

## General Description

The WSR70P10D is the highest performance trench P-Ch MOSFET with extreme high cell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the small power switching and load switch applications.

The WSR70P10D meet the RoHS and Green Product requirement with full function reliability approved.

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

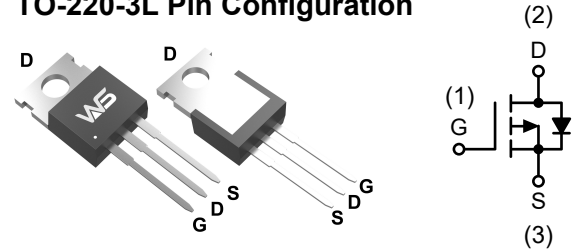
## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
-100V	19m $\Omega$	-70A

## Applications

- Inverters

## TO-220-3L Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_C=25^\circ\text{C}$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	-100	V
$V_{GSS}$	Gate-Source Voltage	$\pm 25$	
$T_J$	Maximum Junction Temperature	175	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ -70	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}^{(1)}$	300 $\mu\text{s}$ Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ -240	A
$I_D^{(2)}$	Continuous Drain Current( $V_{GS}=-10\text{V}$ )	$T_C=25^\circ\text{C}$ -70	A
		$T_C=100^\circ\text{C}$ -45	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 190	W
		$T_C=100^\circ\text{C}$ 95	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.8	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C/W}$
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}^{(3)}$	Avalanche Energy, Single Pulsed	400	mJ

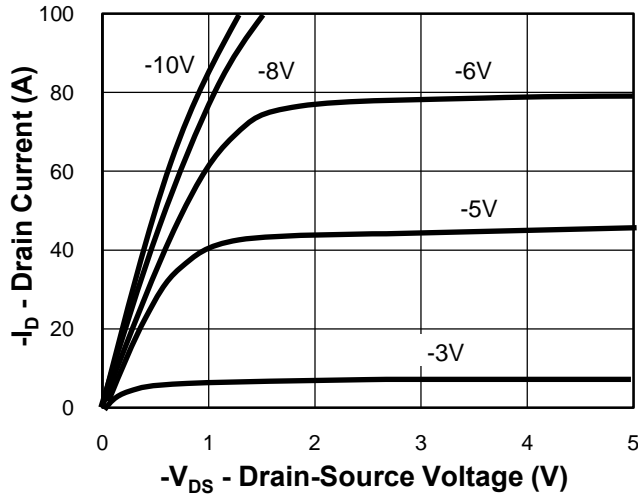
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit	
<b>Static Characteristics</b>							
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-100			V	
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-100V, V_{GS}=0V$			-1	$\mu A$	
		$T_J=125^\circ\text{C}$			-30		
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-1.2	-1.6	-2.5	V	
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$			$\pm 100$	nA	
$R_{DS(ON)}^{④}$	Drain-Source On-state Resistance	$V_{GS}=-10V, I_{DS}=-20A$		19	25	m $\Omega$	
<b>Diode Characteristics</b>							
$V_{SD}^{④}$	Diode Forward Voltage	$I_{SD}=-30A, V_{GS}=0V$			-1.2	V	
$t_{rr}$	Reverse Recovery Time	$I_{SD}=-5A, dI_{SD}/dt=100A/\mu s$		208		ns	
$Q_{rr}$	Reverse Recovery Charge				560		nC
<b>Dynamic Characteristics</b> <sup>⑤</sup>							
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		2		$\Omega$	
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-50V,$ Frequency=1.0MHz		4230		pF	
$C_{oss}$	Output Capacitance				388		
$C_{rss}$	Reverse Transfer Capacitance				26		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-50V, I_{DS}=-5A,$ $V_{GEN}=-10V, R_G=6\Omega$		26		ns	
$t_r$	Turn-on Rise Time				78		
$t_{d(OFF)}$	Turn-off Delay Time				200		
$t_f$	Turn-off Fall Time				210		
<b>Gate Charge Characteristics</b> <sup>⑤</sup>							
$Q_g$	Total Gate Charge	$V_{DS}=-50V, V_{GS}=-10V,$ $I_{DS}=-5A$		80		nC	
$Q_{gs}$	Gate-Source Charge				15.6		
$Q_{gd}$	Gate-Drain Charge				17.2		

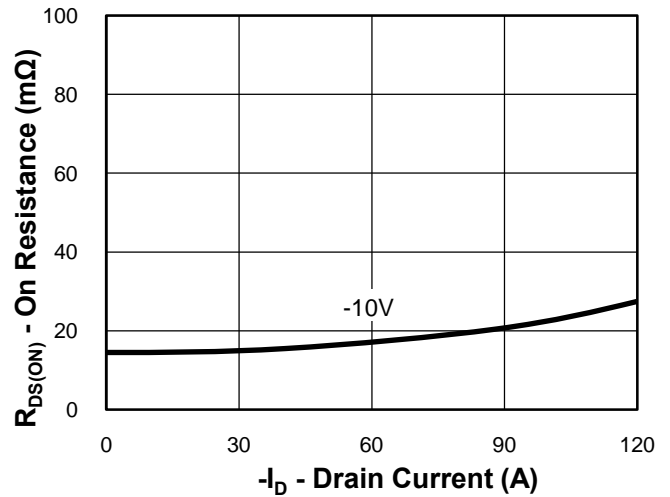
- Notes:
- ① Pulse width limited by safe operating area.
  - ② Calculated continuous current based on maximum allowable junction temperature.
  - ③ Limited by  $T_{Jmax}$ ,  $I_{AS}=-40A$ ,  $V_{DD}=-60V$ ,  $R_G=50\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
  - ④ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  - ⑤ Guaranteed by design, not subject to production testing.

**Typical Characteristics**

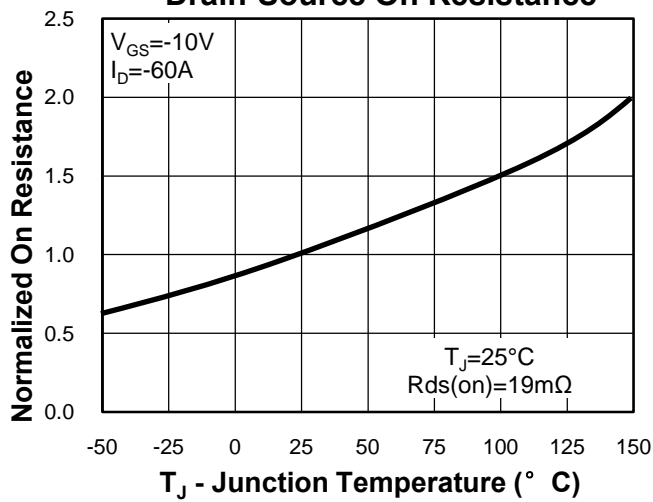
**Output Characteristics**



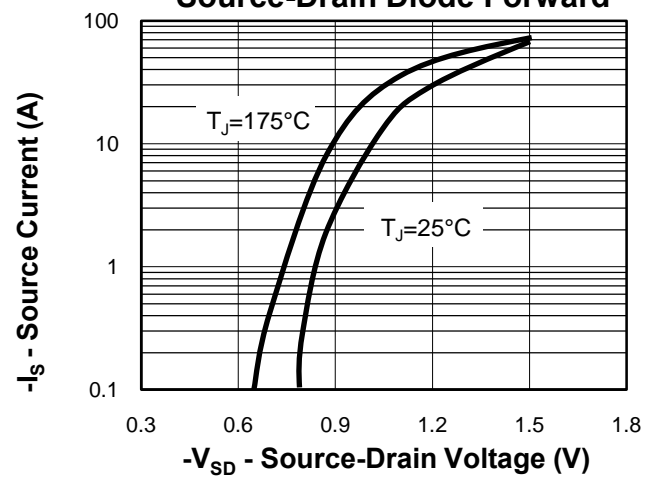
**Drain-Source On Resistance**



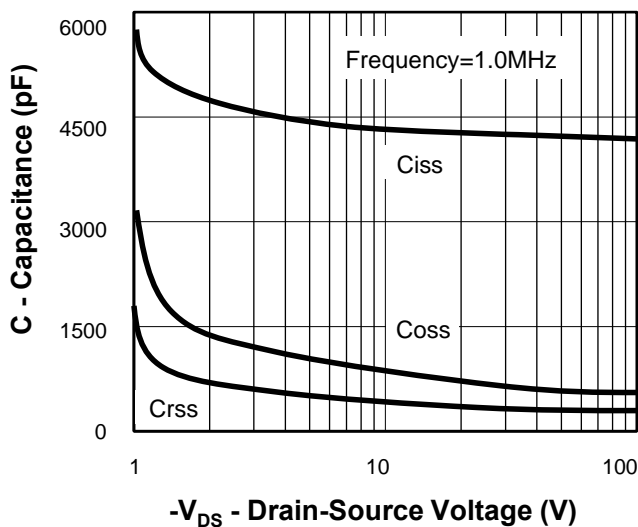
**Drain-Source On Resistance**



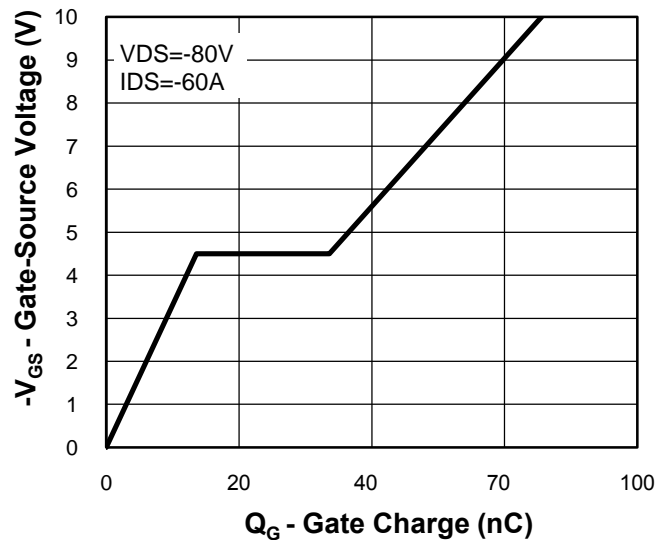
**Source-Drain Diode Forward**



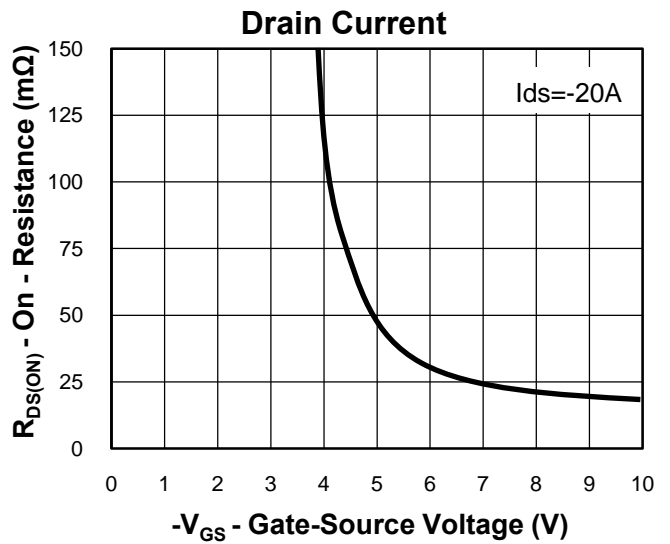
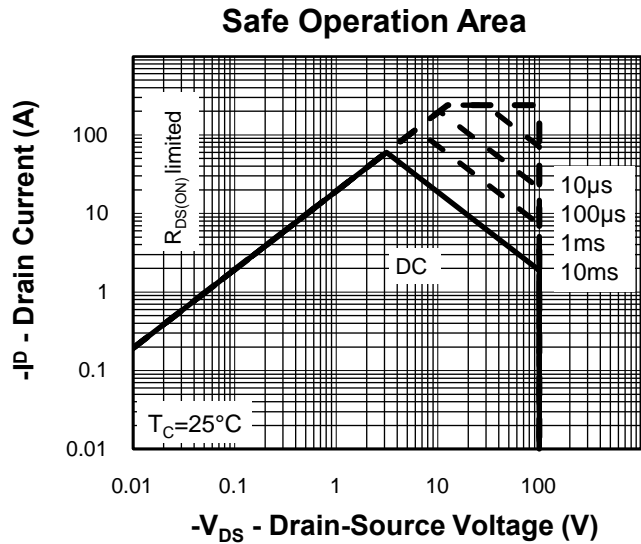
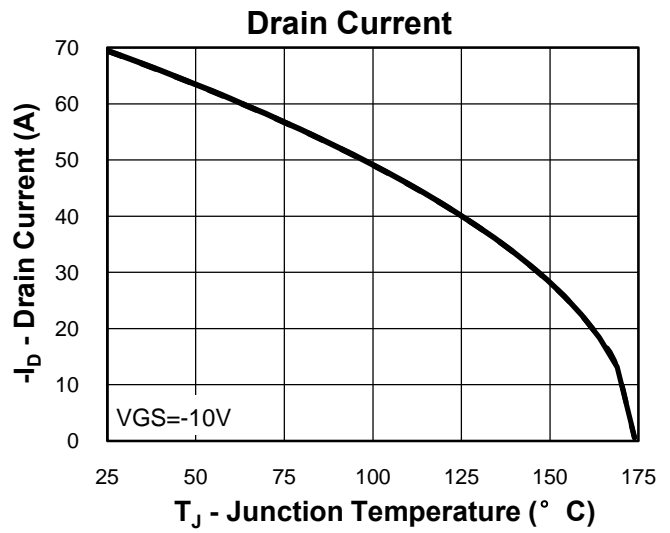
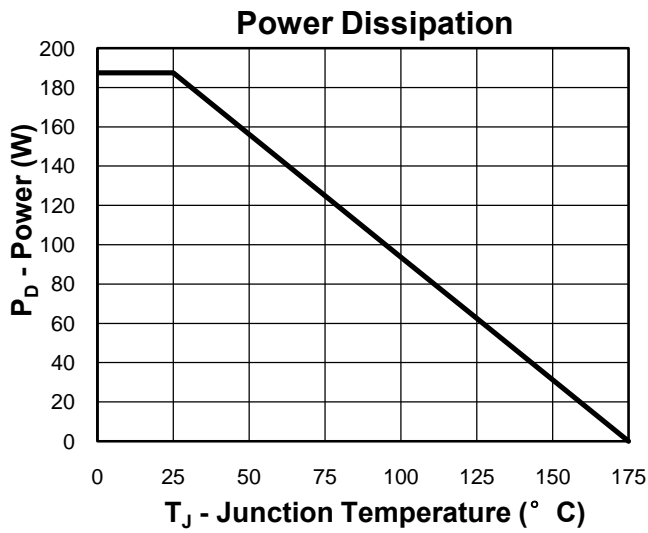
**Capacitance**



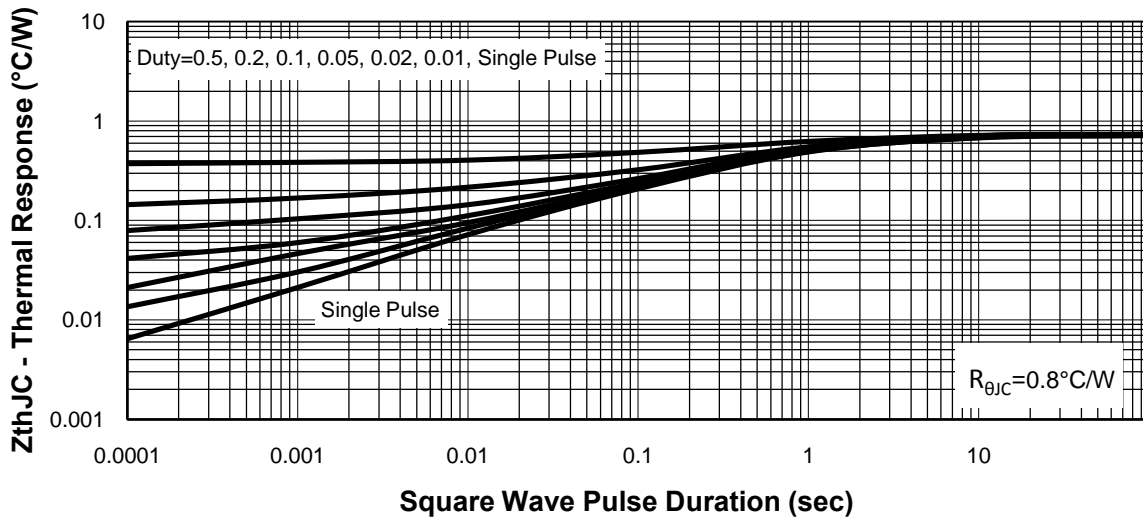
**Gate Charge**



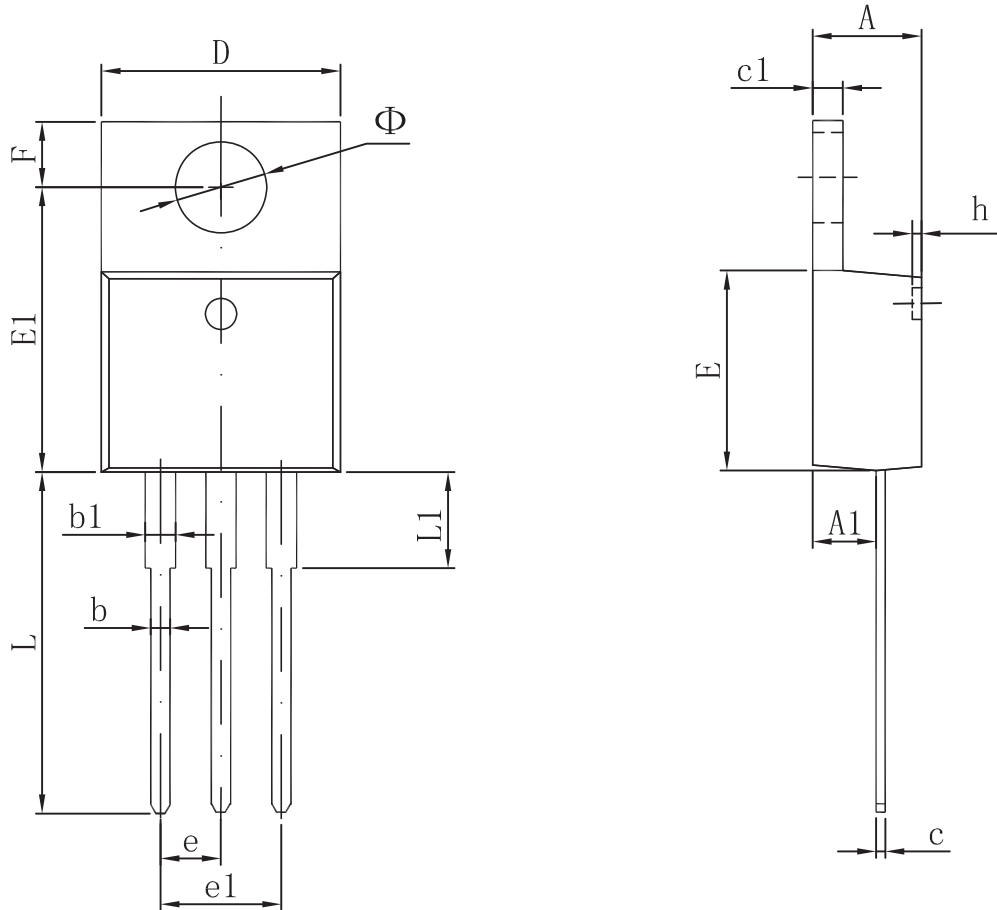
**Typical Characteristics**



**Thermal Transient Impedance**



**Packaging information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
$\Phi$	3.735	3.935	0.147	0.155



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