

# N-Channel MOSFET

## 30V 197A P-PAK5X6

MFT3N44P56

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### FEATURE

- Operating temperature: -55 ~ +150 °C
- Super high dense cell design for extremely low RDS(ON)
- High power and current handling capability
- Low Profile Compact Construction Design



### MAXIMUM RATINGS

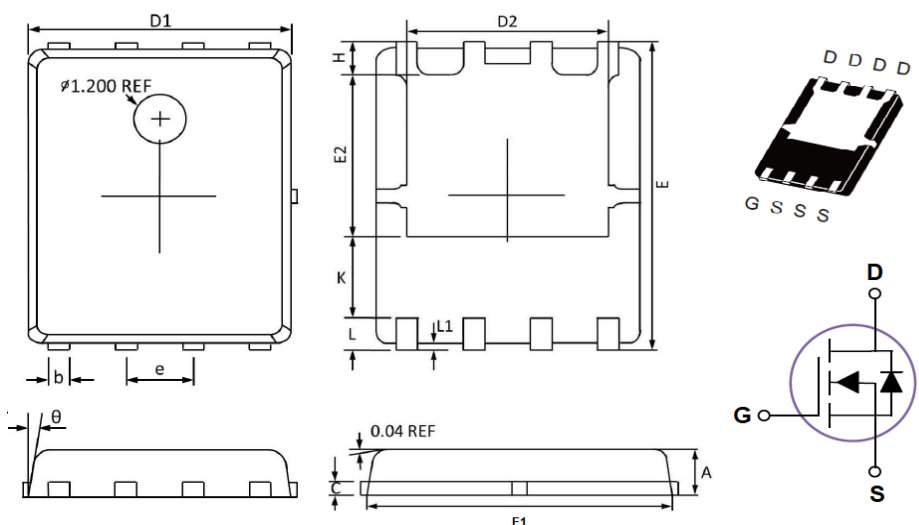
Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current – Continuous	at $R_{\theta JA}$	$I_D$	44
	at $R_{\theta JC}$	$I_D$	197
Drain Current – Pulsed	at $R_{\theta JA}$	$I_{DM}$	176
	at $R_{\theta JC}$	$I_{DM}$	788
Single Pulsed Avalanche Energy	$E_{AS}$	544	mJ
Single Pulsed Avalanche Current	$I_{AS}$	33	A
Power Dissipation	$P_D$	125	W
Operating Junction and Storage Temperature Range	$T_{J/STG}$	-55 to 150	°C

### Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	20	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.0	°C/W

### DIMENSIONS

Item	Min (mm)	Max (mm)
A	0.800	1.100
b	0.330	0.510
C	0.200	0.300
D1	4.800	5.100
D2	3.610	4.100
E	5.900	6.200
E1	5.700	5.900
E2	3.350	3.780
e	1.27BSC	
H	0.410	0.700
K	1.100	1.500
L	0.510	0.710
L1	0.060	0.200



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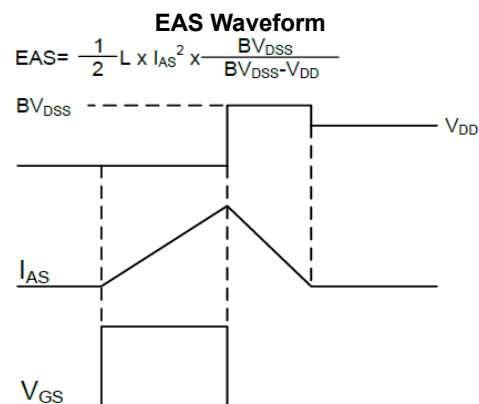
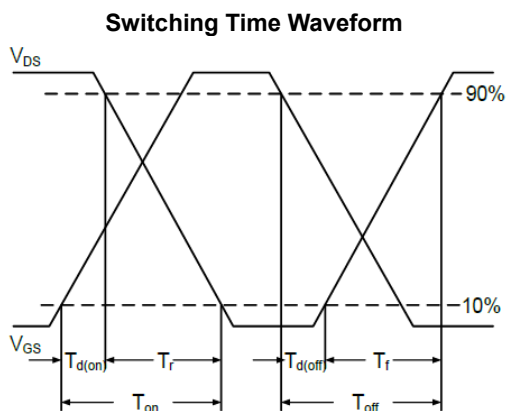
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### ELECTRICAL CHARACTERISTICS

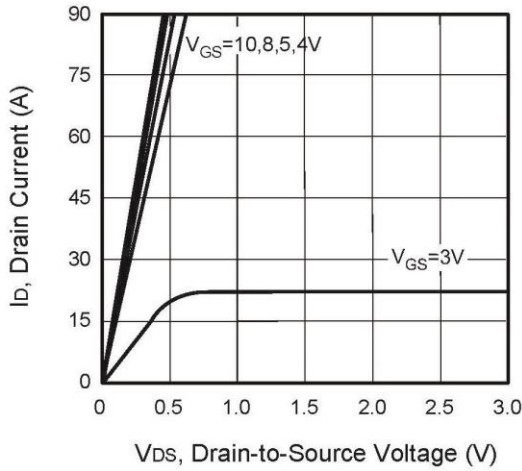
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$BV_{DSS}$	30	--	--	V
Drain-Source Leakage Current	$V_{DS}=60V, V_{GS}=0V$	$I_{DSS}$	--	--	1	$\mu A$
Gate Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	$I_{GSS}$	--	--	$\pm 100$	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=30A$	$R_{DS(ON)}$	--	1.5	2.0	m $\Omega$
	$V_{GS}=4.5V, I_D=30A$		--	2.1	2.8	m $\Omega$
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	--	3.0	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=24V, V_{GS}=4.5V, I_D=50A$	$Q_g$	--	34	--	nC
Gate-Source Charge		$Q_{gs}$	--	11	--	
Gate-Drain Charge		$Q_{gd}$	--	15	--	
Turn-On Delay Time	$V_{DD}=24V, I_D=50A, V_{GS}=10V, R_{GEN}=6\Omega$	$T_{d(on)}$	--	44	--	nS
Rise Time		$T_r$	--	26	--	
Turn-Off Delay Time		$T_{d(off)}$	--	80	--	
Fall Time		$T_f$	--	16	--	
Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1.0MHz$	$C_{iss}$	--	4240	--	pF
Output Capacitance		$C_{oss}$	--	820	--	
Reverse Transfer Capacitance		$C_{rss}$	--	145	--	
Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	$R_g$	--	1.2	--	$\Omega$
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Continuous Source Current	--	$I_s$	--	--	100	A
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_s=30A$	$V_{SD}$	--	--	1.2	V

Note:

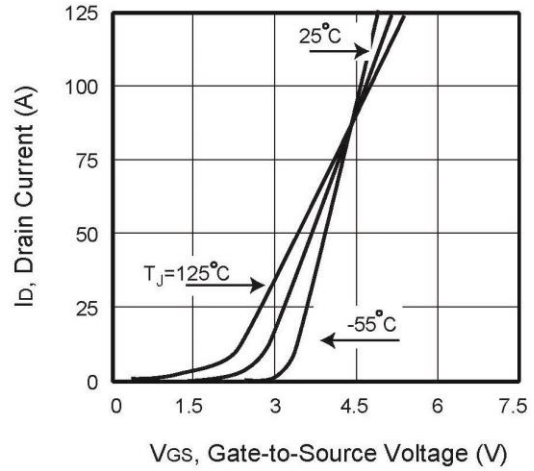
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=79A$ , Starting  $T_J=25^\circ C$
3. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature



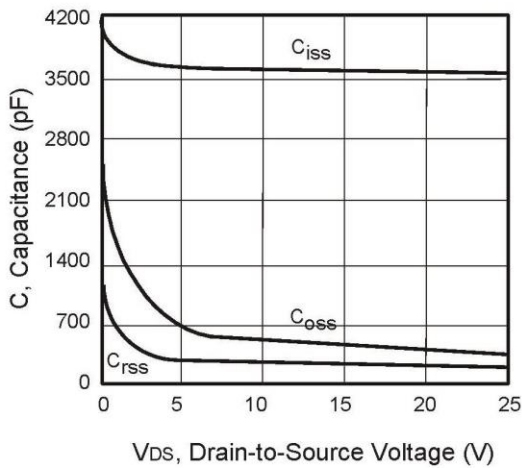
### CHARACTERISTIC CURVES



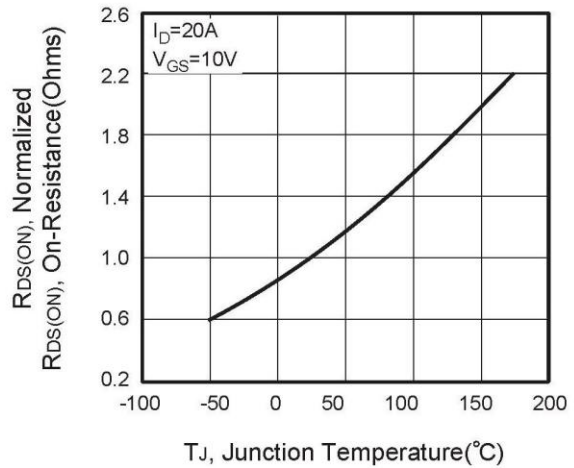
**Output Characteristics**



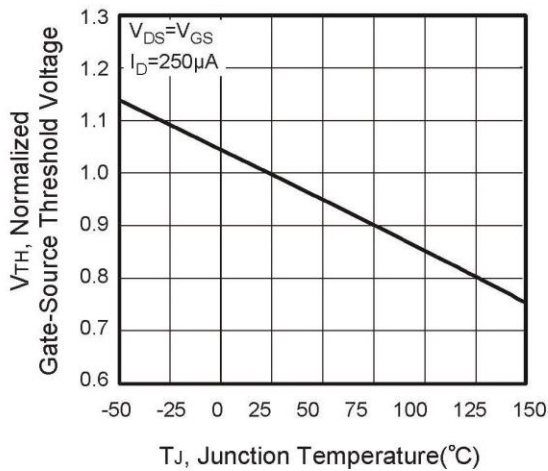
**Transfer Characteristics**



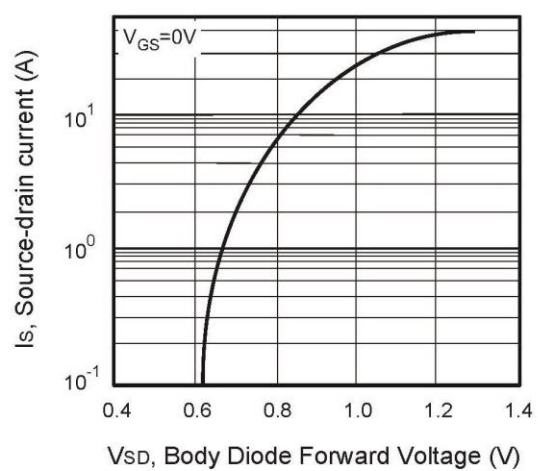
**Capacitance**



**On-Resistance Variation with Temperature**



**Gate Threshold Variation with Temperature**



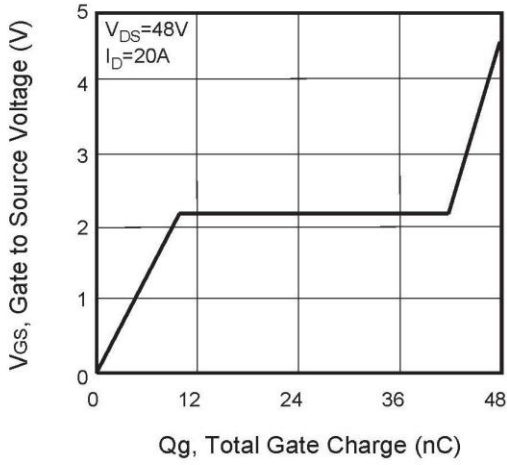
**Body Diode Forward Voltage Variation with Source Current**

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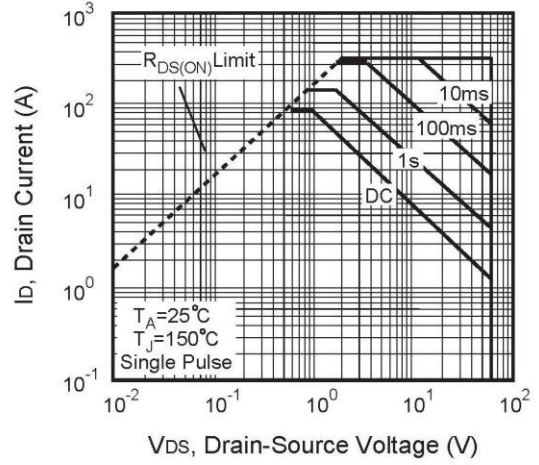
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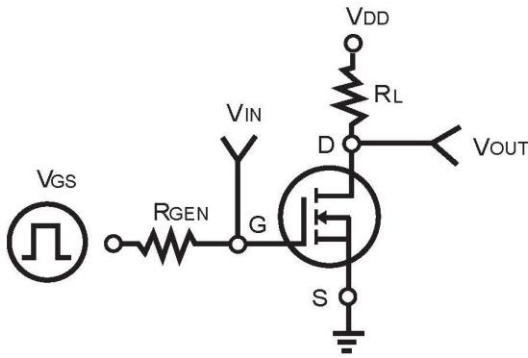
## CHARACTERISTIC CURVES



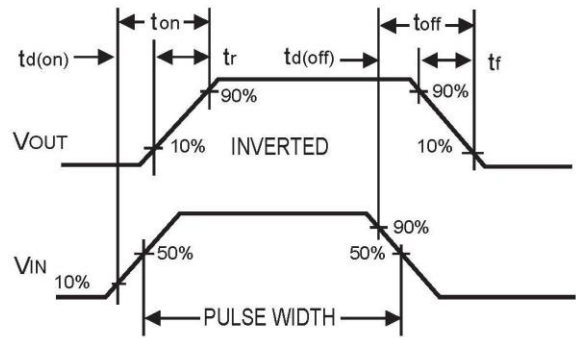
Gate Charge



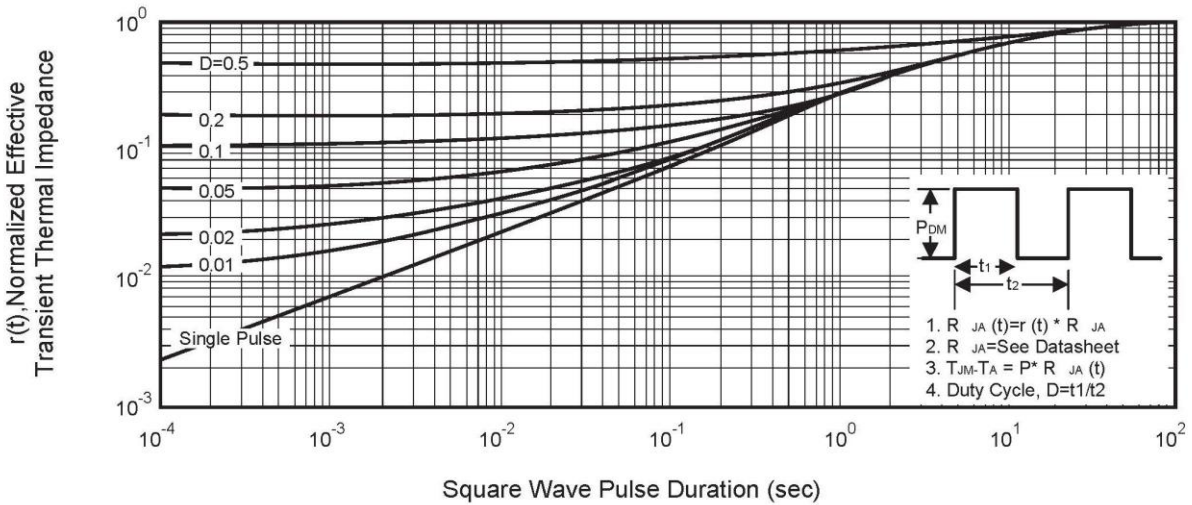
Maximum Safe Operating Area



Switching Test Circuit



Switching Waveforms



Normalized Thermal Transient Impedance Curve

\*Specifications subject to change without notice.