

Dual N-Channel 20-V (D-S) 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.



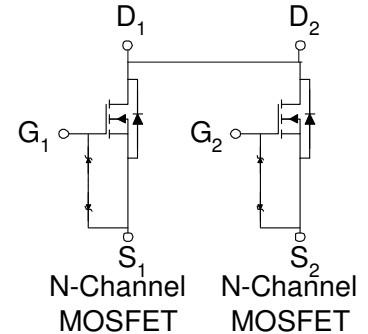
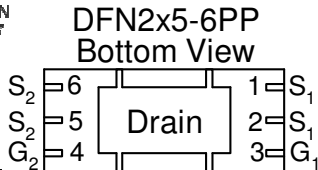
RoHS
COMPLIANT
HALOGEN
FREE
Available

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe DFN2x5-6PP saves board space
- Fast switching speed
- High performance trench technology



ESD Protected
2000V

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ m(Ω)	I_D (A)
20	22 @ $V_{GS} = 4.5V$	11
	28 @ $V_{GS} = 2.5V$	9.2



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current ^a	$T_A = 25^\circ C$	I_D	11	A
	$T_A = 70^\circ C$		8.5	
Pulsed Drain Current ^b		I_{DM}	± 40	
Continuous Source Current (Diode Conduction) ^a		I_S	3.1	A
Power Dissipation ^a	$T_A = 25^\circ C$	P_D	3.5	W
	$T_A = 70^\circ C$		1.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^\circ C$

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	$R_{\theta JA}$	36	$^\circ C/W$
	Steady State		76	$^\circ C/W$

Notes

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

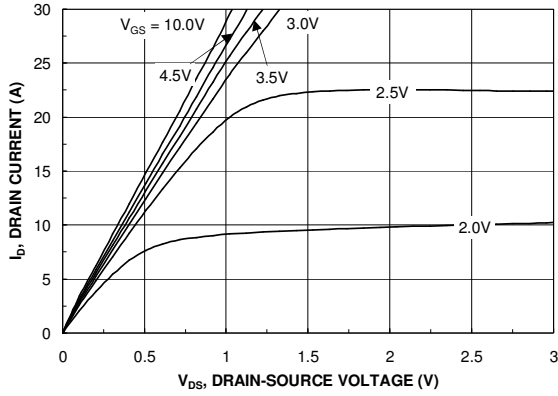
SPECIFICATIONS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	0.5			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 12 \text{ V}$			± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
		$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			30	
On-State Drain Current ^A	$I_{D(on)}$	$V_{DS} = 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	20			A
Drain-Source On-Resistance ^A	$r_{DS(on)}$	$V_{GS} = 4.5 \text{ V}, I_D = 6.7 \text{ A}$	10	18	22	$\text{m}\Omega$
		$V_{GS} = 4 \text{ V}, I_D = 5.6 \text{ A}$	10.5	19	23	
		$V_{GS} = 2.5 \text{ V}, I_D = 4.5 \text{ A}$	11	23	28	
Forward Transconductance ^A	g_{fs}	$V_{DS} = 15 \text{ V}, I_D = 6 \text{ A}$		22		S
Diode Forward Voltage	V_{SD}	$I_S = 0.5 \text{ A}, V_{GS} = 0 \text{ V}$		0.7		V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10 \text{ V}, V_{GS} = 4.5 \text{ V},$ $I_D = 6 \text{ A}$		9.2		nC
Gate-Source Charge	Q_{gs}			1.9		
Gate-Drain Charge	Q_{gd}			2.8		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10 \text{ V}, R_L = 15 \Omega, I_D = 1 \text{ A},$ $V_{GEN} = 4.5 \text{ V}$		1.7		nS
Rise Time	t_r			2.3		
Turn-Off Delay Time	$t_{d(off)}$			1.1		
Fall-Time	t_f			4.4		

Notes

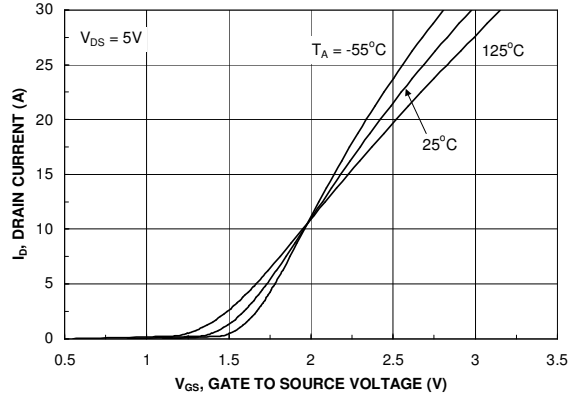
- Pulse test: $PW \leq 300\mu\text{s}$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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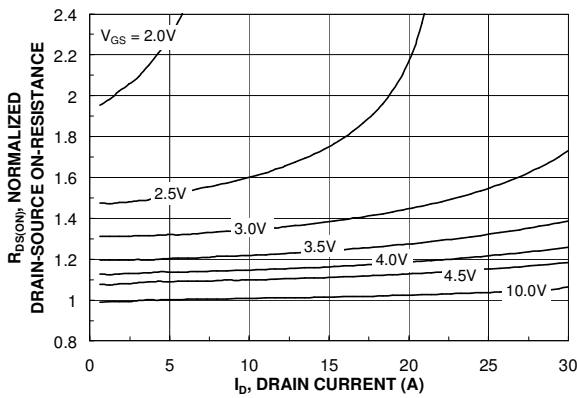
Typical Electrical Characteristics (N-Channel)



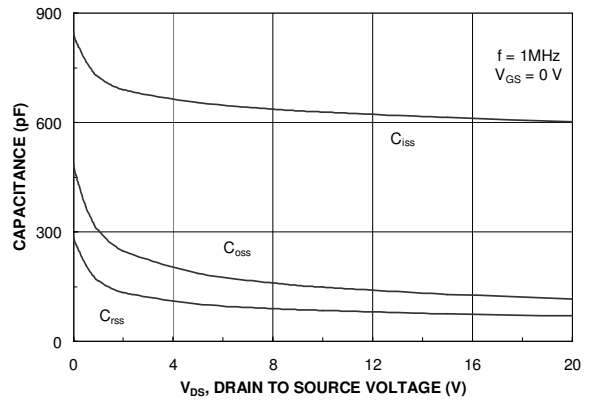
Output Characteristics



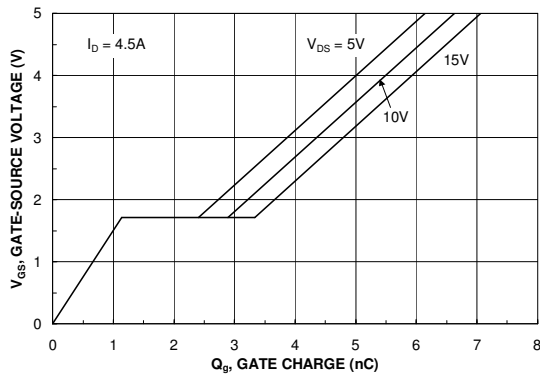
Transfer Characteristics



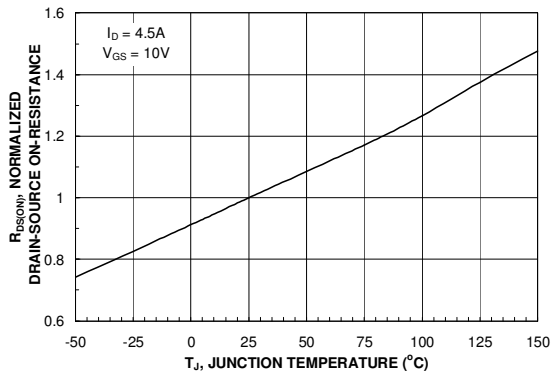
On-Resistance vs. Drain Current



Capacitance

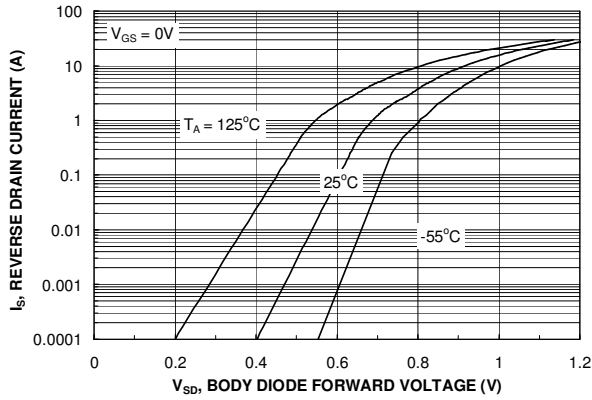


Gate Charge

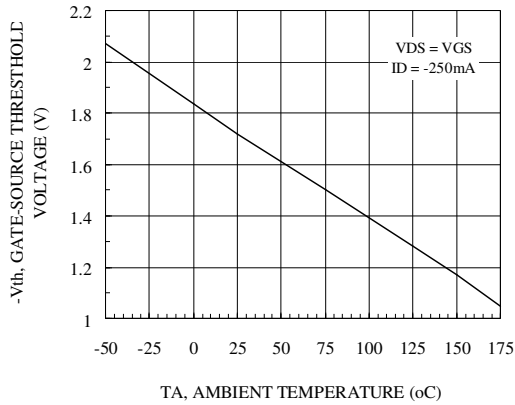


On-Resistance vs. Junction Temperature

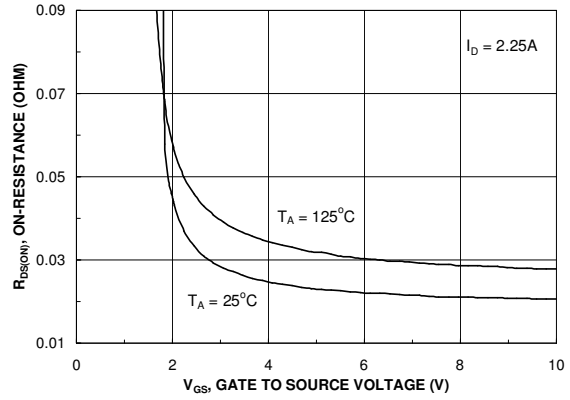
Typical Electrical Characteristics (N-Channel)



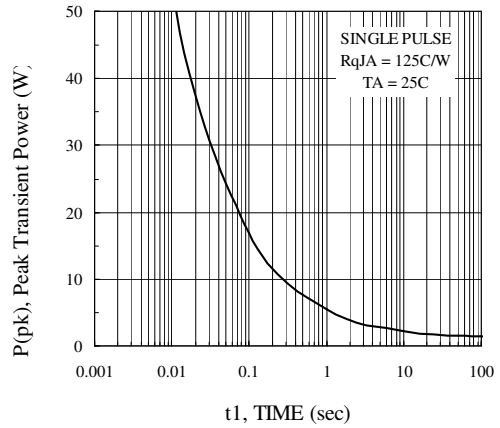
Source-Drain Diode Forward Voltage



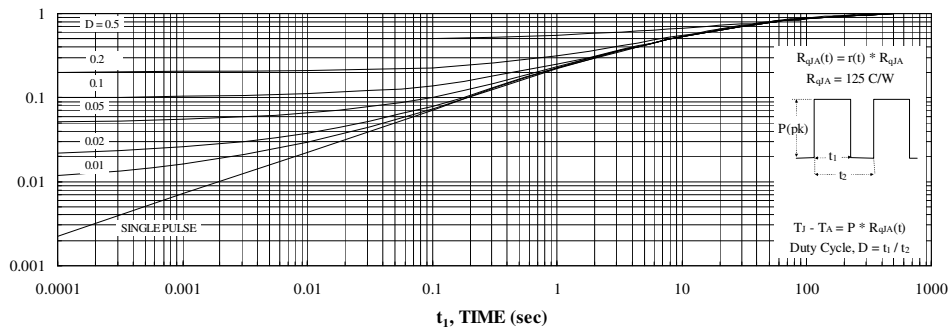
Vth Gate to Source Voltage Vs Temperature



On-Resistance vs. Gate-to-Source Voltage



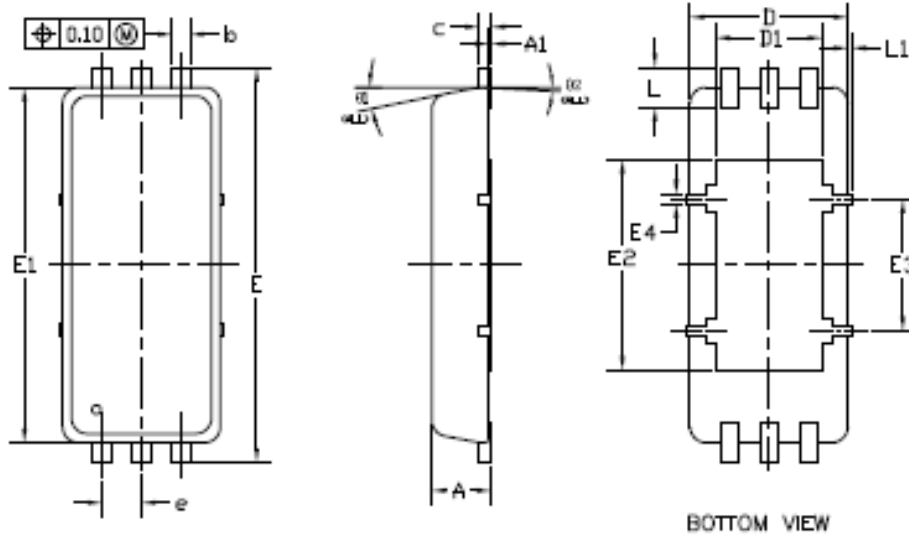
Single Pulse Power, Junction-to-Ambient



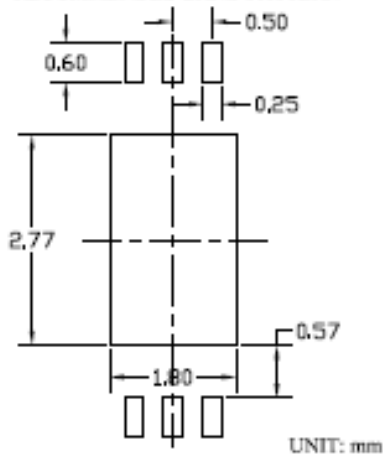
Normalized Thermal Transient Junction to Ambient

Package Information

DFN2x5_6L_EP1_P PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	—	0.05	0.000	—	0.002
b	0.20	0.23	0.30	0.008	0.009	0.012
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.00 BSC			0.079 BSC		
D1	1.30	1.35	1.55	0.051	0.053	0.061
E	3.00 BSC			0.197 BSC		
E1	4.50 BSC			0.177 BSC		
E2	2.60	2.67	2.96	0.102	0.106	0.116
E3	1.67 BSC			0.066 BSC		
E4	0.13 BSC			0.005 BSC		
e	0.50 BSC			0.020 BSC		
L	0.40	0.50	0.60	0.016	0.020	0.024
L1	0	—	0.10	0	—	0.004
Ø1	0°	10°	12°	0°	10°	12°
Ø2	3° BSC			3° BSC		

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MIL EACH.
2. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.