

N-Channel Power MOSFET (100V/27A)

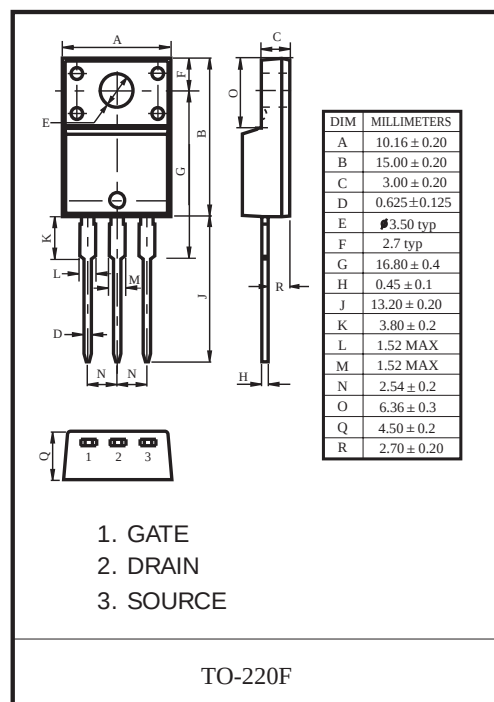
GENERAL DESCRIPTION

It uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

This device is suitable for high current load applications.

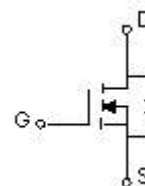
FEATURE

- High current rating
- Ultra lower $R_{DS(on)}$
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation



APPLICATION

- Power switching application
- Load switching in high circuit application
- DC/DC converters



Maximum ratings ($T_a=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	Symbol	Value	Unit
Drain- Source Voltage	V_{DS}	100	V
Gate- Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	27	A
Pulsed Drain Current	I_{DM}	50	
Single Pulsed Avalanche Energy (note1)	E_{AS}	250	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	- 55 ~ +150	
Maximum lead temperature for soldering purposes , 1/8" from case for 5 seconds	T_L	260	



IRF540F

Electrical characteristics (T_a=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain - source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, b =250μA	100			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			25	μA
Gate - body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =± 20V			± 100	nA
On characteristics (note2)						
Gate- threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2		4	V
Static drain - source on -resistance	R _{DS(on)}	V _{GS} =10V, b =7.5A			80	mΩ
Forward transconductance	g _{fs}	V _{DS} =50V, I _D =7.5A	3.8			S
Dynamic characteristics (note 3)						
Input capacitance	C _{iSS}	V _{DS} =25V,V _{GS} =0V,f =1MHz		800		pF
Output capacitance	C _{oSS}			240		
Reverse transfer capacitance	C _{rSS}			76		
Switching characteristics (note 3)						
Turn - on delay time	t _{d(on)}	V _{DD} =100V, V _{GS} =10V, R _G =12Ω, I _D =5.9A		9.4		ns
Turn - on rise time	t _r			28		
Turn - off delay time	t _{d(off)}			39		
Turn - off fall time	t _f			20		
Drain-Source Diode Characteristics						
Drain -source diode forward voltage(note2)	V _{SD}	V _{GS} = 0V, I _S =14A			2	V
Continuous drain - source diode forward current(note4)	I _S				9.3	A
Pulsed drain - source diode forward current	I _{SM}				37	A

Notes :

1. L=4.6mH, I_L=9.9A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C.
2. Pulse Test : Pulse width ≤300μs, duty cycle ≤2%.
3. Guaranteed by design, not subject to production
4. Surface mounted on FR4 board, t ≤ 10s

TYPICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, unless otherwise noted)

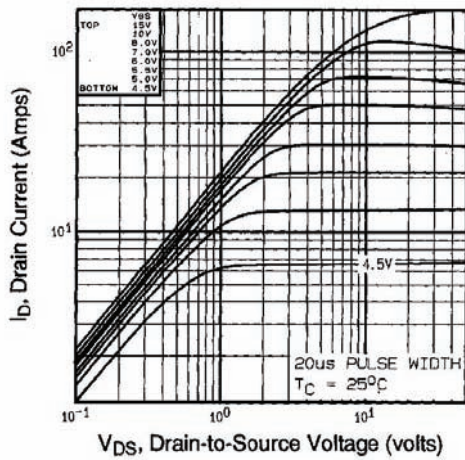


Fig. 1 - Typical Output Characteristics, $T_C = 25^\circ\text{C}$

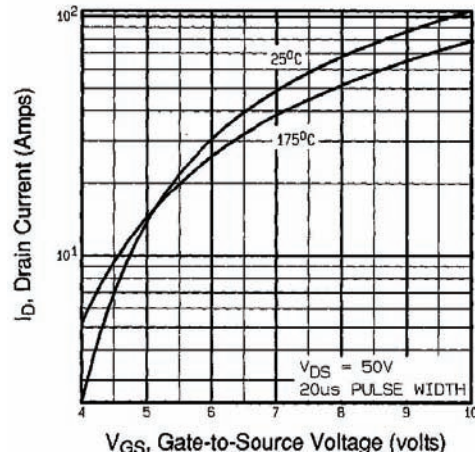


Fig. 3 - Typical Transfer Characteristics

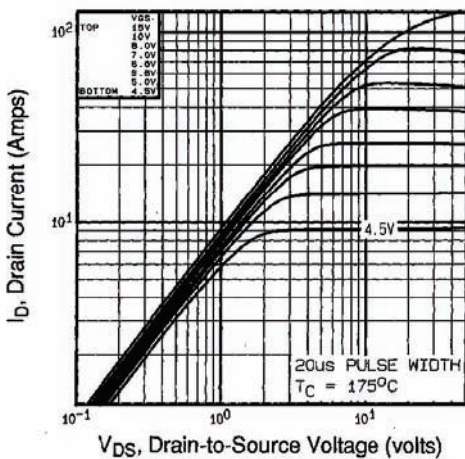


Fig. 2 - Typical Output Characteristics, $T_C = 175^\circ\text{C}$

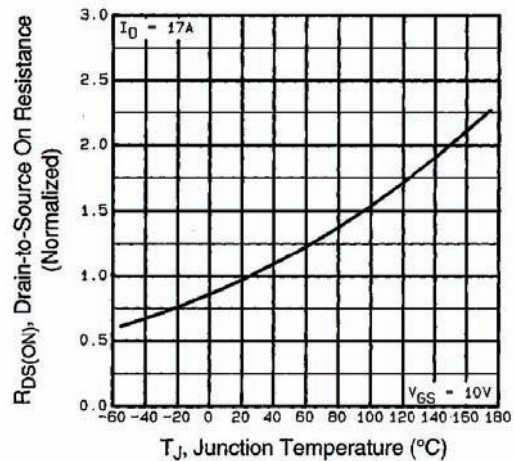


Fig. 4 - Normalized On-Resistance vs. Temperature

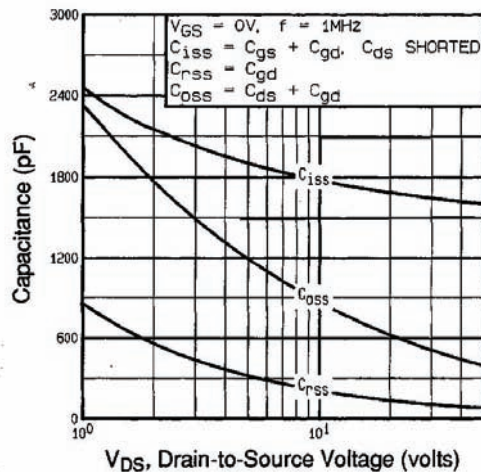


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

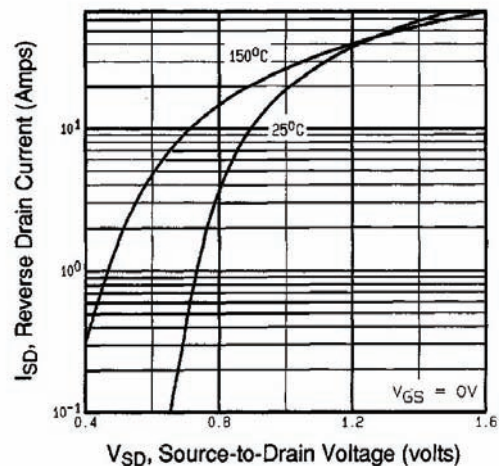


Fig. 7 - Typical Source-Drain Diode Forward Voltage

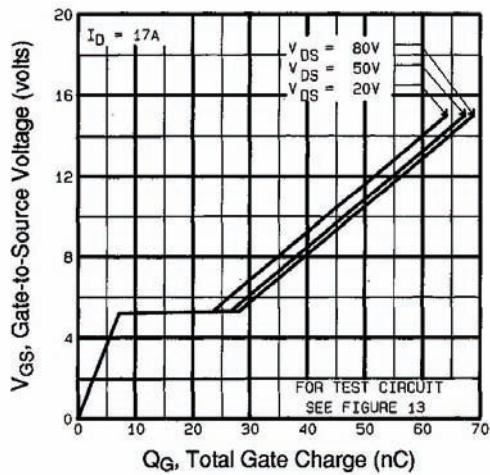


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

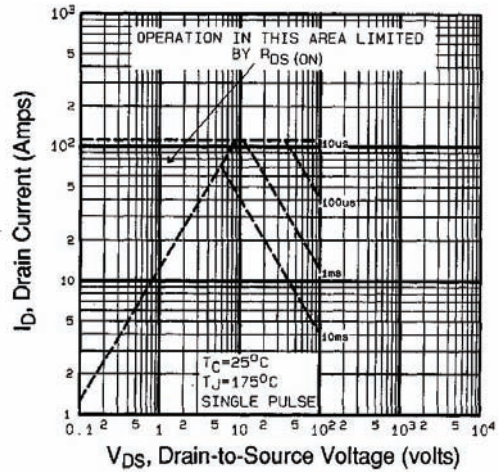


Fig. 8 - Maximum Safe Operating Area

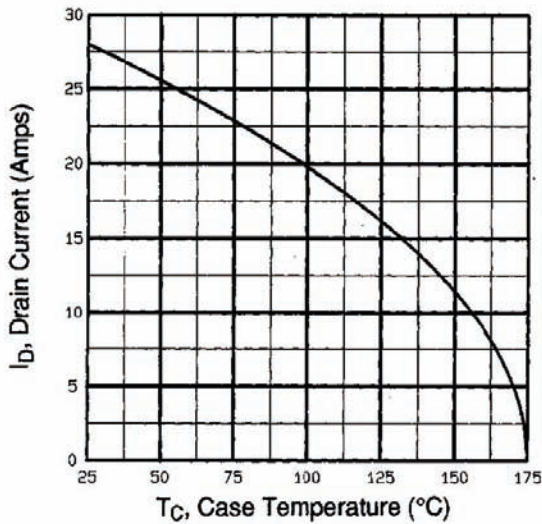


Fig. 9 - Maximum Drain Current vs. Case Temperature

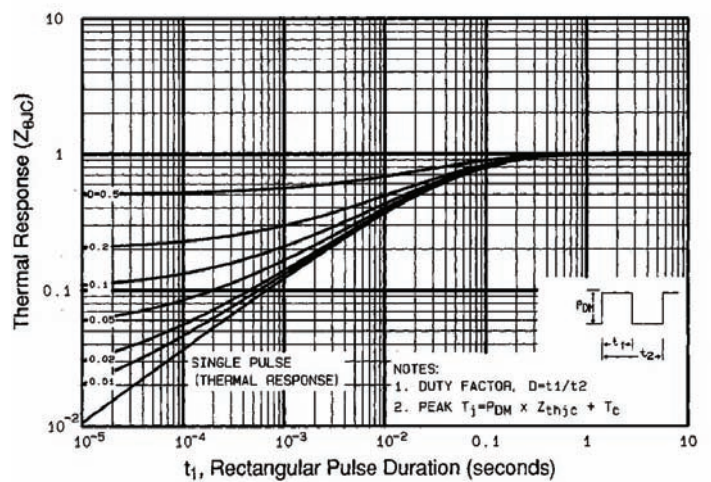


Fig. 10 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

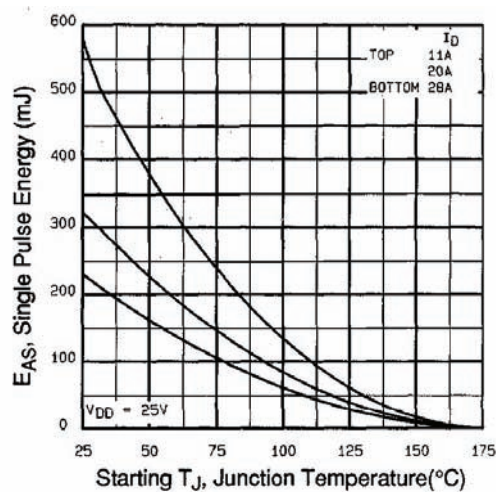


Fig. 11 - Maximum Avalanche Energy vs. Drain Current