

N-Channel Logic Level MOSFET

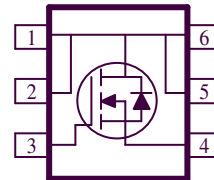
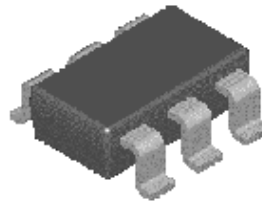
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA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

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.027 @ $V_{GS} = 10\text{ V}$	6.3
	0.035 @ $V_{GS} = 4.5\text{ V}$	5.5

- 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



RoHS
COMPLIANT
HALOGEN
FREE



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ^a	I_D	$T_A = 25^\circ\text{C}$	6.3
		$T_A = 70^\circ\text{C}$	5.2
Pulsed Drain Current ^b	I_{DM}	± 20	A
Continuous Source Current (Diode Conduction) ^a	I_S	1.3	A
Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	1.6
		$T_A = 70^\circ\text{C}$	1.0
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	$R_{\theta JA}$	78.0	$^\circ\text{C/W}$

Notes

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

SPECIFICATIONS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Switch Off Characteristics						
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$			1	uA
		$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			10	
Switch On Characteristics						
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ uA}$	1.0		3.0	V
Drain-Source On-Resistance ^A	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 6.3\text{ A}$			27	m Ω
		$V_{GS} = 10\text{ V}, I_D = 6.3\text{ A}, T_J = 55^\circ\text{C}$			39	
		$V_{GS} = 4.5\text{ V}, I_D = 5.5\text{ A}$			35	
Forward Transconductance ^A	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 6.3\text{ A}$		45		S
On-State Drain Current ^A	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	20			A
Diode Forward Voltage	V_{SD}	$I_S = 1.3\text{ A}, V_{GS} = 0\text{ V}$		0.75		V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 5\text{ V}, I_D = 6.3\text{ A}$ $R_L = 6\text{ }\Omega$		9		nC
Gate-Source Charge	Q_{gs}			2.9		
Gate-Drain Charge	Q_{gd}			3.2		
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 15\text{ V}, R_L = 6\text{ }\Omega, I_D = 1\text{ A},$ $V_{GEN} = 10\text{ V}$		6		ns
Rise Time	t_r			10		
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.

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Typical Electrical Characteristics (N-Channel)

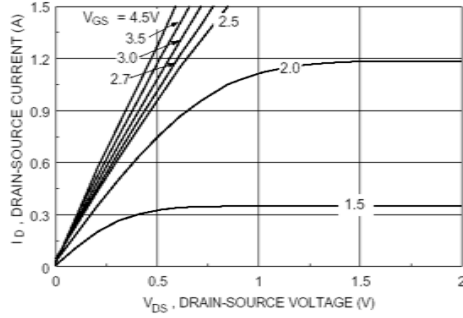


Figure 1. On-Region Characteristics

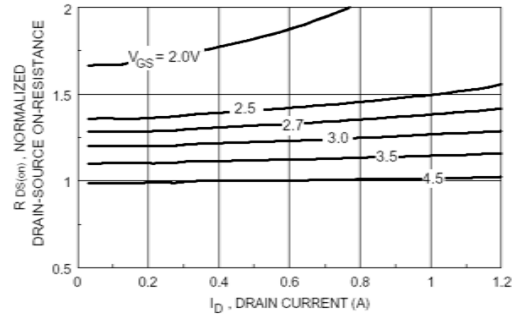


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

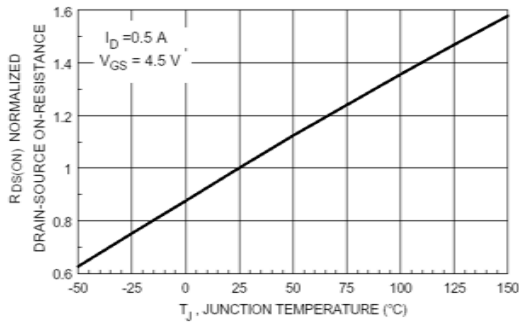


Figure 3. On-Resistance Variation with Temperature

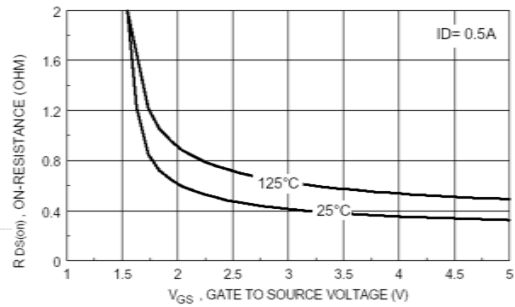


Figure 4. On-Resistance Variation with Gate to Source Voltage

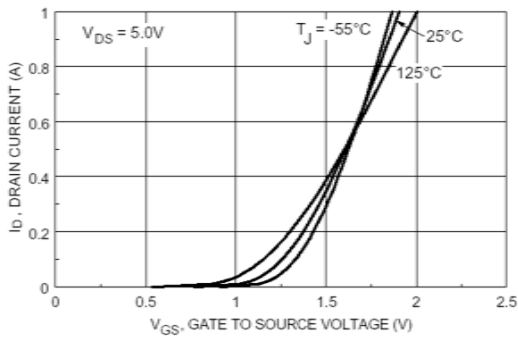


Figure 5. Transfer Characteristics

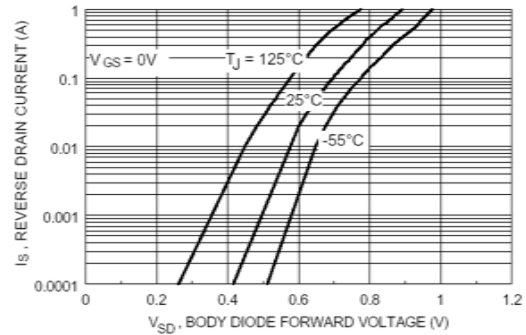


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Electrical Characteristics (N-Channel)

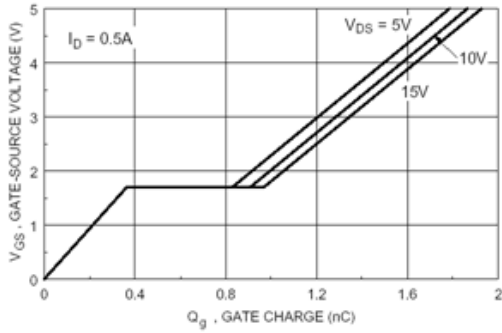


Figure 7. Gate Charge Characteristics.

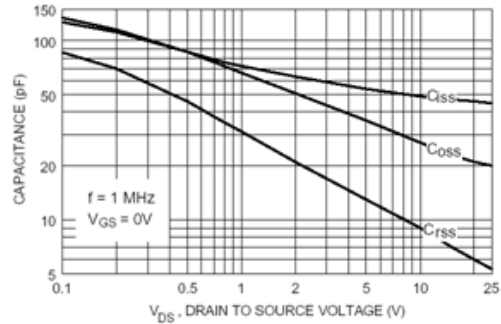


Figure 8. Capacitance Characteristics.

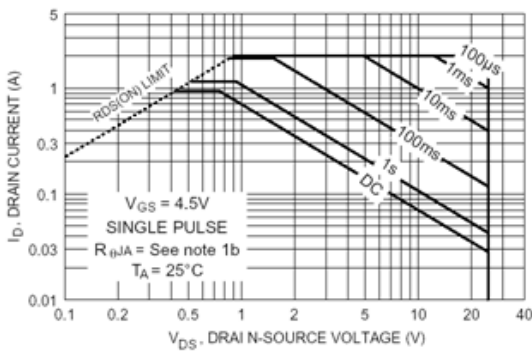


Figure 9. Maximum Safe Operating Area.

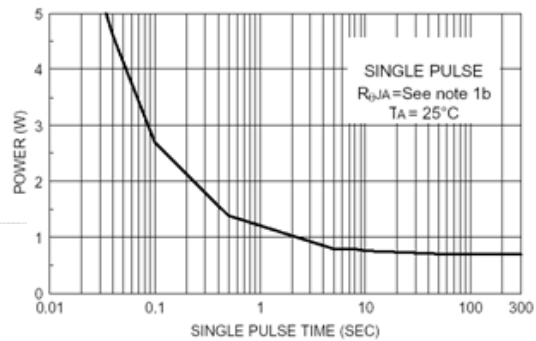


Figure 10. Single Pulse Maximum Power Dissipation.

Normalized Thermal Transient Junction to Ambient

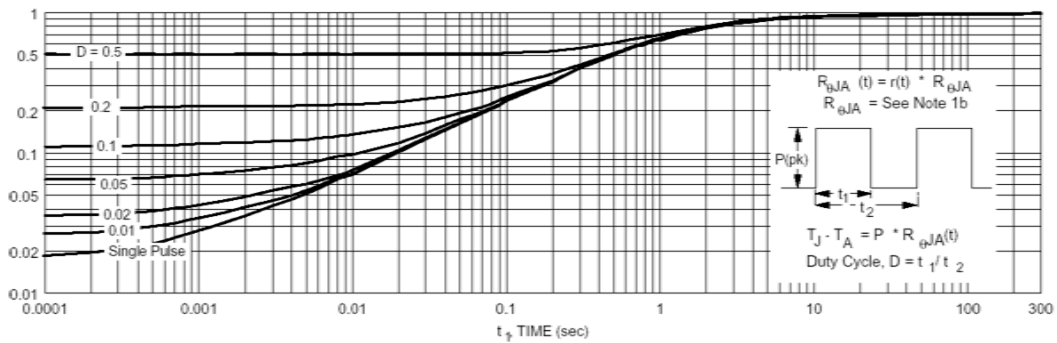
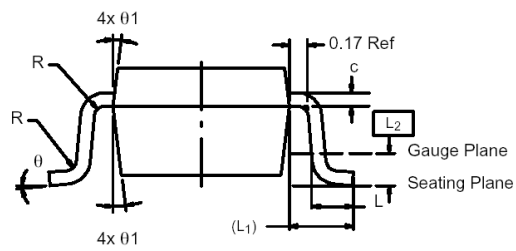
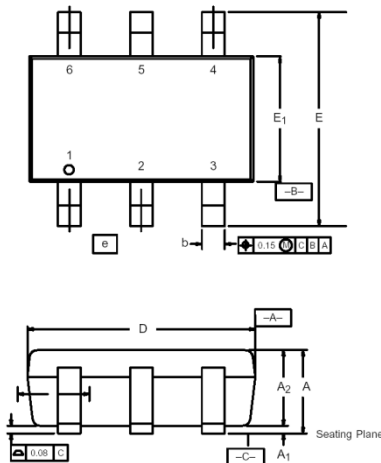


Figure 11. Transient Thermal Response Curve

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		