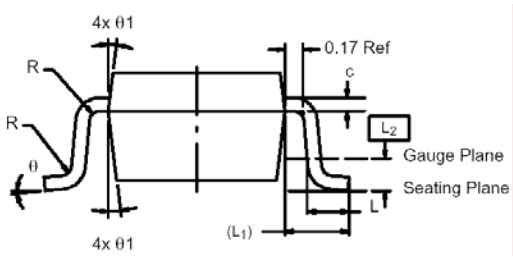
Package Information

TSOP-6: 6LEAD





Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	–	1.10	0.036	–	0.043
A_1	0.01	–	0.10	0.0004	–	0.004
A_2	0.84	–	1.00	0.033	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E_1	1.55	1.65	1.70	0.061	0.065	0.067
e	1.00 BSC			0.0394 BSC		
L	0.35	–	0.50	0.014	–	0.020
L_1	0.60 Ref			0.024 Ref		
L_2	0.25 BSC			0.010 BSC		
R	0.10	–	–	0.004	–	–
θ	0°	4°	8°	0°	4°	8°
θ_1	7° Nom			7° Nom		