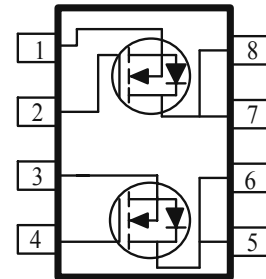


## 60V N+N-Channel Enhancement Mode MOSFET

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.

- Low  $r_{DS(on)}$  provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe SOP-8 saves board space
- Fast switching speed
- High performance trench technology



PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ m( $\Omega$ )	$I_D$ (A)
60	89 @ $V_{GS} = 10V$	$\pm 3.6$
	104 @ $V_{GS} = 4.5V$	$\pm 3.4$

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		$V_{DS}$	60	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_A = 25^\circ C$	$I_D$	$\pm 3.6$	A
	$T_A = 70^\circ C$		$\pm 3.1$	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	$\pm 25$	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	2	A
Power Dissipation <sup>a</sup>	$T_A = 25^\circ C$	$P_D$	2.1	W
	$T_A = 70^\circ C$		1.3	
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 <sup>a</sup>	$t \leq 10$ sec	$R_{\theta JA}$	62.5	$^\circ C/W$
	$t \leq 5$ sec		110	$^\circ C/W$

### Notes

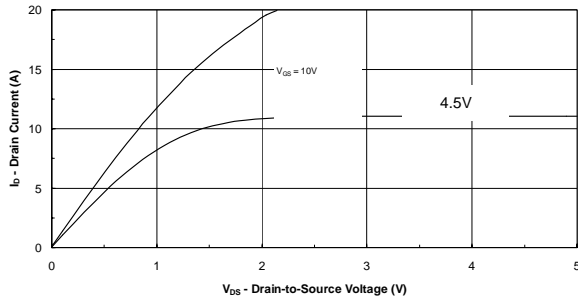
- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

SPECIFICATIONS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	1			
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = 20 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}$			1	uA
		$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			10	
On-State Drain Current <sup>A</sup>	$I_{D(on)}$	$V_{DS} = 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			A
Drain-Source On-Resistance <sup>A</sup>	$r_{DS(on)}$	$V_{GS} = 10 \text{ V}, I_D = 3.6 \text{ A}$			89	m $\Omega$
		$V_{GS} = 4.5 \text{ V}, I_D = 3.4 \text{ A}$			104	
Forward Transconductance <sup>A</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}, I_D = 3.6 \text{ A}$		11		S
Diode Forward Voltage	$V_{SD}$	$I_S = 2.0 \text{ A}, V_{GS} = 0 \text{ V}$		1.1		V
Pulsed Source Current (Body Diode) <sup>A</sup>	$I_{SM}$			3.5		A
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 30 \text{ V}, V_{GS} = 4.5 \text{ V},$ $I_D = 3.6 \text{ A}$		3.6		nC
Gate-Source Charge	$Q_{gs}$			1.8		
Gate-Drain Charge	$Q_{gd}$			1.3		
<b>Switching</b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30 \text{ V}, R_L = 30 \Omega, I_D = 1 \text{ A},$ $V_{GEN} = 10 \text{ V}$		9		nS
Rise Time	$t_r$			10		
Turn-Off Delay Time	$t_{d(off)}$			21		
Fall-Time	$t_f$			8		

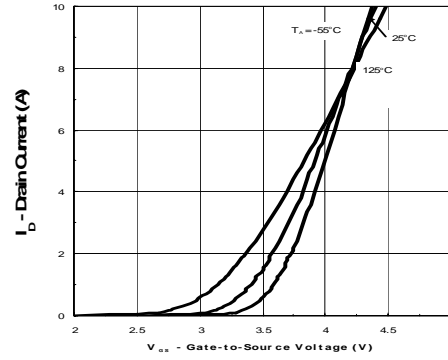
**Notes**

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

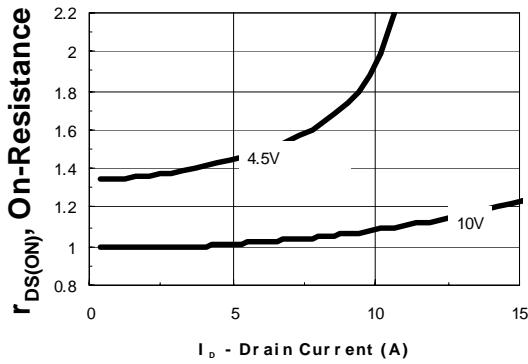
## Typical Electrical Characteristics



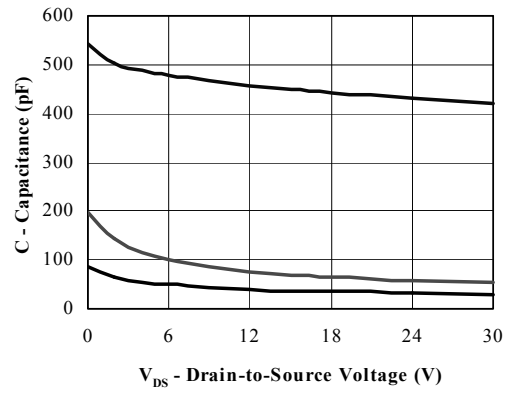
Output Characteristics



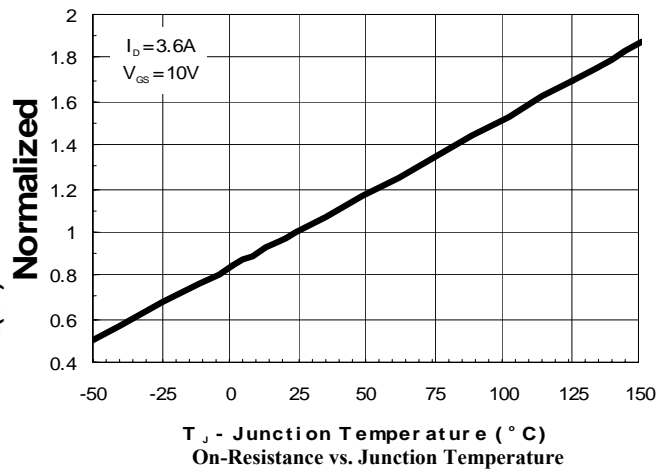
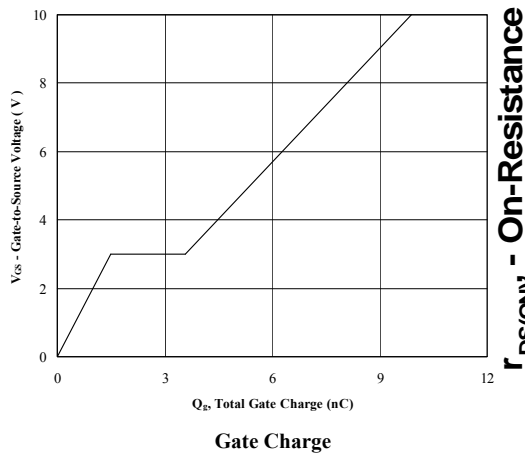
Transfer Characteristics



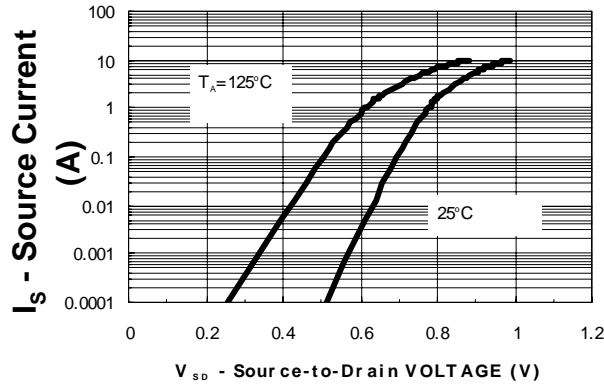
On-Resistance vs. Drain Current



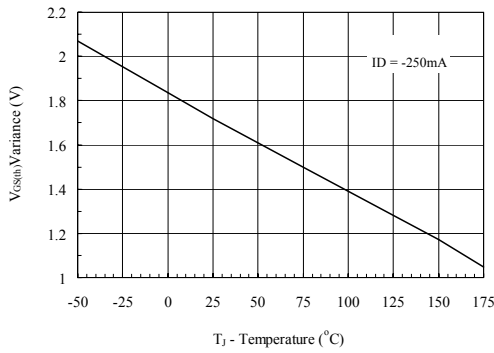
Capacitance



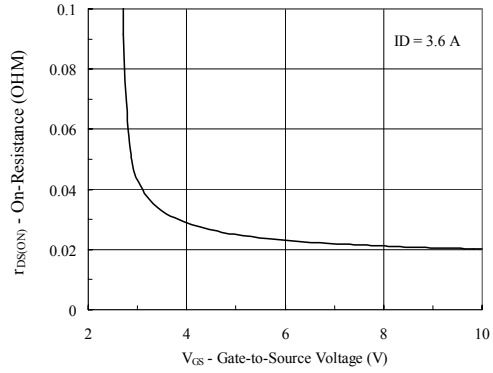
## Typical Electrical Characteristics



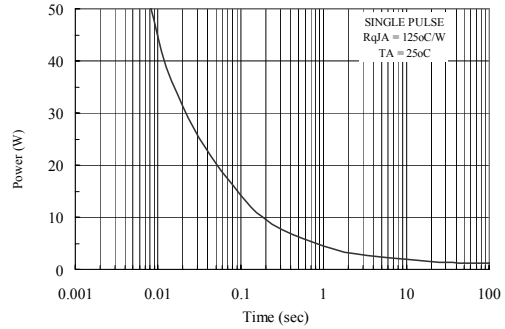
Source-Drain Diode Forward Voltage



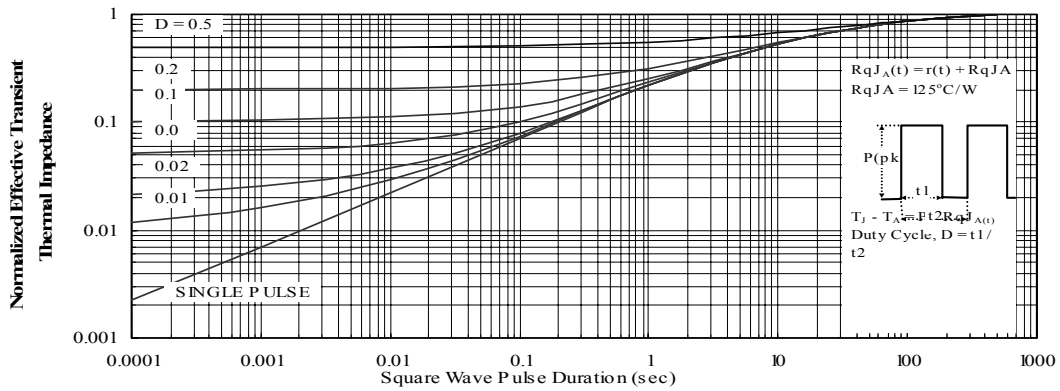
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

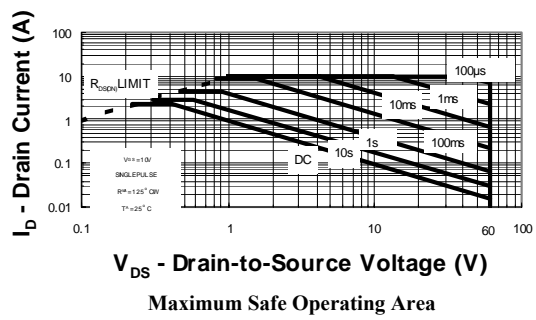


Single Pulse Power



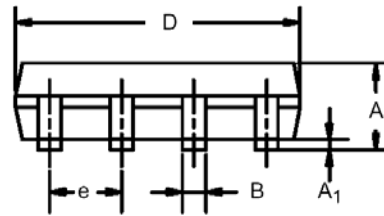
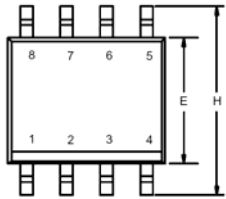
Normalized Thermal Transient Impedance, Junction-to-Ambient

## Typical Electrical Characteristics



### Package Information

#### SO-8: 8LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
<b>A</b>	1.35	1.75	0.053	0.069
<b>A<sub>1</sub></b>	0.10	0.20	0.004	0.008
<b>B</b>	0.35	0.51	0.014	0.020
<b>C</b>	0.19	0.25	0.0075	0.010
<b>D</b>	4.80	5.00	0.189	0.196
<b>E</b>	3.80	4.00	0.150	0.157
<b>e</b>	1.27 BSC		0.050 BSC	
<b>H</b>	5.80	6.20	0.228	0.244
<b>h</b>	0.25	0.50	0.010	0.020
<b>L</b>	0.50	0.93	0.020	0.037
<b>q</b>	0°	8°	0°	8°

