PDFN 5x6 Plastic-Encapsulate MOSFETS

TF3508

P-Channel Enhancement Mode Power MOSFET

Description

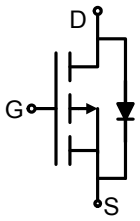
The TF3508 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V.

General Features

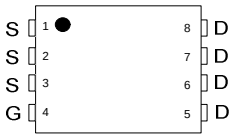
- V_{DS} = -30V,I_D = -60A
  $R_{DS(ON)}$ < 8.0mΩ@ V_{GS}=-10V
  $R_{DS(ON)}$ < 15 mΩ@ V_{GS}=-4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- Battery Switch
- Load switch
- Power management



Schematic diagram



Pin assignment

PDFN5x6-8 top view

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (T_J =150℃)	T_A =25℃	I_D	-60	A
	T_A =70℃		-35	
Drain Current-Pulsed (Note 1)		I_{DM}	-200	A
Maximum Power Dissipation		P_D	40	W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	30	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1.0	-1.6	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	6.6	8.0	mΩ
		V_{GS}=-4.5V, I_D=-15A	-	10	15	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-15V,I_D=-20A	10	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	2900	-	PF
Output Capacitance	C_{oss}		-	410	-	PF
Reverse Transfer Capacitance	C_{rss}		-	280	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, ID=-20A, V_{GS}=-10V,R_{GEN}=3Ω	-	15	-	nS
Turn-on Rise Time	t_r		-	11	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	44	-	nS
Turn-Off Fall Time	t_f		-	21	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-20A V_{GS}=-10V	-	48	-	nC
Gate-Source Charge	Q_{gs}		-	12	-	nC
Gate-Drain Charge	Q_{gd}		-	24	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-20A	-	0.88	1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

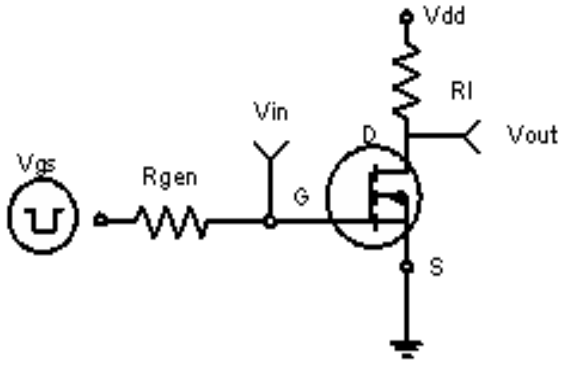


Figure 1 Switching Test Circuit

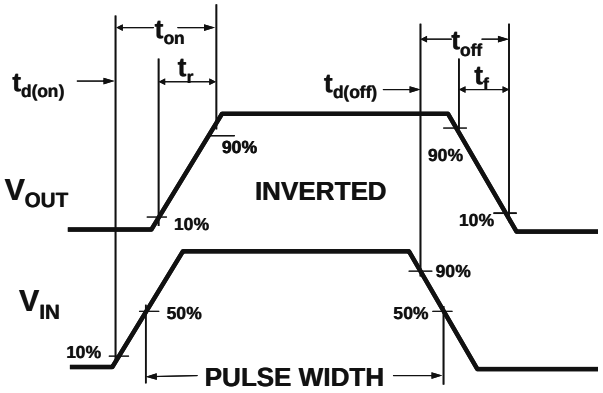


Figure 2 Switching Waveforms

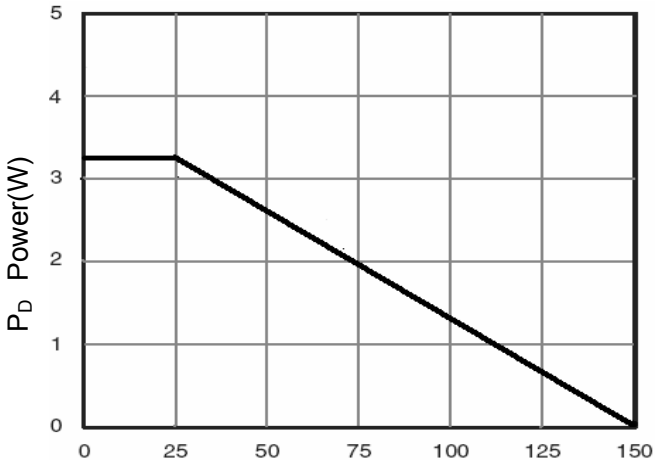


Figure 3 Power Dissipation

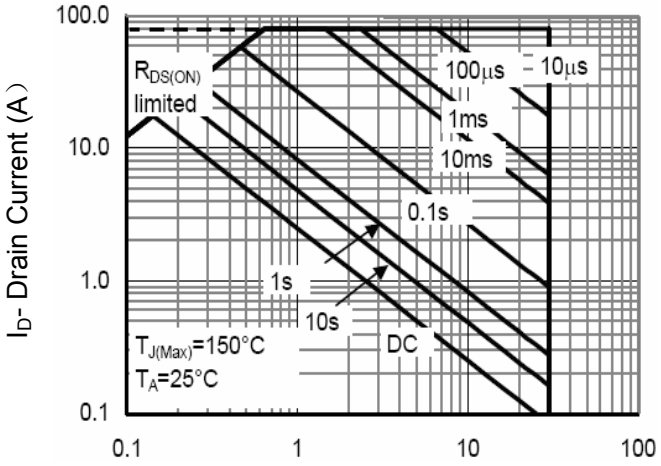


Figure 4 Safe Operation Area

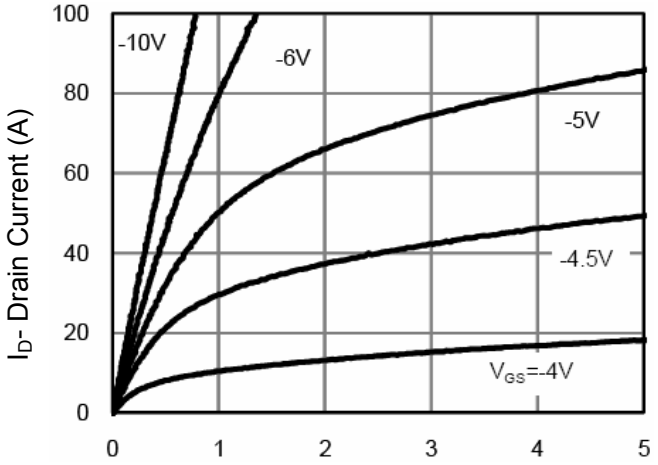


Figure 5 Output Characteristics

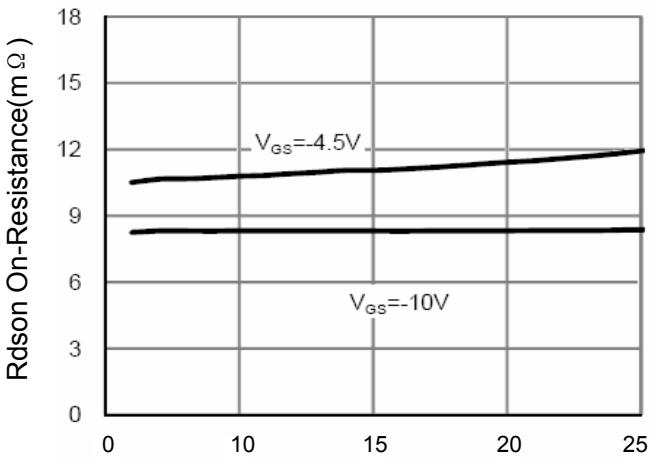


Figure 6 Drain-Source On-Resistance

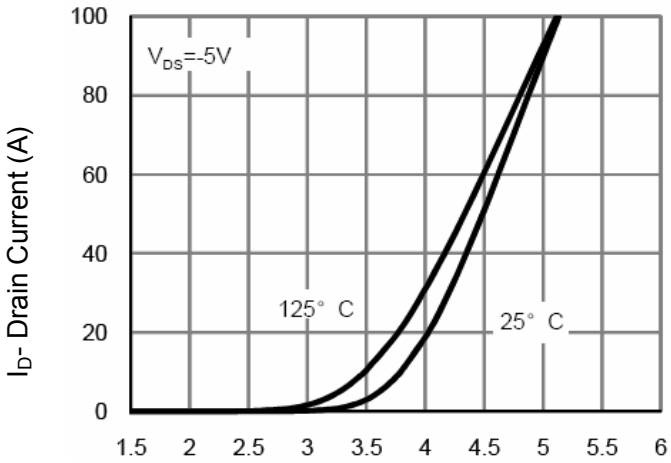


Figure 7 Transfer Characteristics

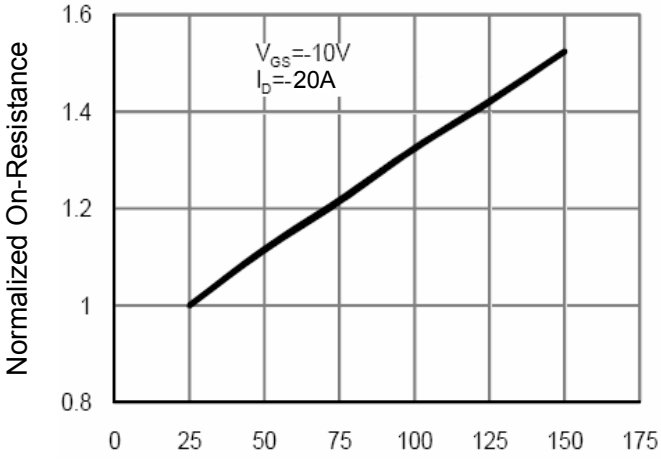


Figure 8 Drain-Source On-Resistance

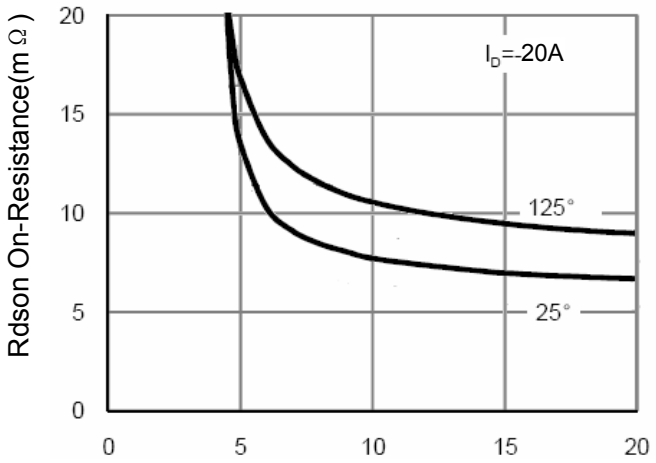


Figure 9 Rdson vs Vgs

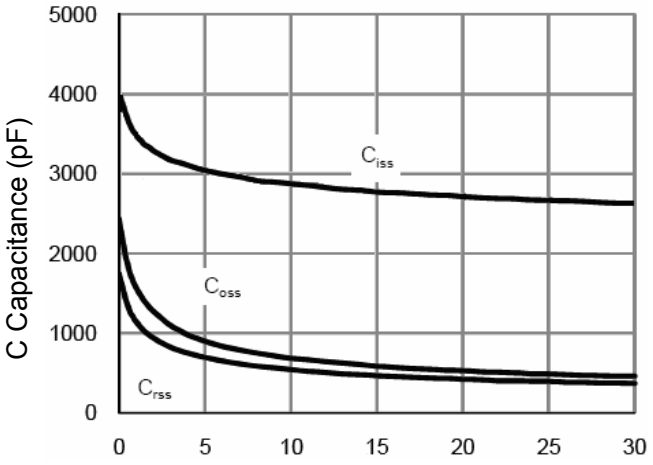


Figure 10 Capacitance vs Vds

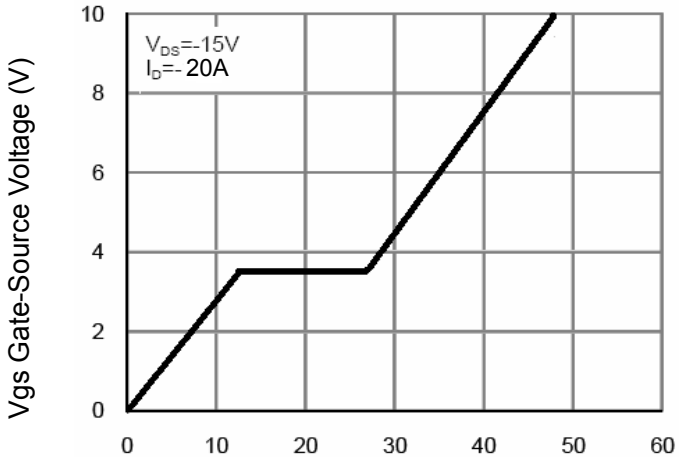


Figure 11 Gate Charge

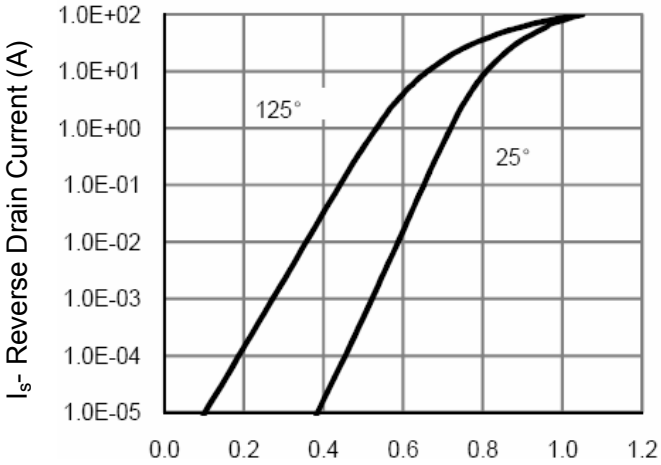


Figure 12 Source- Drain Diode Forward

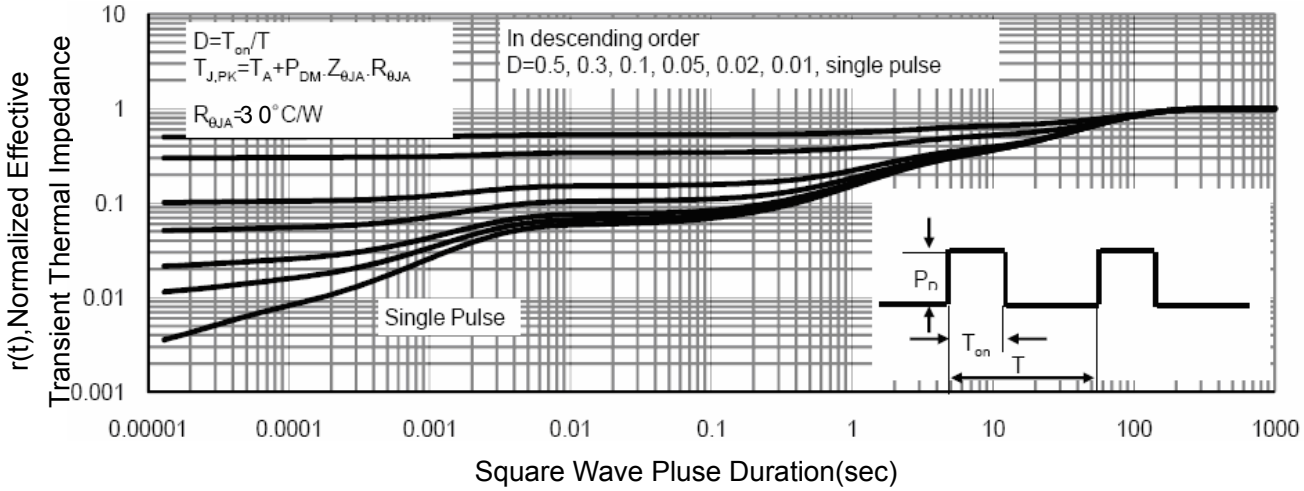
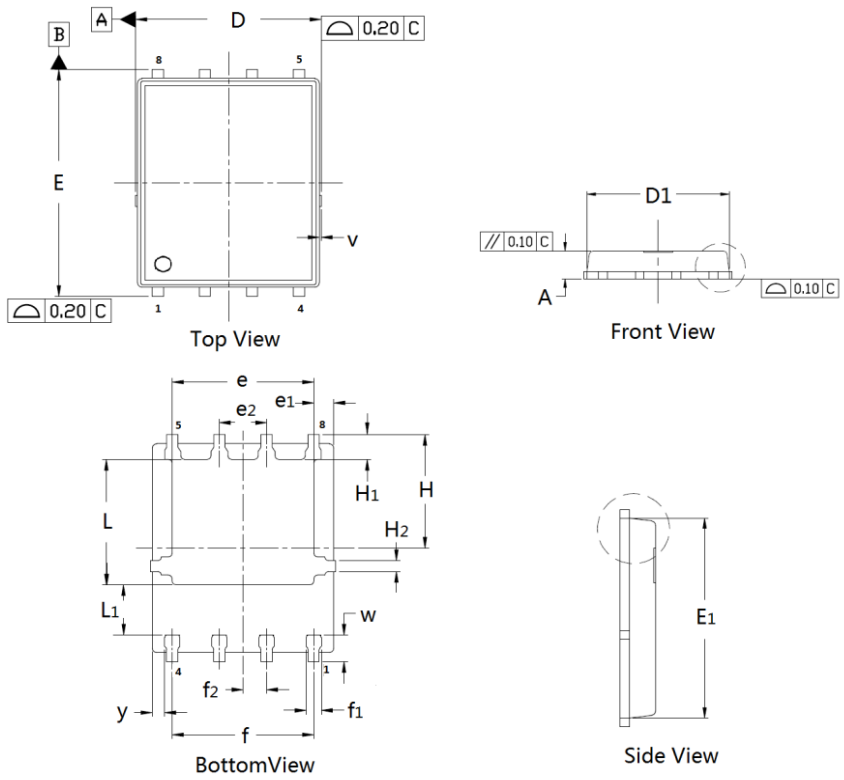


Figure 13 Normalized Maximum Transient Thermal Impedance

PDFN5×6 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.02	1.10	**D**	4.90	4.98	5.10
D_1	4.80	4.89	5.00	**E**	6.00	6.11	6.20
E_1	5.65	5.74	5.85	**e**	3.72	3.80	3.92
e_1	--	0.54	--	**e_2**	--	1.27	--
f	--	3.82	--	**f_1**	0.31	0.37	0.51
f_2	--	0.64	--	**H**	--	3.15	--
H_1	0.59	0.63	0.79	**H_2**	0.26	0.28	0.32
L	3.38	3.45	3.58	**L_1**	--	1.39	--
v	--	0.13	--	**w**	0.64	0.68	0.84
y	--	0.34	--		--		--