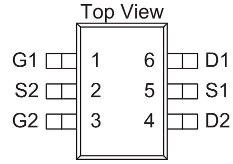
N & P-Channel 30-V (D-S) MOSFET

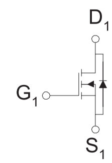
These miniature surface mount MOSFETs utilize High Cell Density process. Low $r_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are DC-DC converters, power management in portable and battery-powered products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

- Low $r_{DS(on)}$ Provides Higher Efficiency
- and Extends Battery Life
- Miniature TSOP-6 Surface Mount Package Saves Board Space

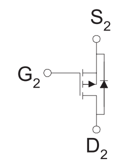
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
23	0.058 @ V_{GS} = 4.5V	3.7
	0.082 @ V_{GS} = 2.5V	3.1
	0.160 @ V_{GS} = 1.8V	2.2
-23	0.112 @ V_{GS} = -4.5V	-2.7
	0.172 @ V_{GS} = -2.5V	-2.2
	0.210 @ V_{GS} = -1.8V	-2.0

TSOP-6
Top View





N-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V_{DS}	23	-23	V
Gate-Source Voltage		V_{GS}	±12	±12	
Continuous Drain Current[a]	T_A=25°C	I_D	3.7	-2.7	A
	T_A=70°C		2.9	-2.1	
Pulsed Drain Current[b]		I_{DM}	8	-8	
Continuous Source Current (Diode Conduction)[a]		I_S	1.05	-1.05	A
Power Dissipation[a]	T_A=25°C	P_D	1.15		W
	T_A=70°C		0.7		
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	N-Channel		P-Channel		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient[a]	t <= 10 sec	R_{thJA}	93	110	93	110	°C/W
	Steady State		130	150	130	150	

Notes

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

b. Pulse width limited by maximum junction temperature

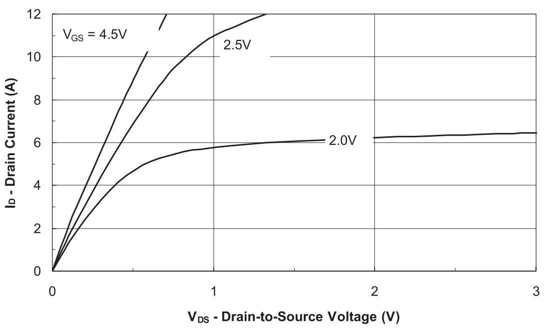
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)							
Parameter	**Symbol**	**Test Conditions**	**Limits**				**Unit**
			Ch	**Min**	**Typ**	**Max**	
Static							
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$, I_D = 250 uA	N	1			V
		$V_{GS} = V_{DS}$, I_D = -250 uA	P	-1			
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = 12 V	N			100	uA
		V_{DS} = 0 V, V_{GS} = -12 V	P			-100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V	N			1	uA
		V_{DS} = -16 V, V_{GS} = 0 V	P			-1	
		V_{DS} = 16 V, V_{GS} = 0 V, T_J = 55°C	N			10	uA
		V_{DS} = -16 V, V_{GS} = 0 V, T_J = 55°C	P			-10	
On-State Drain Current[A]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	N	5			A
		V_{DS} = -5 V, V_{GS} = -4.5 V	P	-5			
Drain-Source On-Resistance[A]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 3.7 A	N			0.058	Ω
		V_{GS} = -4.5 V, I_D = 3.1 A	P			0.112	
		V_{GS} = 2.5 V, I_D = 2.7 A	N			0.082	
		V_{GS} = -2.5 V, I_D = -2.2 A	P			0.172	
		V_{GS} = 1.8 V, I_D = 2.2 A	N			0.160	
		V_{GS} = -1.8 V, I_D = -2.0 A	P			0.210	
Forward Tranconductance[A]	g_{fs}	V_{DS} = 5 V, I_D = 3.7 A	N		10		S
		V_{DS} = -5 V, I_D = 3.1 A	P		5		
Diode Forward Voltage[A]	V_{SD}	I_S = 1.05 A, V_{GS} = 0 V	N		0.80		S
		I_S = -1.05 A, V_{GS} = 0 V	P		-0.83		
Dynamic[b]							
Total Gate Charge	Q_g	N-Channel V_{DS}=15V, V_{GS}=4.5V, I_D=2.7A P-Channel V_{DS}=-15V, V_{GS}=-4.5V, I_D=-3.1A	N		7.5		nC
			P		3.8		
Gate-Source Charge	Q_{gs}		N		0.6		
			P		0.6		
Gate-Drain Charge	Q_{gd}		N		1.0		
			P		1.5		
Turn-On Delay Time	$t_{d(on)}$	N-Chaneel V_{DD}=15V, V_{GS}=4.5V, I_D=1A , R_{GEN}=15Ω, P-Channel V_{DD}=-15V, V_{GS}=-4.5V, I_D=-1A R_{GEN}=15Ω	N		5		nS
			P		5		
Rise Time	t_r		N		12		
			P		15		
Turn-Off Delay Time	$t_{d(off)}$		N		13		
			P		20		
Fall-Time	t_f		N		7		
			P		20		

Notes

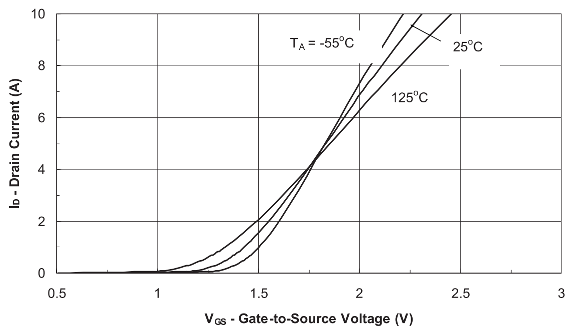
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

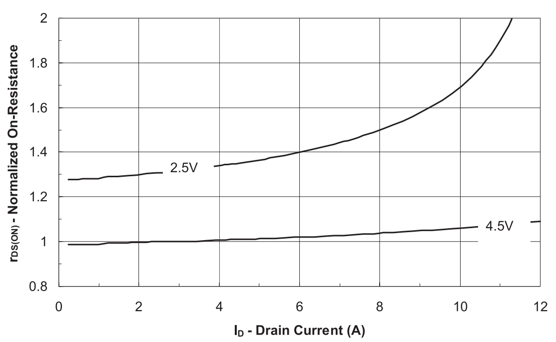
Typical Electrical Characteristics (N-Channel)



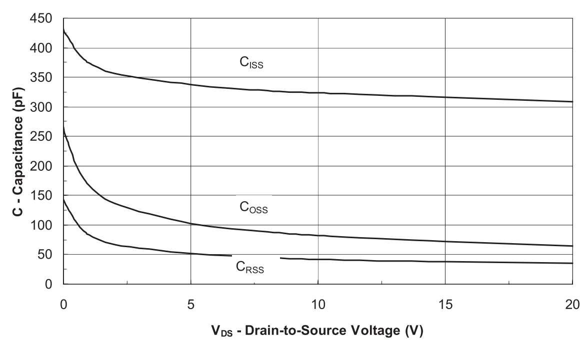
Output Characteristics



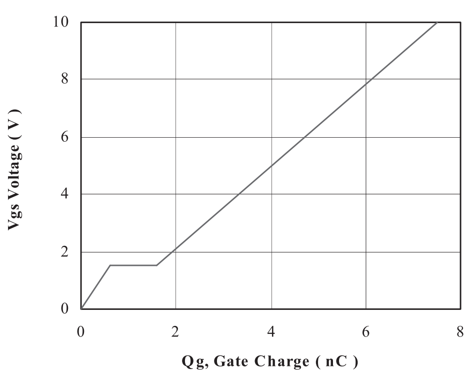
Transfer Characteristics



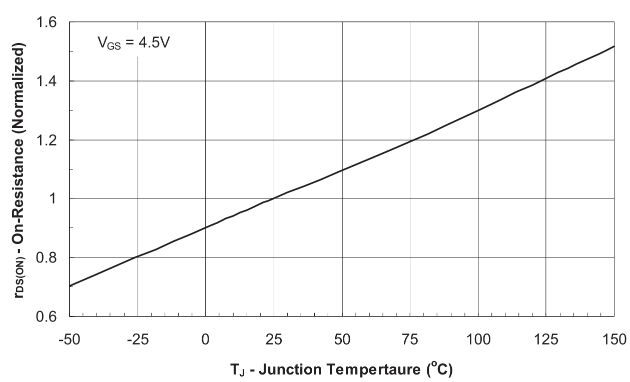
On-Resistance vs. Drain Current



Capacitance

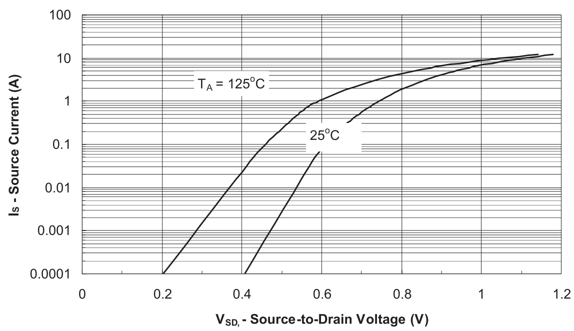


Gate Charge

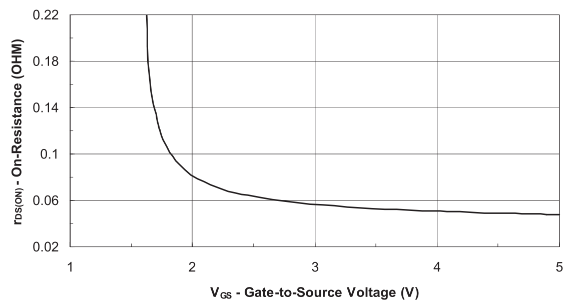


On-Resistance vs. Junction Temperature

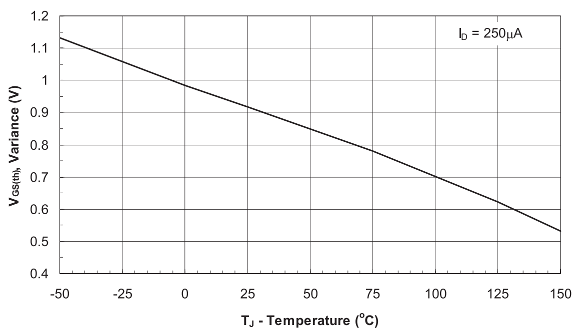
Typical Electrical Characteristics (N-Channel)



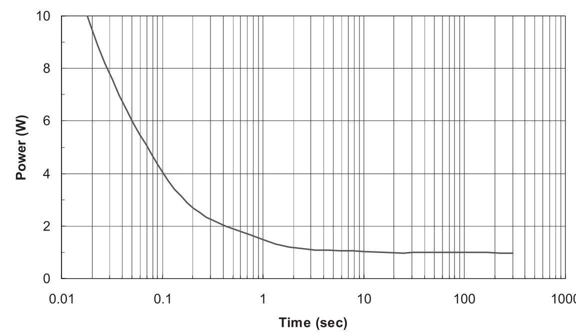
Source-Drain Diode Forward Voltage



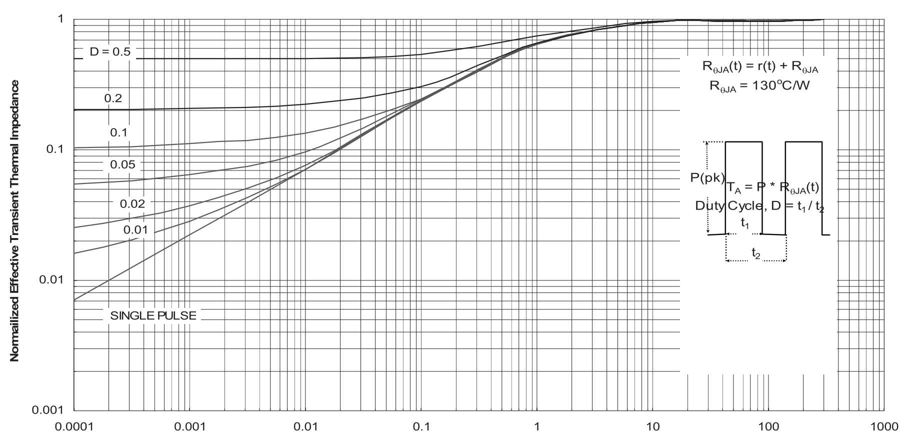
On-Resistance vs.Gate-to Source Voltage



Threshold Voltage

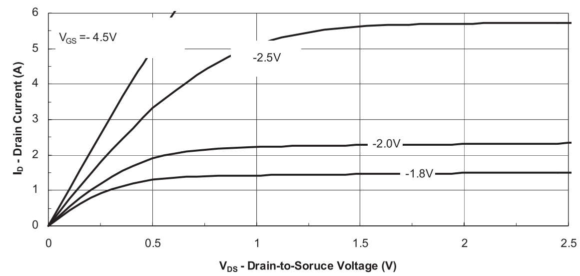


Single Pulse Power

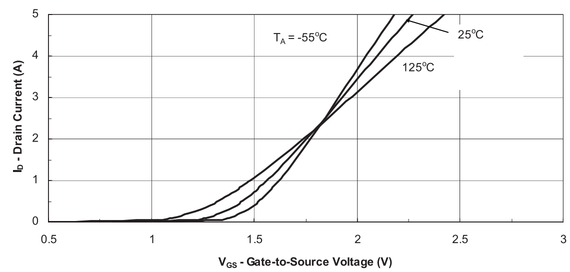


Normalized Thermal Transient Impedance, Junction-to-Ambient

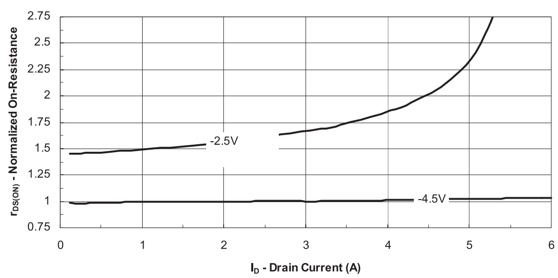
Typical Electrical Characteristics (P-Channel)



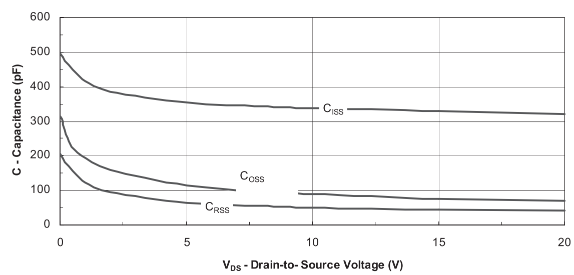
Output Characteristics



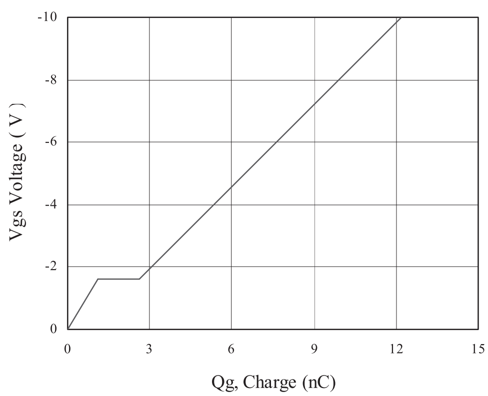
Transfer Characteristics



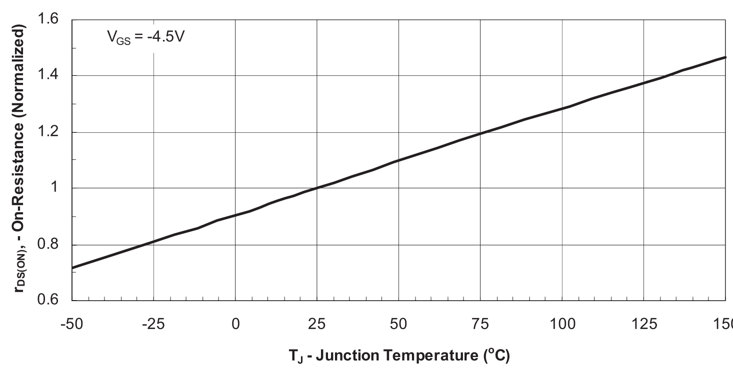
On-Resistance vs. Drain Current



Capacitance

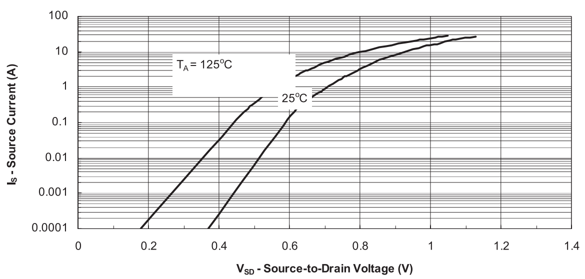


Gate Charge

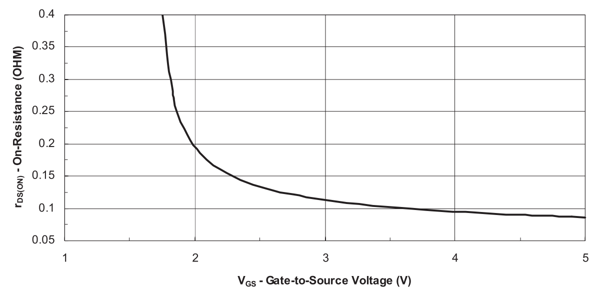


On-Resistance vs. Junction Temperature

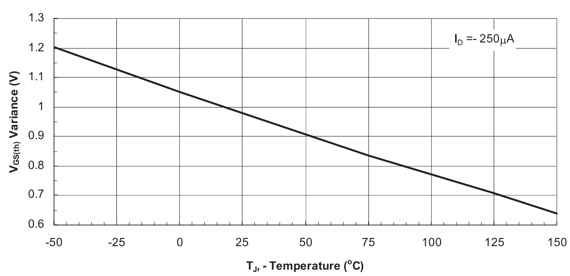
Typical Electrical Characteristics (P-Channel)



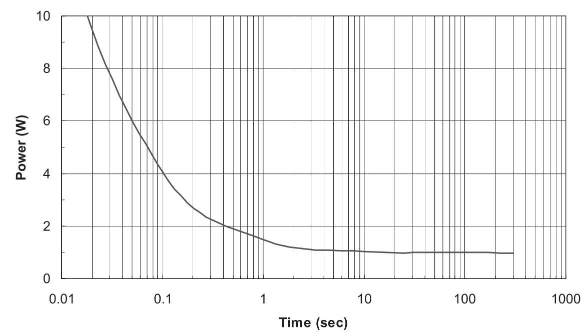
Source-Drain Diode Forward Voltage



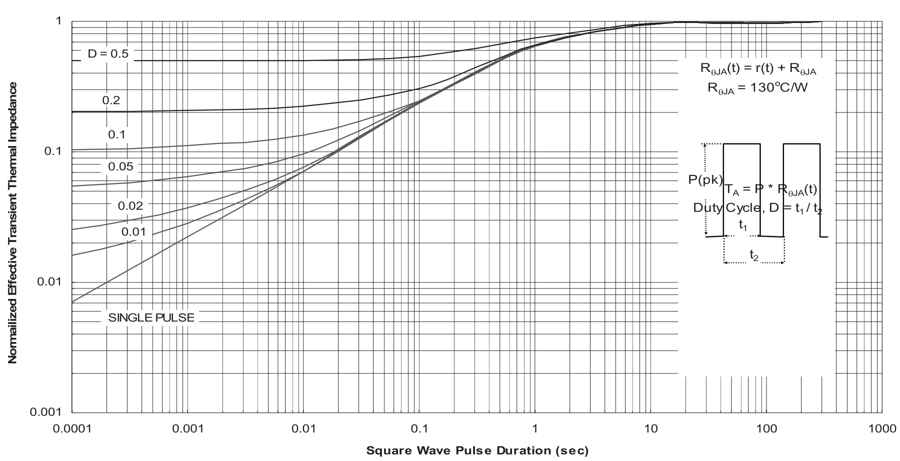
On-Resistance vs.Gate-to Source Voltage



Threshold Voltage



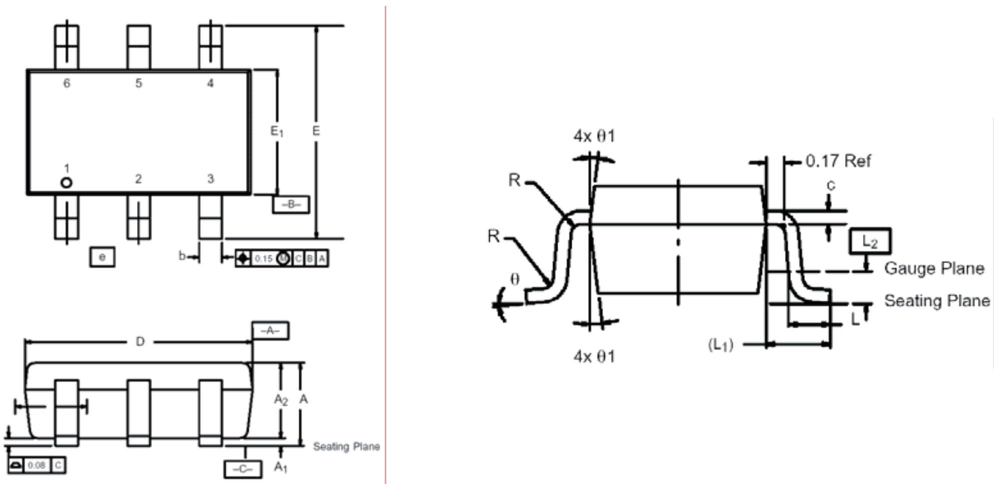
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

Package Information

TSOP-6: 6LEAD



	MILLIMETERS			INCHES		
Dim	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		