

## MS74N52

### N-Channel 60-V (D-S) MOSFET

#### Features

- Low  $r_{DS(on)}$  trench technology
- Low thermal impedance
- Fast switching speed
- Low thermal impedance copper lead frame DFN5X6-8L saves board space

- RoHS compliant package

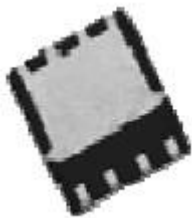
#### Typical Applications:

- DC/DC Conversion Circuits
- Motor Drives

Package type : DFN5X6-8L

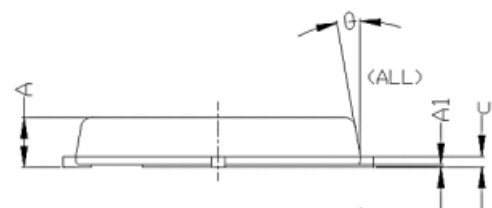
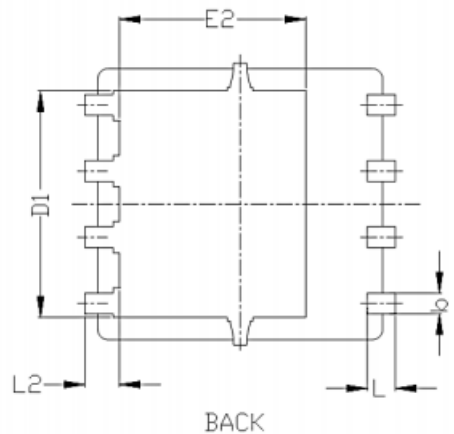
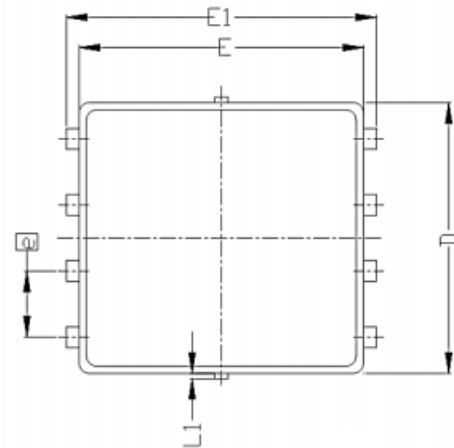
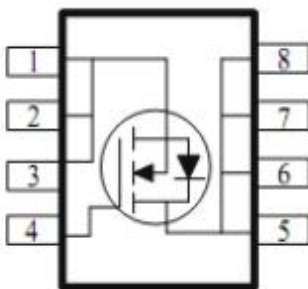
#### Packing & Order Information

3,000/Reel



**RoHS  
COMPLIANT**

Graphic symbol



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	—	0.05	0.000	—	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.20 BSC			0.205 BSC		
D1	4.35 BSC			0.171 BSC		
E	5.55 BSC			0.219 BSC		
E1	6.05 BSC			0.238 BSC		
E2	3.62 BSC			0.143 BSC		
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	—	0.15	0	—	0.006
L2	0.68 REF			0.027 REF		
θ	0°	—	10°	0°	—	10°

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#### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

##### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage	60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current <sup>a</sup> ( $T_A=25^\circ\text{C}$ )	29	A
	Continuous Drain Current <sup>a</sup> ( $T_A=70^\circ\text{C}$ )	23	A
$I_{DM}$	Pulsed Drain Current <sup>b</sup>	100	A
$I_S$	Continuous Source Current (Diode Conduction) <sup>a</sup>	7.3	A
$P_D$	Power Dissipation <sup>a</sup> ( $T_A=25^\circ\text{C}$ )	5	W
	Power Dissipation <sup>a</sup> ( $T_A=70^\circ\text{C}$ )	3.2	W
$T_J/T_{STG}$	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

##### Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient <sup>a</sup> ( $t \leq 10$ sec)	25	$^\circ\text{C/W}$
	Maximum Junction-to-Ambient <sup>a</sup> (Steady-State)	65	

##### Notes

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

##### Static

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	0.4			V
$I_{GSS}$	Gate-Body Leakage	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 48$ V, $V_{GS} = 0$ V $V_{DS} = 48$ V, $V_{GS} = 0$ V, $T_J = 55^\circ\text{C}$			1 10	$\mu\text{A}$
$I_{D(on)}$	On-State Drain Current	$V_{DS} = 5$ V, $V_{GS} = 10$ V	40			A
$r_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = 10$ V, $I_D = 20$ A $V_{GS} = 4.5$ V, $I_D = 16$ A			4.2 4.7	m $\Omega$
$g_{fs}$	Forward Transconductance	$V_{GS} = 15$ V, $I_D = 20$ A		22		S
$V_{SD}$	Diode Forward Voltage	$I_S = 3.7$ A, $V_{GS} = 0$ V		0.74		V

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### N-Channel 60-V (D-S) MOSFET

Dynamic						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$Q_g$	Total Gate Charge	$V_{DS} = 30\text{ V}$ , $I_D = 4.5\text{ A}$ , $V_{GS} = 20\text{ V}$	--	48	--	nC
$Q_{gs}$	Gate-Source Charge		--	18	--	nC
$Q_{gd}$	Gate-Drain Charge		--	20	--	nC
$t_{d(on)}$	Turn-On Delay Time	$I_D = 20\text{ A}$ , $R_L = 1.5\ \Omega$ , $V_{GEN} = 10\text{ V}$ , $R_{GEN} = 6\ \Omega$ , $V_{DS} = 30\text{ V}$	--	16	--	ns
$t_r$	Rise Time		--	17	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	136	--	ns
$t_f$	Fall Time		--	36	--	ns
$C_{ISS}$	Input Capacitance	$V_{DS} = 15\text{ V}$ , $f = 1\text{ MHz}$ , $V_{GS} = 0\text{ V}$	--	14642	--	pF
$C_{OSS}$	Output Capacitance		--	433	--	pF
$C_{RSS}$	Reverse Transfer Capacitance		--	427	--	pF

#### Notes

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

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#### Typical Electrical Characteristics

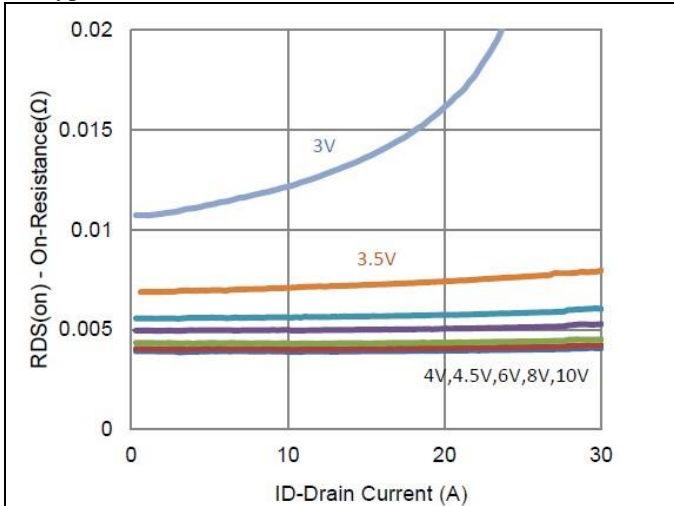


FIG.1-ON-RESISTANCE VS. DRAIN CURRENT

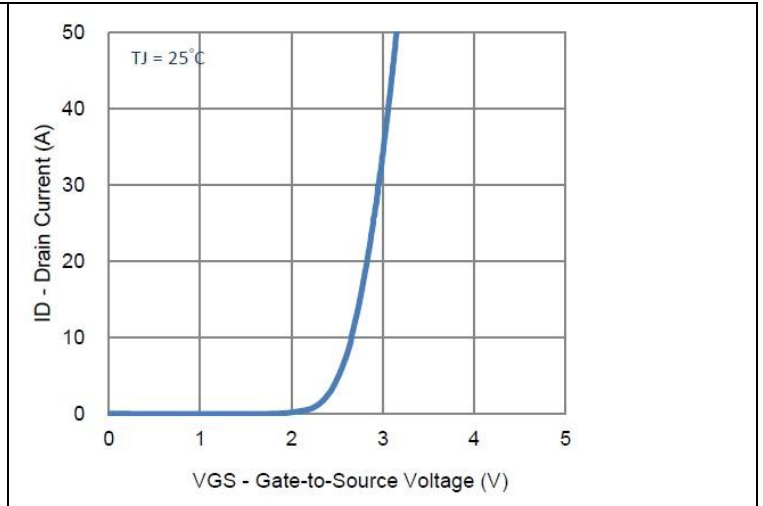


FIG.2-TRANSFER CHARACTERISTICS

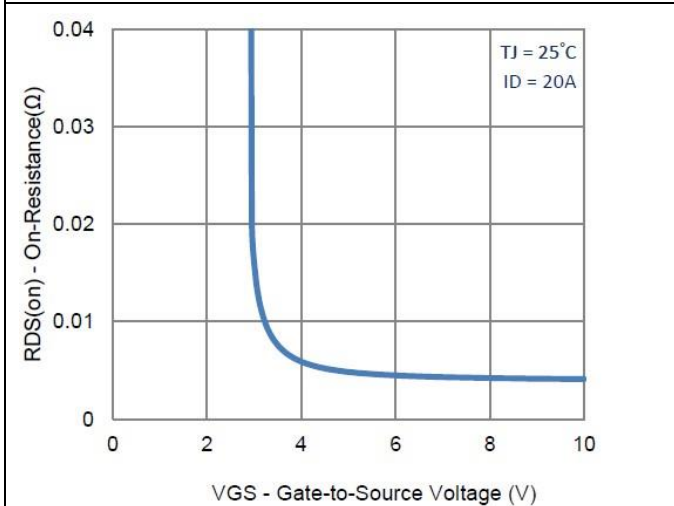


FIG.3-ON-RESISTANCE VS GATE-TO-SOURCE VOLTAGE

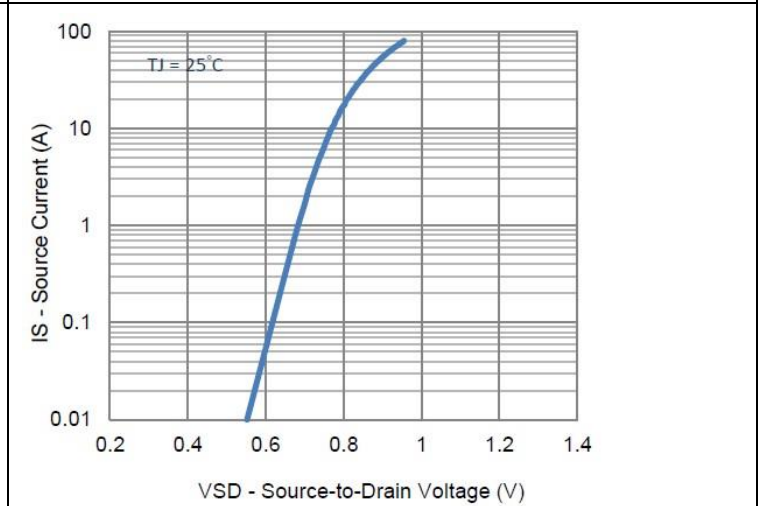


FIG.4-DRAIN-TO-SOURCE FORWARD VOLTAGE

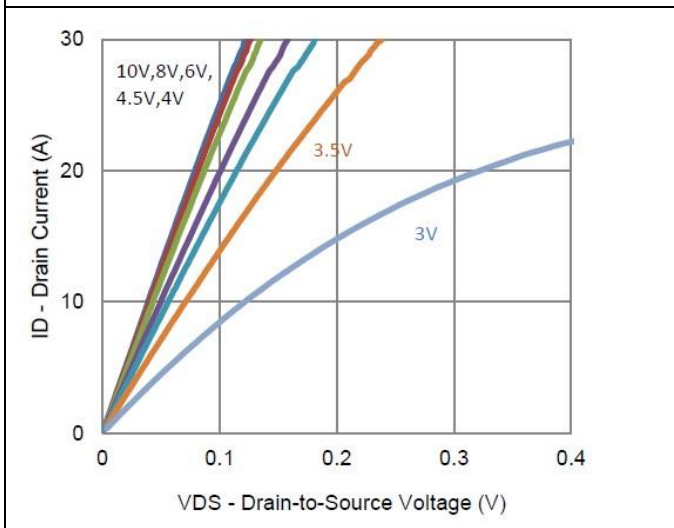


FIG.5-OUTPUT CHARACTERISTICS

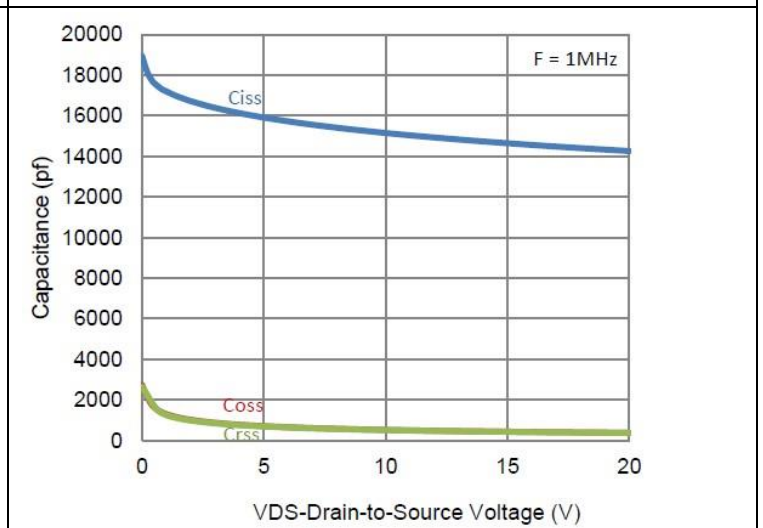
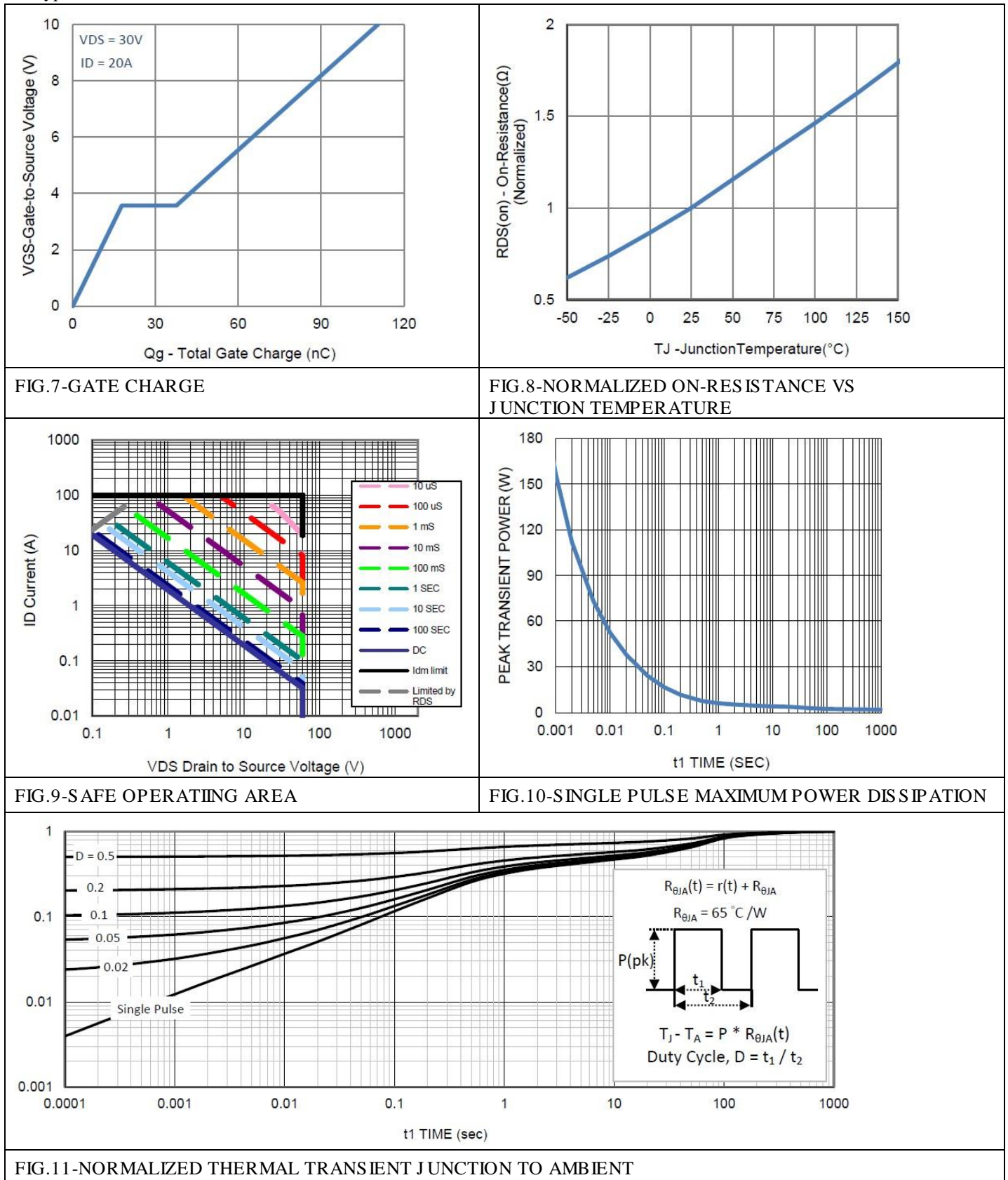


FIG.6-CAPACITANCE

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### N-Channel 60-V (D-S) MOSFET

#### Typical Electrical Characteristics



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#### Disclaimer

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