

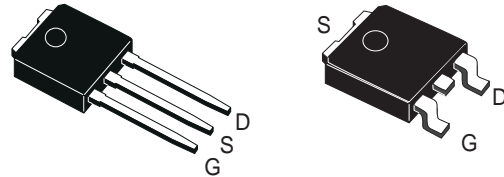


N-Channel Enhancement Mode MOSFET

### Features

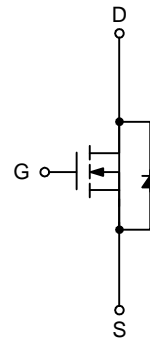
- 25V/50A,  
 $R_{DS(ON)}=8.5m\Omega$  (Typ.) @  $V_{GS}=10V$   
 $R_{DS(ON)}=12m\Omega$  (Typ.) @  $V_{GS}=4.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- Avalanche Rated
- Lead Free and Green Devices Available  
 (RoHS Compliant)

### Pin Description



IPAK  
TO-251

DPAK  
TO-252



N-Channel MOSFET

### Applications

- Power Management in Desktop Computer or DC/DC Converters

### Ordering and Marking Information

50N02		Package Code U : TO-251,TO-252 Operating Junction Temperature Range C : -55 to 150 °C Handling Code TR : Tape & Reel Assembly Material G : Halogen and Lead Free Device
50N02 :	50N02 TFXXX	XXX - Date Code;TF-Tuo Feng

Note: TUOFENG lead-free products contain molding compounds/die attach materials and 100% matte tin plate termination finish; which are fully compliant with RoHS. TUOFENG lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020C for MSL classification at lead-free peak reflow temperature. TUOFENG defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

TUOFENG reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings</b> ( $T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)				
$V_{DSS}$	Drain-Source Voltage	25	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 20$		
$T_J$	Maximum Junction Temperature	150	$^{\circ}\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$	
$I_S$	Diode Continuous Forward Current	30	A	
$I_{DP}$	300 $\mu\text{s}$ Pulse Drain Current Tested	$T_C=25^{\circ}\text{C}$	120	A
		$T_C=100^{\circ}\text{C}$	80	
$I_D$	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	50*	A
		$T_C=100^{\circ}\text{C}$	35	
$P_D$	Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$	50	W
		$T_C=100^{\circ}\text{C}$	20	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.5	$^{\circ}\text{C}/\text{W}$	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	50	$^{\circ}\text{C}/\text{W}$	
$E_{AS}$	Drain-Source Avalanche Energy, $L=0.5\text{mH}$	100	mJ	

Note : \* Current limited by bond wire.

### Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	AM2508A			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_{DS}=250\mu\text{A}$	25	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$ $T_J=85^{\circ}\text{C}$	-	-	1	$\mu\text{A}$
			-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	1.3	1.8	2.5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$	-	-	$\pm 100$	nA
$R_{DS(ON)}^a$	Drain-Source On-state Resistance	$V_{GS}=10\text{V}, I_{DS}=30\text{A}$	-	8.5	10.5	m $\Omega$
		$V_{GS}=4.5\text{V}, I_{DS}=15\text{A}$	-	12	20	
<b>Diode Characteristics</b>						
$V_{SD}^a$	Diode Forward Voltage	$I_{SD}=15\text{A}, V_{GS}=0\text{V}$	-	0.8	1.1	V
$t_{rr}$	Reverse Recovery Time	$I_{DS}=30\text{A}, dI_{SD}/dt=100\text{A}/\mu\text{s}$	-	24	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	16	-	nC



**Electrical Characteristics (Cont.)** ( $T_A=25^{\circ}\text{C}$  Unless Otherwise Noted)

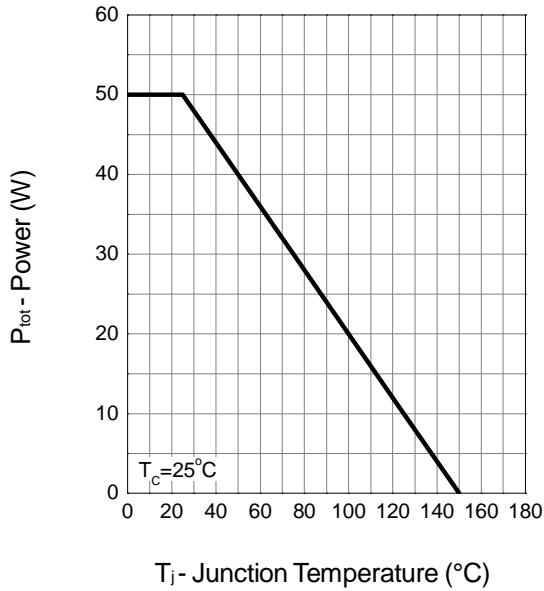
Symbol	Parameter	Test Conditions	AM2508A			Unit
			Min.	Typ.	Max.	
<b>Dynamic Characteristics<sup>b</sup></b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	2.5	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz	-	1080	-	pF
$C_{oss}$	Output Capacitance					
$C_{rss}$	Reverse Transfer Capacitance					
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	-	12	22	ns
$t_r$	Turn-on Rise Time					
$t_{d(OFF)}$	Turn-off Delay Time					
$t_f$	Turn-off Fall Time					
<b>Gate Charge Characteristics<sup>b</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=30A$	-	18	25	nC
$Q_{gs}$	Gate-Source Charge					
$Q_{gd}$	Gate-Drain Charge					

Note a : Pulse test ; pulse width $\leq 300\mu\text{s}$ , duty cycle $\leq 2\%$ .

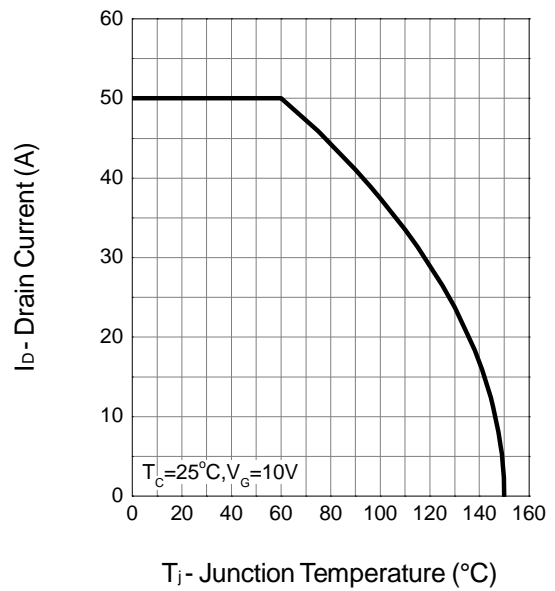
Note b : Guaranteed by design, not subject to production testing.

### Typical Operating Characteristics

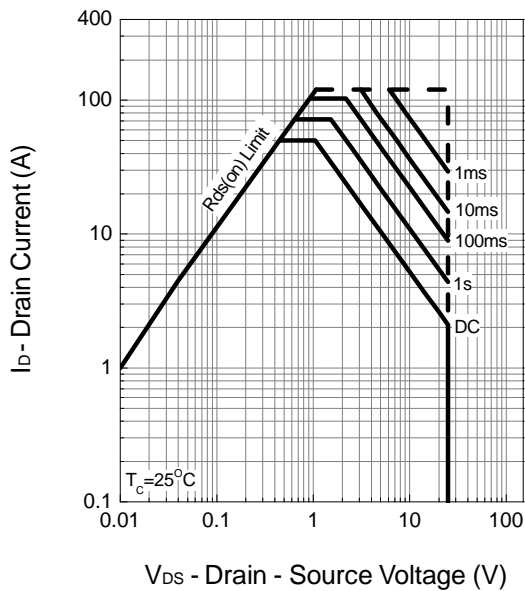
**Power Dissipation**



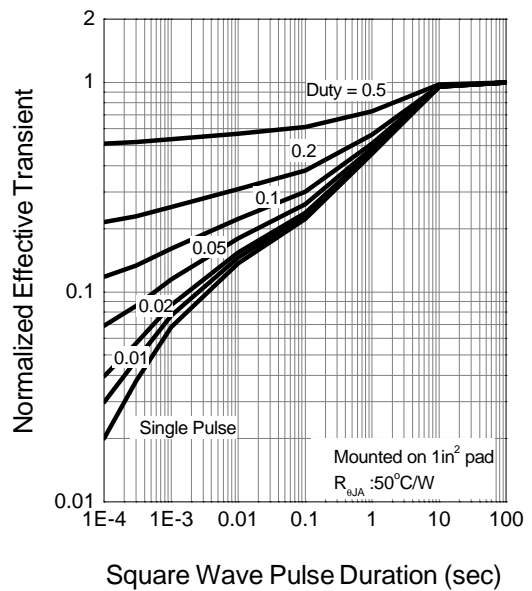
**Drain Current**



**Safe Operation Area**

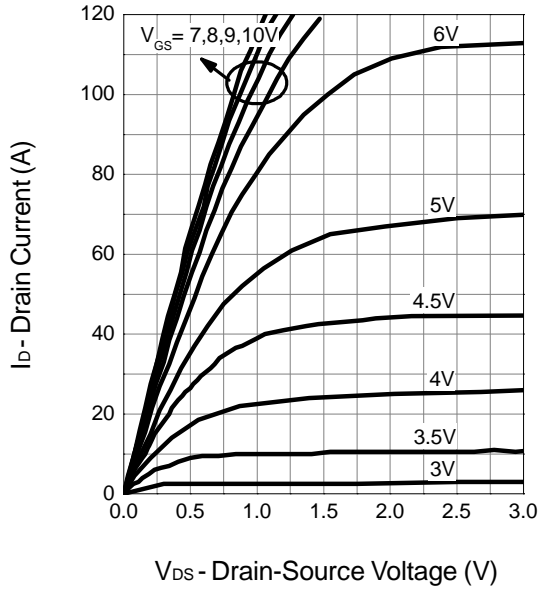


**Thermal Transient Impedance**

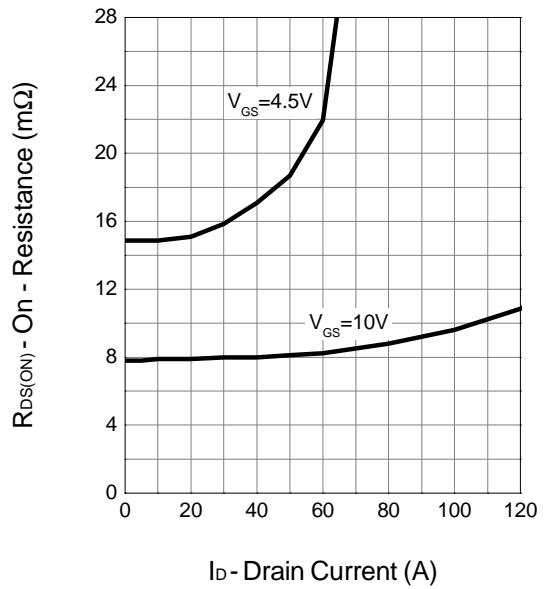


### Typical Operating Characteristics (Cont.)

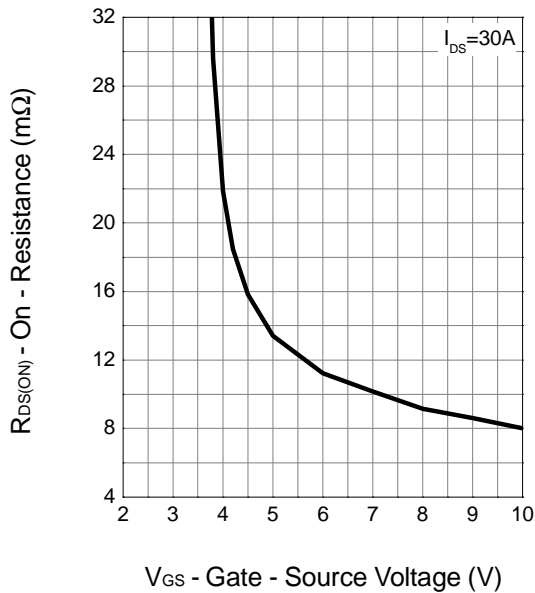
**Output Characteristics**



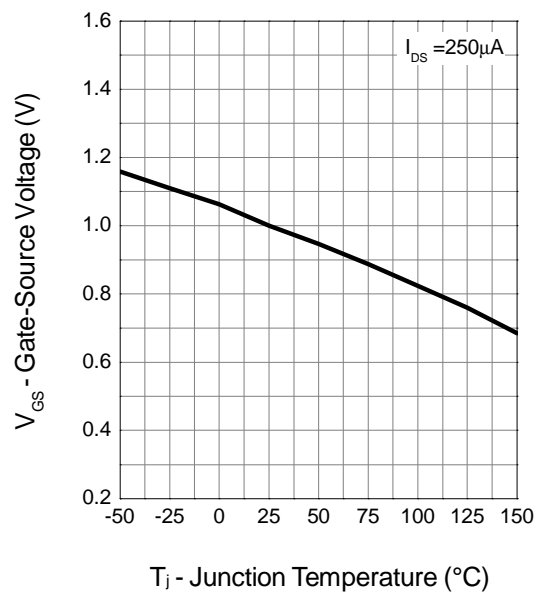
**Drain-Source On Resistance**



**Drain-Source On Resistance**

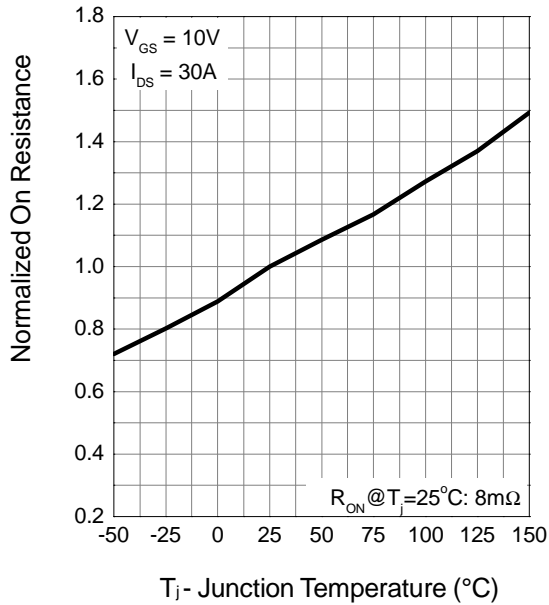


**Gate Threshold Voltage**

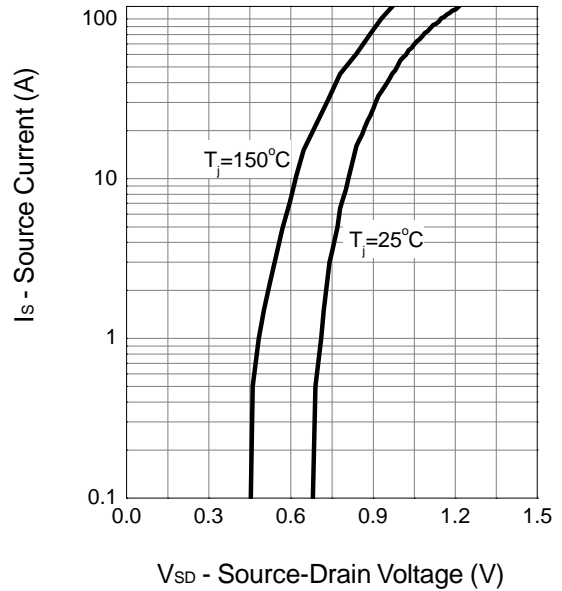


### Typical Operating Characteristics (Cont.)

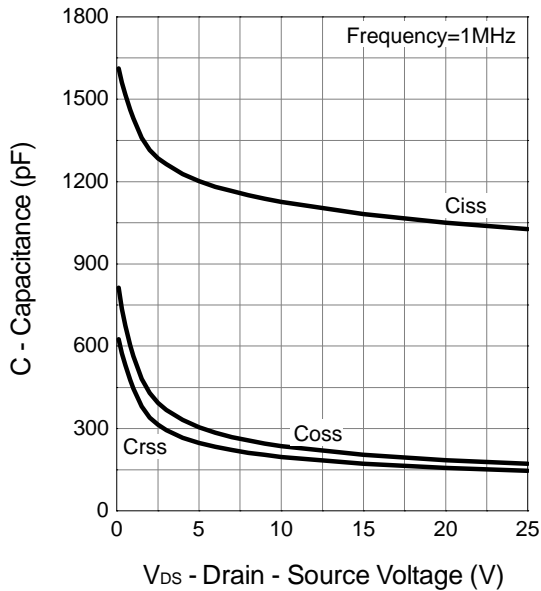
**Drain-Source On Resistance**



**Source-Drain Diode Forward**



**Capacitance**



**Gate Charge**

