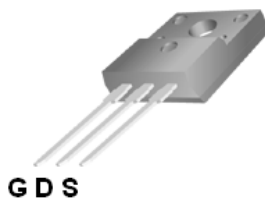


# P3506DTF

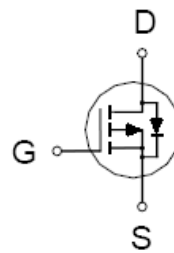
## P-Channel Enhancement Mode MOSFET

### PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$
-60V	35m $\Omega$ @ $V_{GS} = -10V$	-20A



TO-220F



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		$V_{DS}$	-60	V
Gate-Source Voltage		$V_{GS}$	$\pm 25$	
Continuous Drain Current	$T_C = 25\text{ }^\circ\text{C}$	$I_D$	-20	A
	$T_C = 100\text{ }^\circ\text{C}$		-10	
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	-100	
Avalanche Current		$I_{AS}$	-38	
Avalanche Energy	$L = 0.1\text{mH}$	$E_{AS}$	72	mJ
Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	$P_D$	26	W
	$T_C = 100\text{ }^\circ\text{C}$		10.4	
Junction & Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		4.8	$^\circ\text{C} / \text{W}$
Junction-to-Ambient	$R_{\theta JA}$		62.5	

<sup>1</sup>Pulse width limited by maximum junction temperature.

# P3506DTF

## P-Channel Enhancement Mode MOSFET

### ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25 °C, Unless Otherwise Noted)

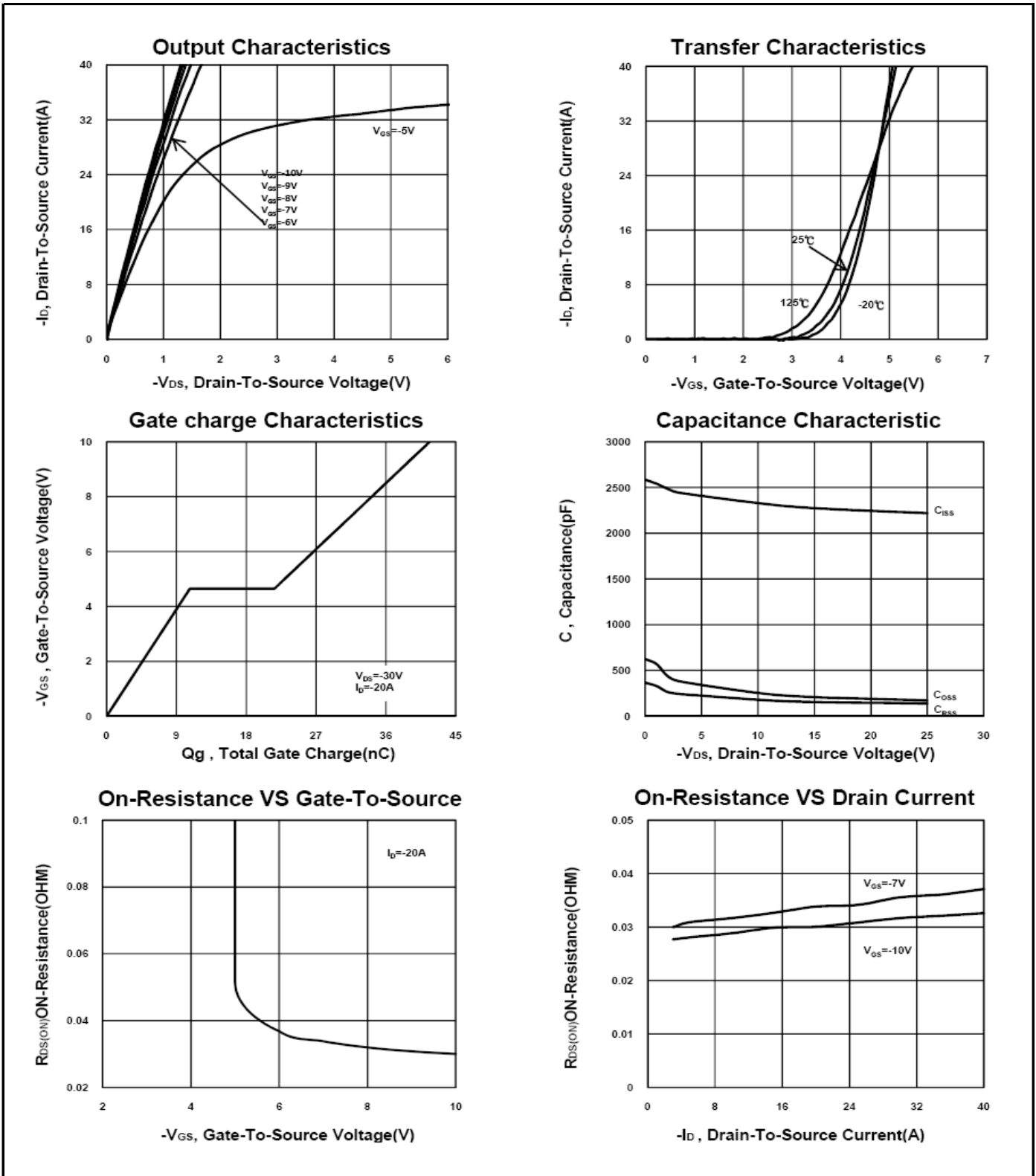
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	-60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	-2.0	-2.7	-4.0	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±25V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -48V, V <sub>GS</sub> = 0V			1	μA
		V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55 °C			10	
On-State Drain Current <sup>1</sup>	I <sub>D(ON)</sub>	V <sub>DS</sub> = -5V, V <sub>GS</sub> = -10V		-100		A
Drain-Source On-State Resistance <sup>1</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> = -7V, I <sub>D</sub> = -20A		34	55	mΩ
		V <sub>GS</sub> = -10V, I <sub>D</sub> = -20A		29	35	
Forward Transconductance <sup>1</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -20A		32		S
<b>DYNAMIC</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1MHz		2320		pF
Output Capacitance	C <sub>oss</sub>			175		
Reverse Transfer Capacitance	C <sub>rss</sub>			142		
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz		4.8		Ω
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 0.5V <sub>(BR)DSS</sub> , V <sub>GS</sub> = -10V, I <sub>D</sub> = -20A		43		nC
Gate-Source Charge <sup>2</sup>	Q <sub>gs</sub>			11		
Gate-Drain Charge <sup>2</sup>	Q <sub>gd</sub>			13.5		
Turn-On Delay Time <sup>2</sup>	t <sub>d(on)</sub>	V <sub>DS</sub> = -30V, I <sub>D</sub> ≅ -10A, V <sub>GS</sub> = -10V, R <sub>GEN</sub> = 25Ω		45		nS
Rise Time <sup>2</sup>	t <sub>r</sub>			380		
Turn-Off Delay Time <sup>2</sup>	t <sub>d(off)</sub>			70		
Fall Time <sup>2</sup>	t <sub>f</sub>			190		
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>J</sub> = 25 °C)</b>						
Continuous Current	I <sub>S</sub>				-20	A
Forward Voltage <sup>1</sup>	V <sub>SD</sub>	I <sub>F</sub> = -20A, V <sub>GS</sub> = 0V			-1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -20A, di <sub>F</sub> /dt = 100A / μS		40		nS
Reverse Recovery Charge	Q <sub>rr</sub>			57		nC

<sup>1</sup>Pulse test : Pulse Width ≤ 380 μsec, Duty Cycle ≤ 2%.

<sup>2</sup>Independent of operating temperature.

# P3506DTF

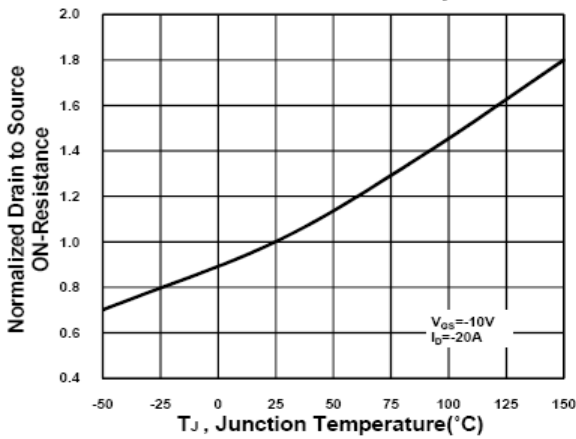
## P-Channel Enhancement Mode MOSFET



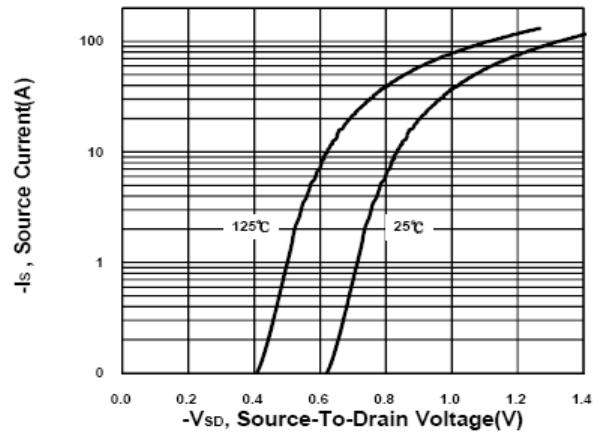
# P3506DTF

## P-Channel Enhancement Mode MOSFET

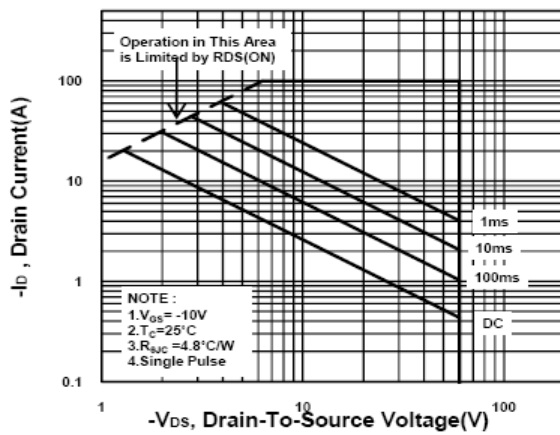
**On-Resistance VS Temperature**



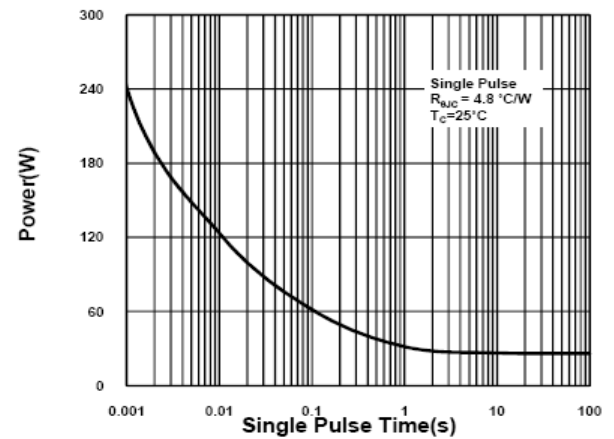
**Source-Drain Diode Forward Voltage**



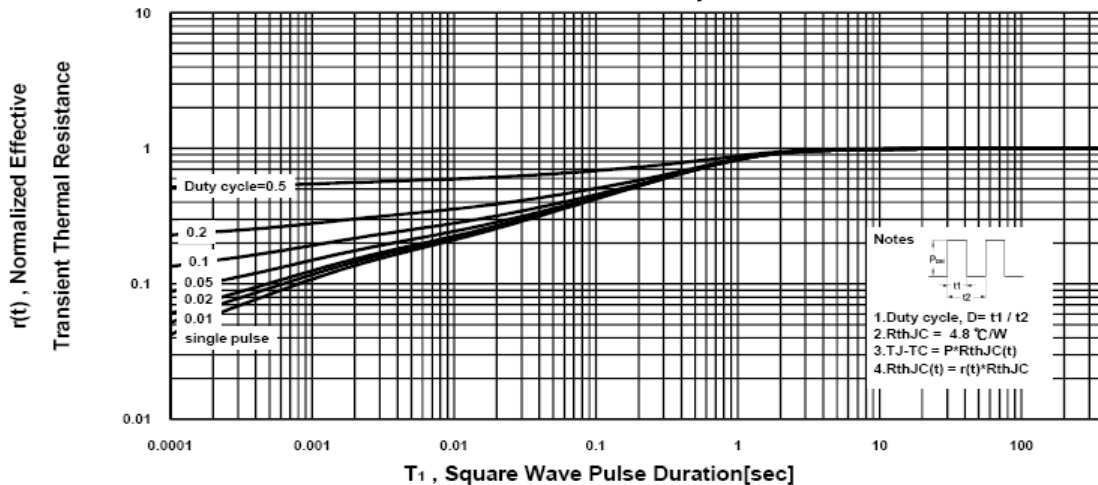
**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**



**Transient Thermal Response Curve**



# P3506DTF

## P-Channel Enhancement Mode MOSFET

### Package Dimension

### TO-220F (3-Lead) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.2		4.93	e	2.05	2.55	3.05
A1	2.34		3.1	F	27.45		30.6
B	17.77		20.3	G	7.72		9.3
b	0.6		1.05	H	6.1		7.1
b1	0.9	1.23	1.62	L	12.5		14.5
b2	0.6		1.9	L1	1.97		3.8
c	0.4		1.0	P	2.98		3.4
D	14.7		16.4	Q	2.1		2.96
D1	6.4		7.5	q	3.0		3.8
E	9.7		10.4				

