

50A, 60V N-CHANNEL POWER MOSFET

● Features

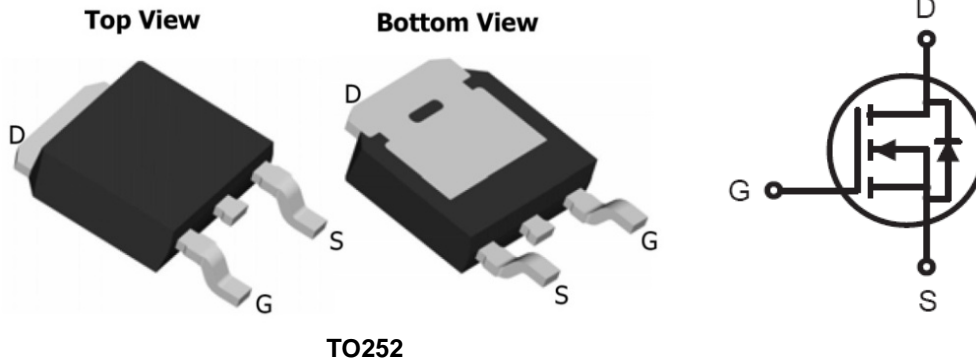
- * $R_{DS(ON)} = 23m\Omega @ V_{GS} = 10V$
- * Ultra low gate charge (typical 30 nC)
- * Low reverse transfer Capacitance ($C_{RSS} =$ typical 80 pF)
- * Fast switching capability
- * 100% avalanche energy specified
- * Improved dv/dt capability

● General Description

The FS50N06 is three-terminal silicon device with current conduction capability of about 50A, fast switching speed. Low on-state resistance, breakdown voltage rating of 60V, and max threshold voltages of 4 volt.

It is mainly suitable electronic ballast, and low power switching mode power appliances.

● Pin Configurations



● Absolute Maximum Ratings @ $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Ratings	Units
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	$T_A=25^\circ C$	50
		$T_A=100^\circ C$	35
Drain Current Pulsed (Note 1)	I_{DM}	200	A
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	480	mJ
Repetitive Avalanche Energy (Note 1)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	7	V/ns
Total Power Dissipation ($T_C = 25^\circ C$)	P_D	130	W
Derating Factor above $25^\circ C$		0.9	W/ $^\circ C$
Operation Junction Temperature	T_J	-55 ~ +150	$^\circ C$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ C$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

FS50N06

THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Thermal Resistance, Junction-to-Case	θ_{JC}			1.15	°C/W
Thermal Resistance, Case-to-Sink	θ_{CS}		0.5		
Thermal Resistance, Junction-to-Ambient	θ_{JA}			62.5	

● Electrical Characteristics @ $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	
I_{GSS}	Gate-Body Leakage	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$			1	μA
$R_{DS(ON)}$	Drain-Source On-Resistance ^a	$V_{GS}=10V, I_D=25A$		18	23	m Ω
V_{SD}	Diode Forward Voltage	$I_{SD}=50A, V_{GS}=0V$			1.5	V
DYNAMIC PARAMETERS						
Q_g	Total Gate Charge	$V_{DS}=48V, V_{GS}=10V, I_D=50A, (Note\ 4,5)$		30	40	nC
Q_{gs}	Gate Source Charge			9.6		
Q_{gd}	Gate-Drain Charge			10		
C_{iss}	Input capacitance	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		900	1220	pF
C_{oss}	Output Capacitance			4305	550	
C_{rss}	Reverse Transfer Capacitance			80	100	
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, I_D=25A, R_G=50\Omega (Note\ 4,5)$		40	60	nS
t_r	Turn-On Rise Time			100	200	
$t_{d(off)}$	Turn-Off Delay Time			90	180	
t_f	Turn-Off Fall Time			80	160	

Note 1. Repeativity rating: pulse width limited by junction temperature

2. $L=5.6mH, I_{AS}=50A, V_{DD}=25V, R_G=0\Omega$, Starting $T_J=25^\circ\text{C}$

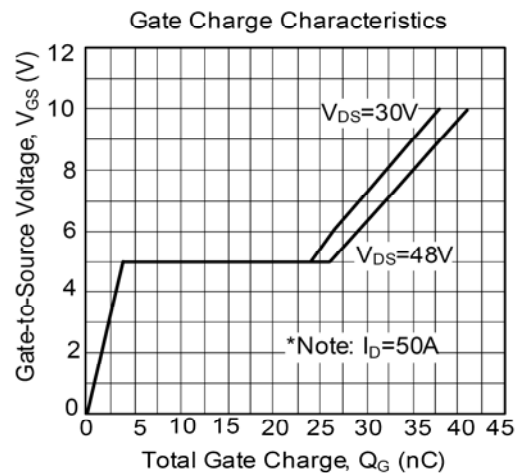
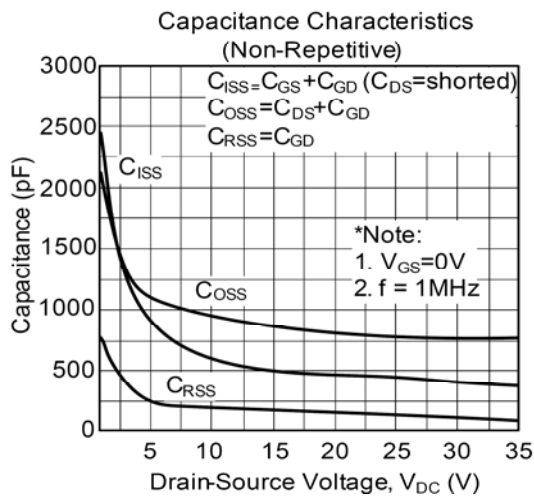
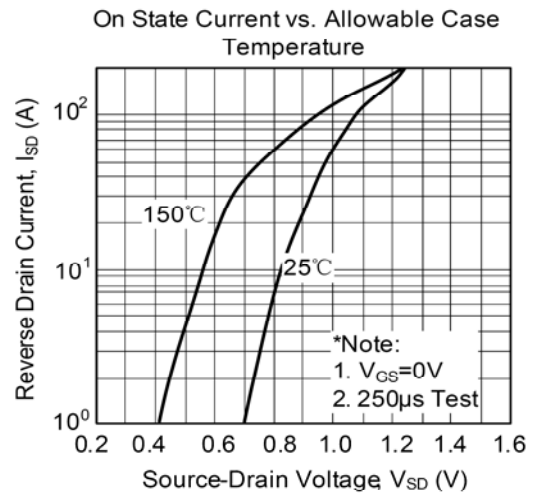
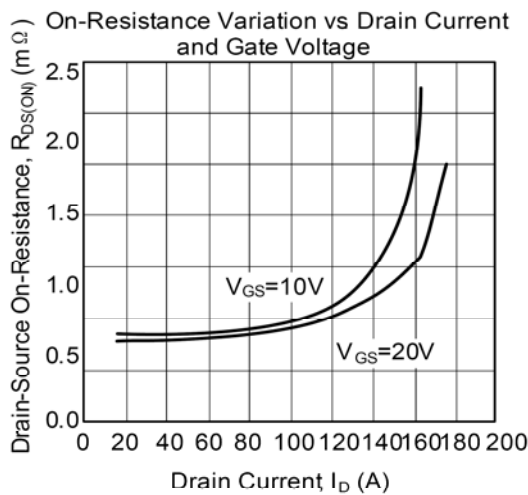
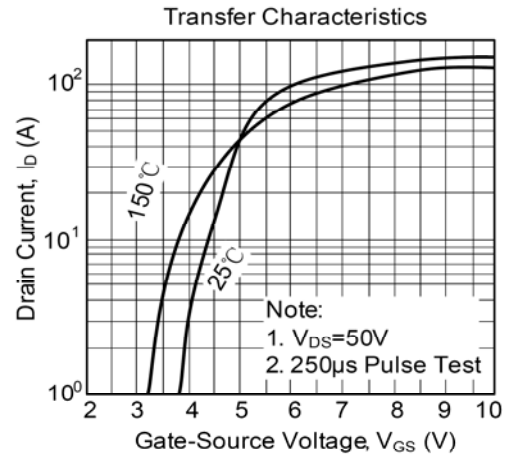
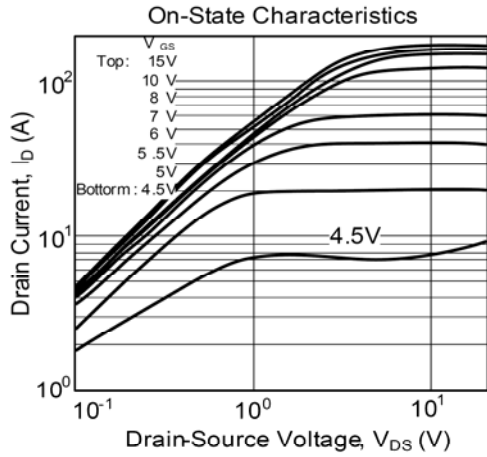
3. $I_{SD}\leq 50A, di/dt\leq 300A/\mu s, V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

5. Essentially independent of operating temperature.

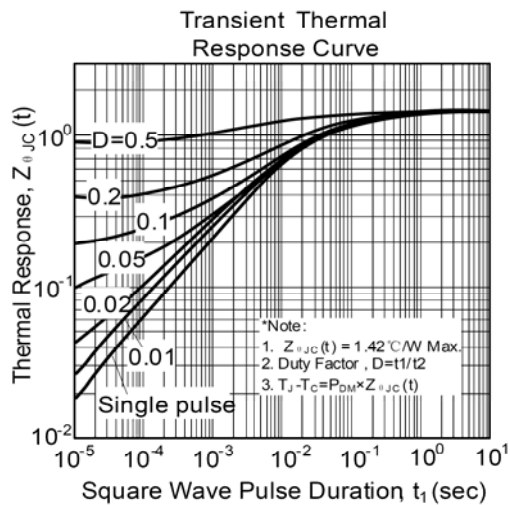
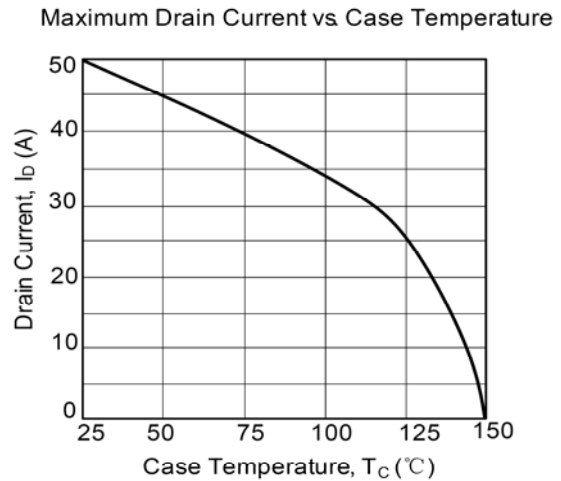
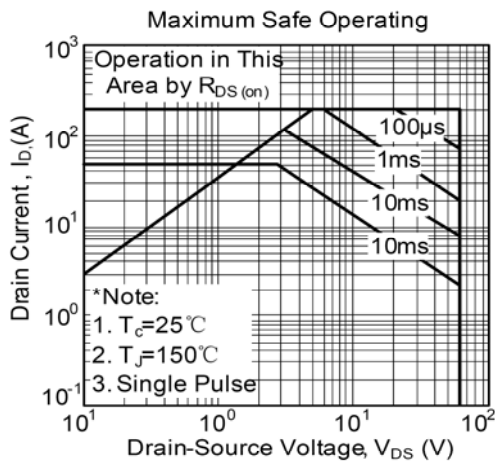
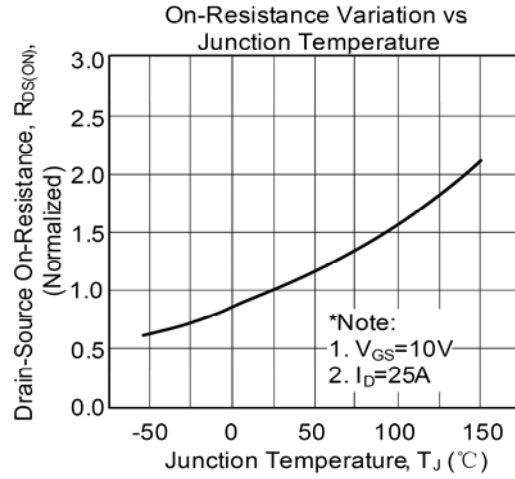
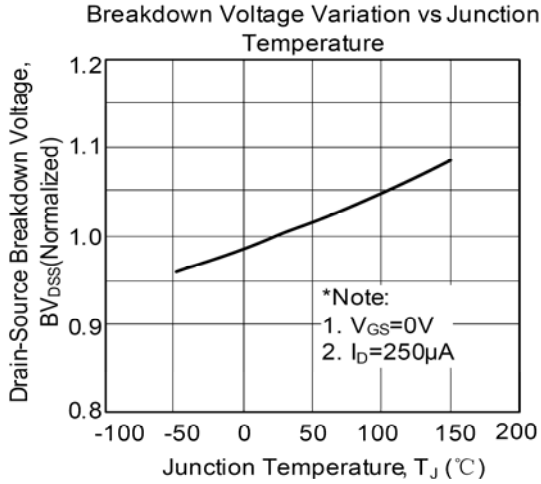
FS50N06

Typical Performance Characteristics (T_J = 25 Noted)



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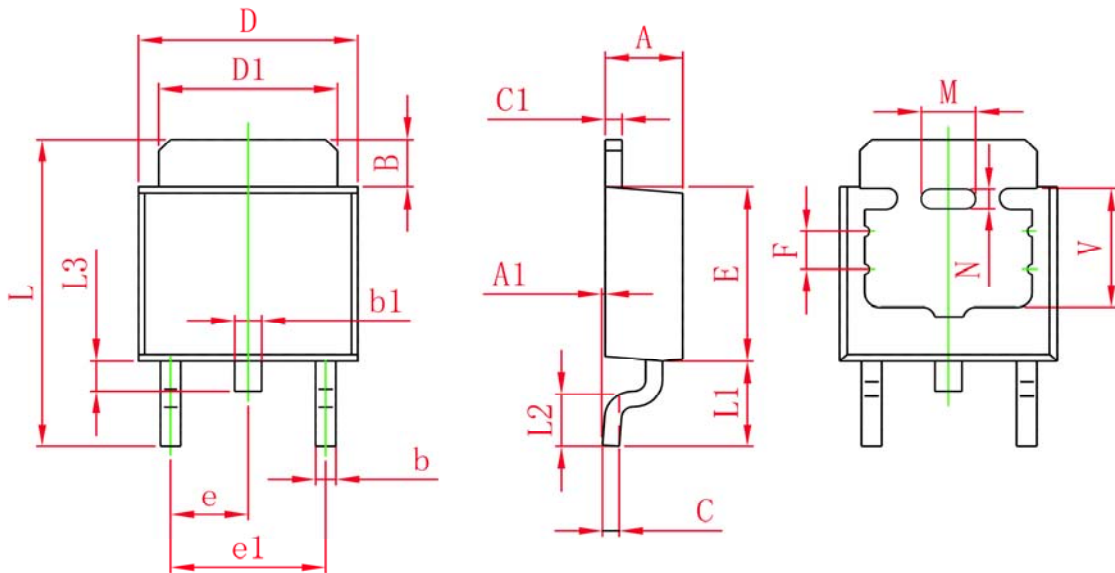
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- Package Information

TO-252C-2L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
F	1.200REF.		0.047REF.	
M	1.600REF.		0.063REF.	
N	0.450REF.		0.018REF.	
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	