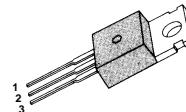


## FEATURES

- Advanced New Design
- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Very Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Unrivalled Gate Charge: 5.0nC (Typ.)
- Extended Safe Operating Area
- Lower  $R_{DS(ON)}$ : 9.3Ω (Typ.)

$BV_{DSS} = 600V$   
 $R_{DS(ON)} = 11.5\Omega$   
 $I_D = 1.2A$

TO-220



1. Gate 2. Drain 3. Source

## ABSOLUTE MAXIMUM RATINGS

Symbol	Characteristics	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	600	V
$I_D$	Continuous Drain Current ( $T_C = 25^\circ C$ )	1.2	A
	Continuous Drain Current ( $T_C = 100^\circ C$ )	0.76	
$I_{DM}$	Drain Current-Pulsed ①	4.8	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy ②	50	mJ
$I_{AR}$	Avalanche Current ①	1.2	A
$E_{AR}$	Repetitive Avalanche Energy ①	4.0	mJ
$dv/dt$	Peak Diode Recovery $dv/dt$ ③	4.5	V/ns
$P_D$	Total Power Dissipation ( $T_C = 25^\circ C$ )	40	W
	Linear Derating Factor	0.32	$W/W^\circ C$
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ C$
$T_L$	Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds	300	

## THERMAL RESISTANCE

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	-	3.13	$^\circ C/W$
$R_{\theta CS}$	Case-to-Sink	0.5	-	
$R_{\theta JA}$	Junction-to-Ambient	-	62.5	

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Characteristics	Min.	Typ.	Max.	Units	Test Conditions
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	600	—	—	V	$\text{V}_{\text{GS}}=0\text{V}$ , $\text{I}_D=250\mu\text{A}$
$\Delta \text{BV}/\Delta T_J$	Breakdown Voltage Temp. Coeff.	—	0.4	—	$\text{V}/^\circ\text{C}$	$\text{I}_D=250\mu\text{A}$ , <b>See Fig 7</b>
$\text{V}_{\text{GS}(\text{th})}$	Gate Threshold Voltage	3.0	—	5.0	V	$\text{V}_{\text{DS}}=5\text{V}$ , $\text{I}_D=250\mu\text{A}$
$\text{I}_{\text{GSS}}$	Gate-Source Leakage, Forward	—	—	100	nA	$\text{V}_{\text{GS}}=30\text{V}$
	Gate-Source Leakage, Reverse	—	—	-100		$\text{V}_{\text{GS}}= -30\text{V}$
$\text{I}_{\text{DSS}}$	Drain-to-Source Leakage Current	—	—	10	$\mu\text{A}$	$\text{V}_{\text{DS}}=600\text{V}$
		—	—	100		$\text{V}_{\text{DS}}=480\text{V}$ , $T_C=125^\circ\text{C}$
$\text{R}_{\text{DS}(\text{on})}$	Static Drain-Source On-State Resistance	—	9.3	11.5	$\Omega$	$\text{V}_{\text{GS}}=10\text{V}$ , $\text{I}_D=0.6\text{A}$ ④
$\text{g}_{\text{fs}}$	Forward Transconductance	—	0.9	—	S	$\text{V}_{\text{DS}}=50\text{V}$ , $\text{I}_D=0.6\text{A}$ ④
$\text{C}_{\text{iss}}$	Input Capacitance	—	120	150	pF	$\text{V}_{\text{GS}}=0\text{V}$ , $\text{V}_{\text{DS}}=25\text{V}$ $f=1\text{MHz}$ <b>See Fig 5</b>
$\text{C}_{\text{oss}}$	Output Capacitance	—	20	25		
$\text{C}_{\text{rss}}$	Reverse Transfer Capacitance	—	3.0	4.0		
$t_{\text{d}(\text{on})}$	Turn-On Delay Time	—	5	20	ns	$\text{V}_{\text{DD}}=300\text{V}$ , $\text{I}_D=1.2\text{A}$ $\text{R}_G=50\Omega$ <b>See Fig 13</b> ④ ⑤
$t_r$	Rise Time	—	25	60		
$t_{\text{d}(\text{off})}$	Turn-Off Delay Time	—	7	25		
$t_f$	Fall Time	—	25	60		
$\text{Q}_g$	Total Gate Charge	—	5.0	6.0	nC	$\text{V}_{\text{DS}}=480\text{V}$ , $\text{V}_{\text{GS}}=10\text{V}$ $\text{I}_D=1.2\text{A}$ <b>See Fig 6 &amp; Fig 12</b> ④ ⑤
$\text{Q}_{\text{gs}}$	Gate-Source Charge	—	1.0	—		
$\text{Q}_{\text{gd}}$	Gate-Drain (Miller) Charge	—	2.6	—		

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Symbol	Characteristics	Min.	Typ.	Max.	Units	Test Conditions
$\text{I}_S$	Continuous Source Current	—	—	1.2	A	Integral reverse pn-diode in the MOSFET
$\text{I}_{\text{SM}}$	Pulsed-Source Current ①	—	—	4.8		
$\text{V}_{\text{SD}}$	Diode Forward Voltage ④	—	—	1.4	V	$T_J=25^\circ\text{C}$ , $\text{I}_S=1.2\text{A}$ , $\text{V}_{\text{GS}}=0\text{V}$
$t_{\text{rr}}$	Reverse Recovery Time	—	160	—	ns	$T_J=25^\circ\text{C}$ , $\text{I}_F=1.2\text{A}$ , $\text{V}_{\text{DD}}=480\text{V}$ $d\text{I}/dt=100\text{A}/\mu\text{s}$ ④
$\text{Q}_{\text{rr}}$	Reverse Recovery Charge	—	0.3	—		

**Notes:**

- ① Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- ②  $L=64\text{mH}$ ,  $\text{I}_{AS}=1.2\text{A}$ ,  $\text{V}_{\text{DD}}=50\text{V}$ ,  $\text{R}_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
- ③  $\text{I}_{SD} \leq 1.2\text{A}$ ,  $d\text{I}/dt \leq 200\text{A}/\mu\text{s}$ ,  $\text{V}_{\text{DD}} \leq \text{BV}_{\text{DSS}}$ , Starting  $T_J=25^\circ\text{C}$
- ④ Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
- ⑤ Essentially Independent of Operating Temperature