

MSC09N74X

100V N-Channel MOSFETs

Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

- 100V, 70A , $R_{DS(ON)} = 6.5m\Omega$ @ $V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- RoHS compliant package

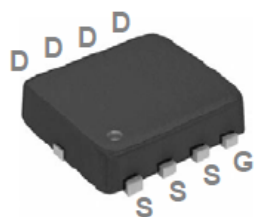
Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

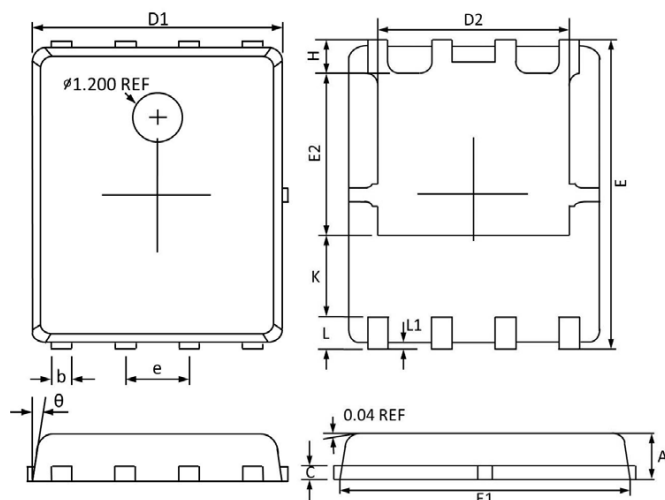
Packing & Order Information

Shipping : 3,000/Reel

PPAK5X6 Pin Configuration

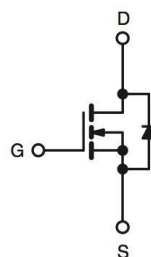


RoHS
COMPLIANT



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
θ	12°	0°	12°	0°

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	$\pm 20/-12$	V
I_D	Drain Current - Continuous ($T_C=25^\circ\text{C}$)	70	A
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	44	A
I_{DM}	Drain Current - Pulsed ¹	280	A

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

Symbol	Parameter	Value	Unit
EAS	Single Pulse Avalanche Energy ²	320	mJ
IAS	Single Pulse Avalanched Current ²	80	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	142	W
	Power Dissipation - Derate above 25°C	1.14	W/ $^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to +150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Thermal Resistance Junction to ambient	--	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	--	0.88	

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = V_{GS}, I_D = 250\mu\text{A}$	100			V
I_{GSS}	Gate-Source Leakage Current	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$			1	μA
		$V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}, T_J = 85^\circ\text{C}$			10	

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		5.5	6.5	m Ω
		$V_{GS} = 5\text{ V}, I_D = 10\text{ A}$		7	9	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2	1.8	2.5	V
g_{fs}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 5\text{ A}$		8		S

Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge ^{3,4}	$V_{DS} = 80\text{ V}, I_D = 10\text{ A},$ $V_{GS} = 10\text{ V}$	--	58.2	100	nC
Q_{gs}	Gate-Source Charge ^{3,4}		--	9.2	18	nC
Q_{gd}	Gate-Drain Charge ^{3,4}		--	20.8	30	nC
$t_{d(on)}$	Turn-On Delay Time ^{3,4}	$I_D = 1\text{ A}, R_G = 6\text{ }\Omega,$ $V_{GS} = 10\text{ V}, V_{DD} = 15\text{ V}$	--	24	48	ns
t_r	Rise Time ^{3,4}		--	19.8	39	ns
$t_{d(off)}$	Turn-Off Delay Time ^{3,4}		--	46	92	ns
t_f	Fall Time ^{3,4}		--	26	52	ns

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Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	3110	7500	pF
C_{OSS}	Output Capacitance		--	1705	4200	pF
C_{RSS}	Reverse Transfer Capacitance		--	178	220	pF
R_g	Total Gate Charge	$V_{DS} = 0\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	2	4	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source Current	$V_G = V_D = 0\text{ V}$, Force Current	--	--	70	A
I_{SM}	Pulsed Source Current		--	--	140	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 1\text{ A}$, $T_J = 25^\circ\text{C}$	--	--	1	V

Note :

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=1\text{mH}$, $I_{AS}=80\text{A}$., $R_G=25\Omega$,Starting $T_J=25^\circ\text{C}$.
- 3.The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- 4.Essentially independent of operating temperature.

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■ Characteristics Curve

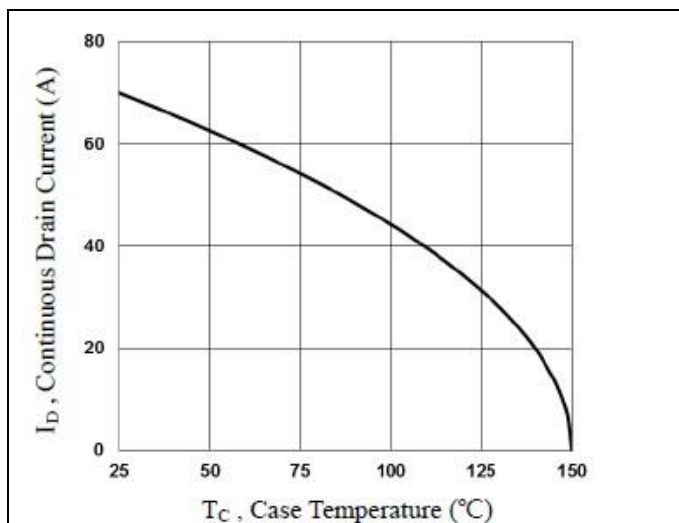


FIG.1-CONTINUOUS DRAIN CURRENT VS. TC

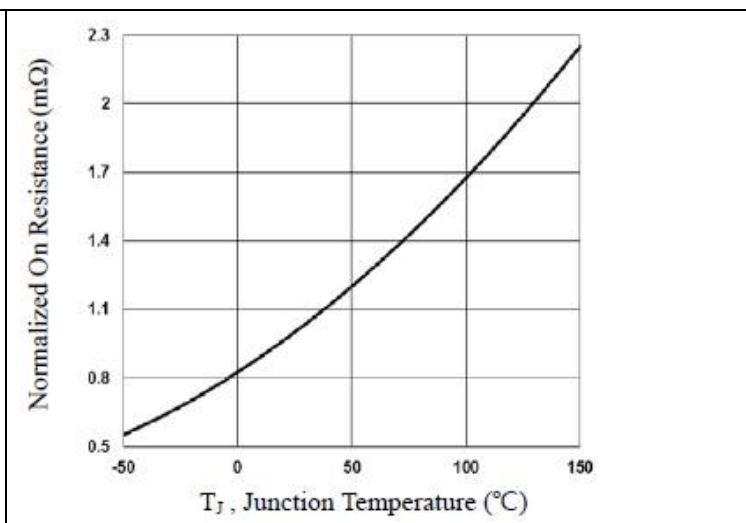


FIG.2-NORMALIZED RDSON VS. TJ

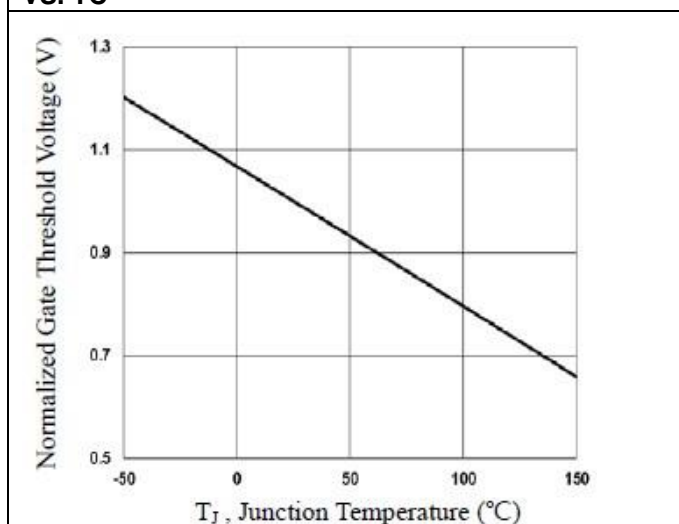


FIG.3-NORMALIZED VTH VS. TJ

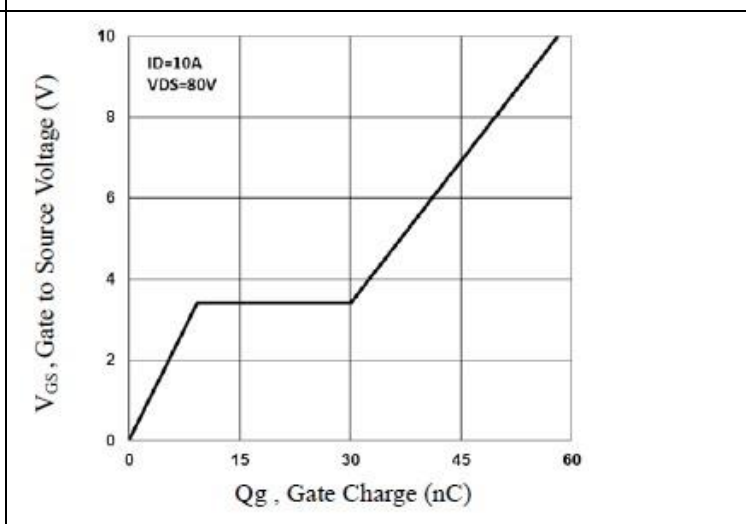


FIG.4-GATE CHARGE WAVEFORM

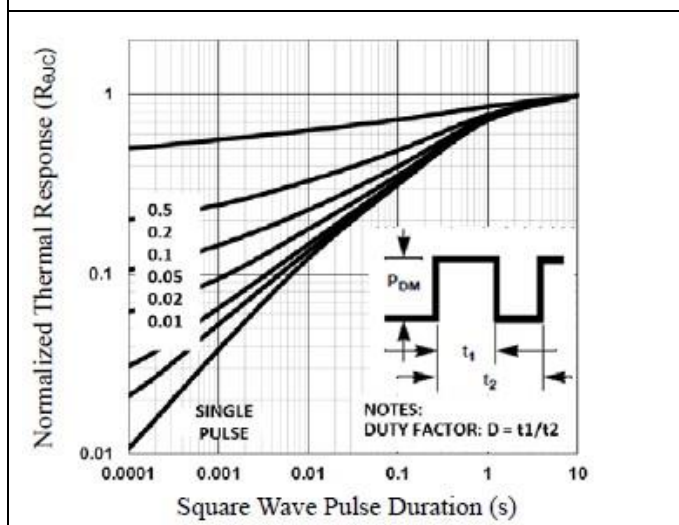


FIG.5-NORMALIZED TRANSIENT IMPEDANCE

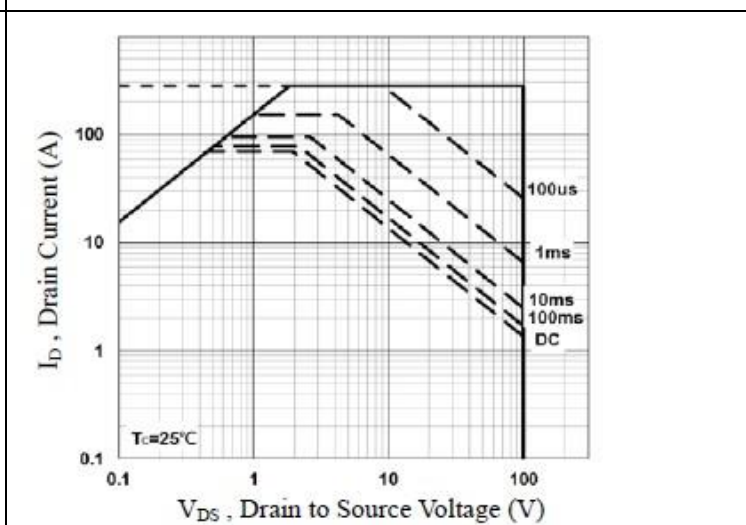


FIG.6-MAXIMUM SAFE OPERATION AREA

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■ Characteristics Curve

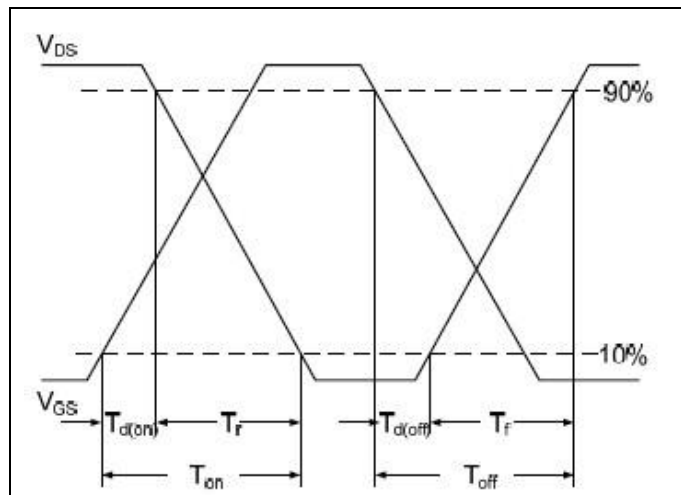


FIG.7-SWITCHING TIME WAVEFORM

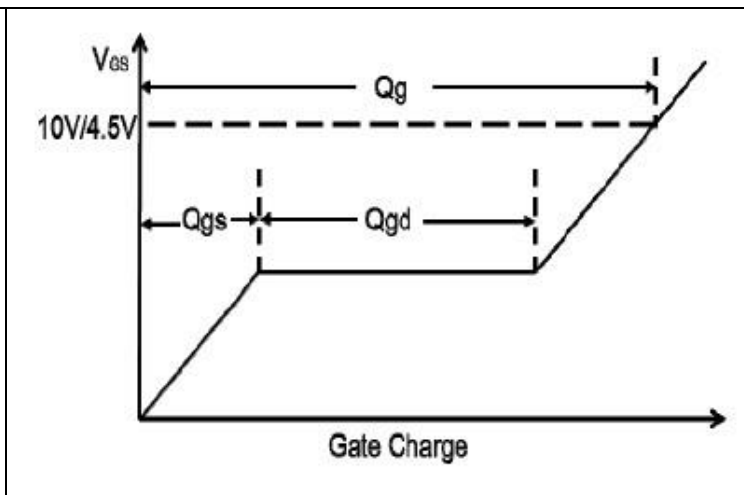


FIG.8-EAS WAVEFORM

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