

N-Channel Enhancement Mode MOSFET

TDM3548

DESCRIPTION

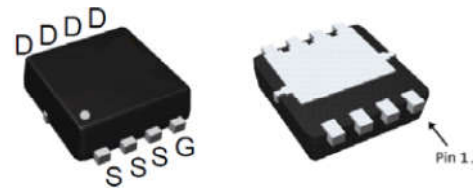
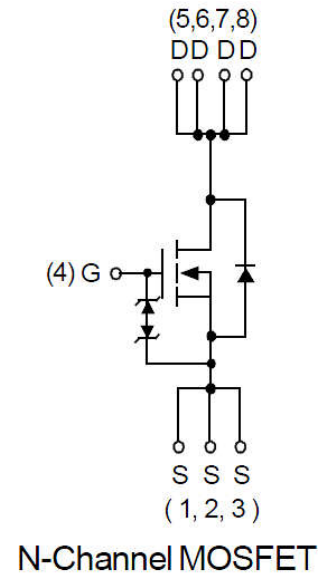
The TDM3548 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- $R_{DS(ON)} < 13m\Omega$ @ $V_{GS}=4.5V$
 $R_{DS(ON)} < 6.8m\Omega$ @ $V_{GS}=10V$
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management



PPAK-3*3-8

ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current @ Continuous	I_D ($T_C=25^\circ\text{C}$)	57	A
	I_D ($T_C=100^\circ\text{C}$)	36	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM} ($T_C=25^\circ\text{C}$)	100	A
Maximum Power Dissipation	$P_D(T_C=25^\circ\text{C})$	31.3	W
	$P_D(T_C=100^\circ\text{C})$	12.5	
Drain Current @ Continuous	I_D ($T_A=25^\circ\text{C}$)	13	A
	I_D ($T_A=70^\circ\text{C}$)	10	A
Maximum Power Dissipation	$P_D(T_A=25^\circ\text{C})$	2.08	W
	$P_D(T_A=70^\circ\text{C})$	1.3	
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$ ($t_s \leq 10s$)	40	$^\circ\text{C}/\text{W}$
	$R_{\theta JA}$ (Steady State)	60	
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$ (Steady State)	4	$^\circ\text{C}/\text{W}$
Maximum Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To 150	$^\circ\text{C}$

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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

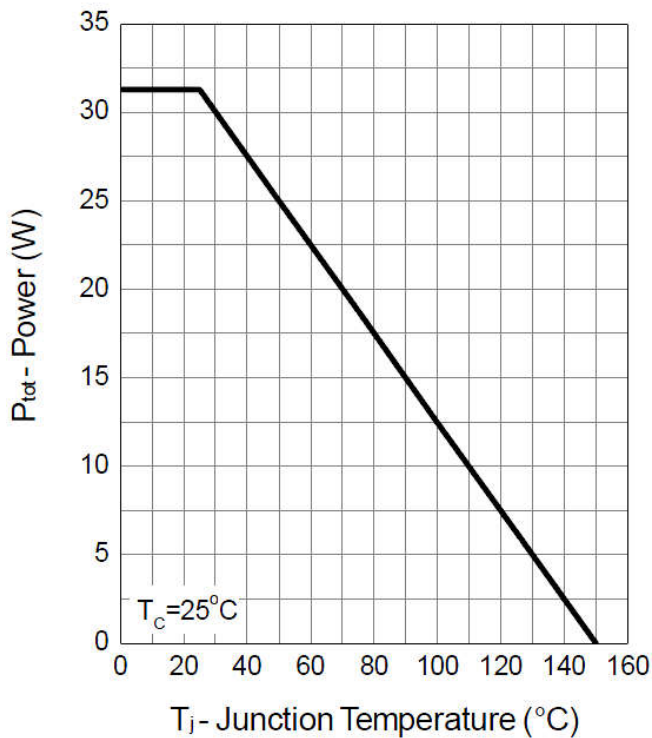
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V,V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	± 10	μ A
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.4	1.7	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =10A	-	8.6	13	mΩ
		V _{GS} =10V, I _D =15A	-	5.6	6.8	mΩ
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C _{iss}	V _{DS} =15V,V _{GS} =0V, F=1.0MHz	-	690	-	PF
Output Capacitance	C _{oss}		-	380	-	PF
Reverse Transfer Capacitance	C _{rss}		-	113	-	PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DS} =15V, R _L =15 Ω, V _{GEN} =10V, R _G =1 Ω I _D =1A	-	10.8	-	nS
Turn-on Rise Time	t _r		-	8.6	-	nS
Turn-Off Delay Time	t _{d(off)}		-	18	-	nS
Turn-Off Fall Time	t _f		-	11.6	-	nS
Total Gate Charge	Q _g	V _{DS} =15V,I _D =15A,V _{GS} =4.5V	-	7	-	nC
Gate-Source Charge	Q _{gs}		-	1.4	-	nC
Gate-Drain Charge	Q _{gd}		-	4.1	-	nC
Body Diode Reverse Recovery Time	T _{rr}	I _F =5A, dI/dt=100A/μs	-	23	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}		-	10	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =20A	-	0.81	1.1	V

NOTES:

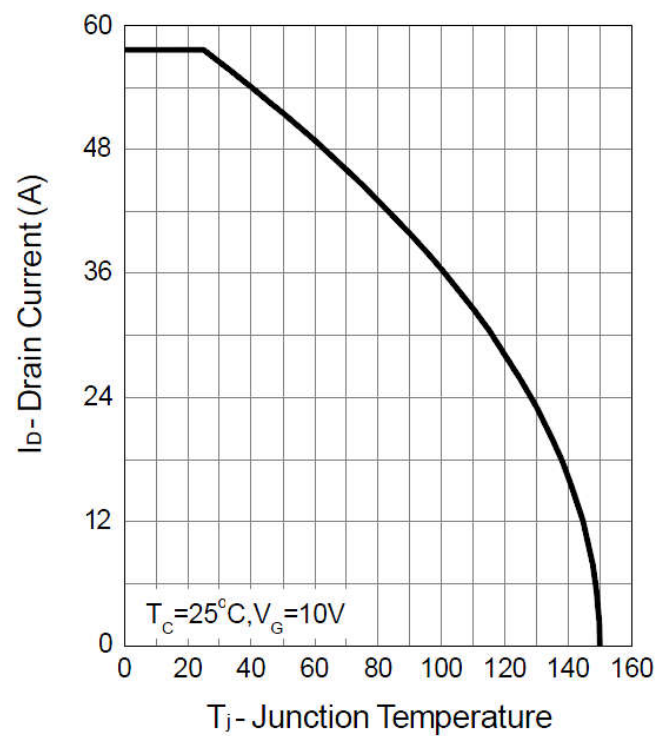
1. Pulse width limited by max. junction temperature.
2. $R_{\theta JA}$ steady state $t=100s$.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

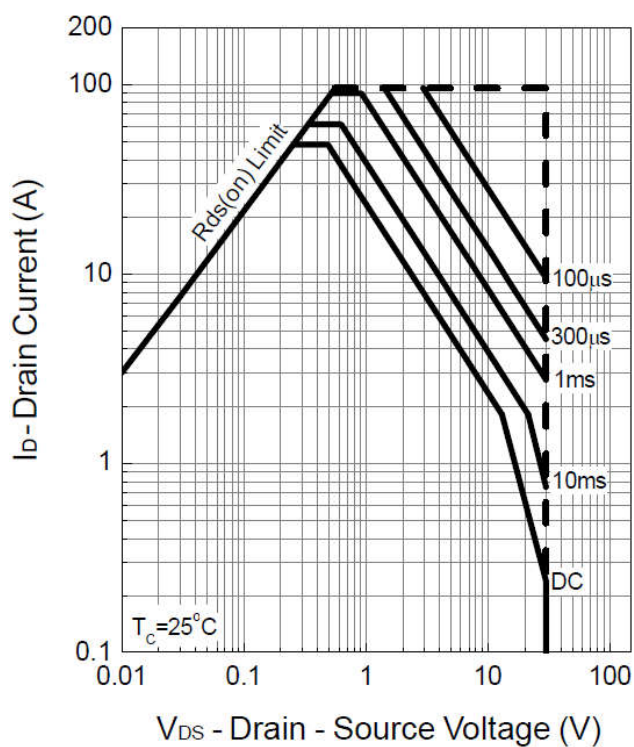
Power Dissipation



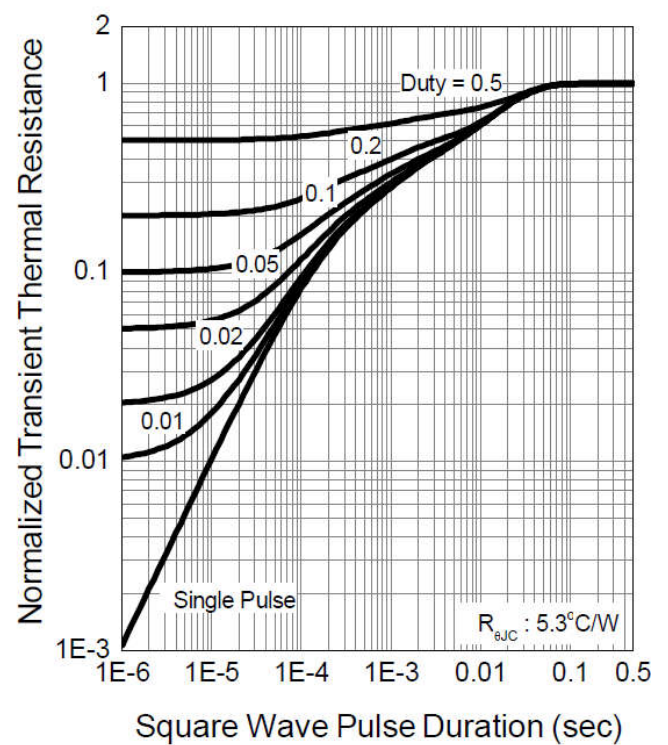
Drain Current



Safe Operation Area

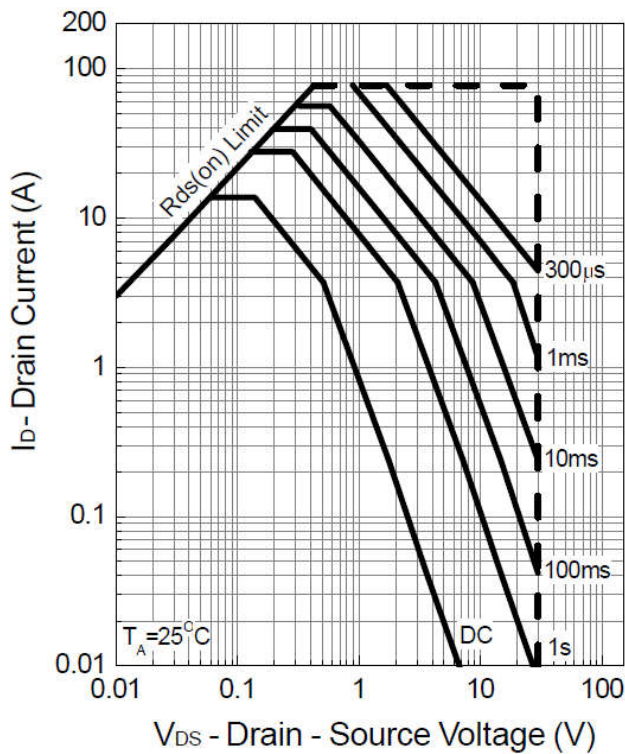


Thermal Transient Impedance

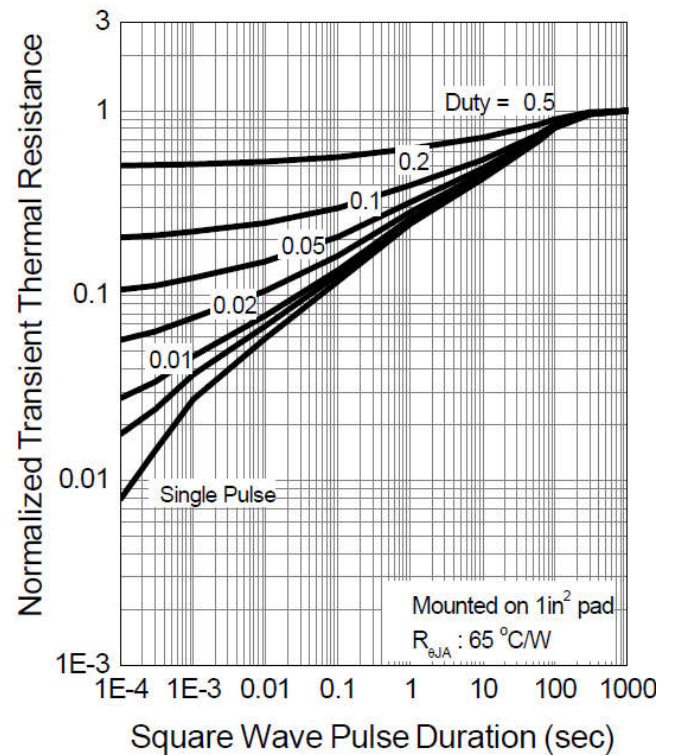


Typical Operating Characteristics(Cont.)

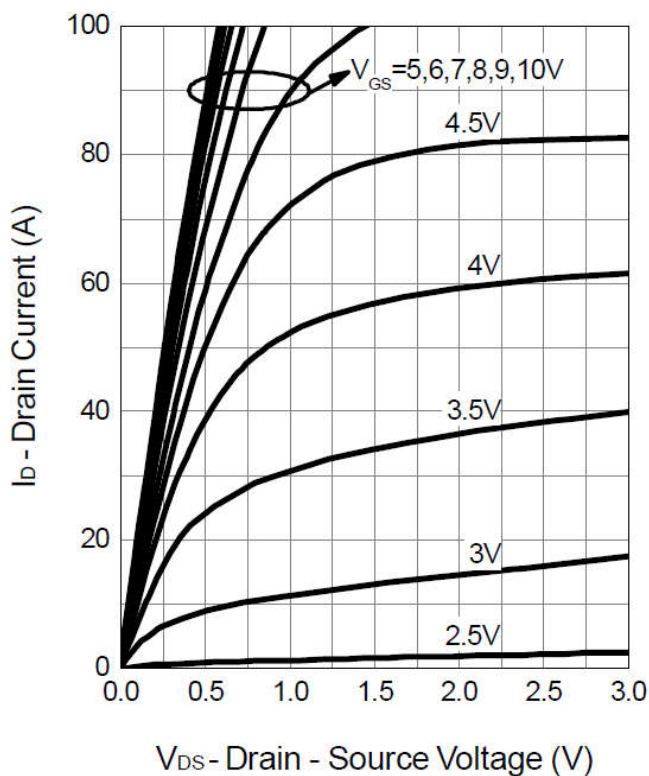
Safe Operation Area



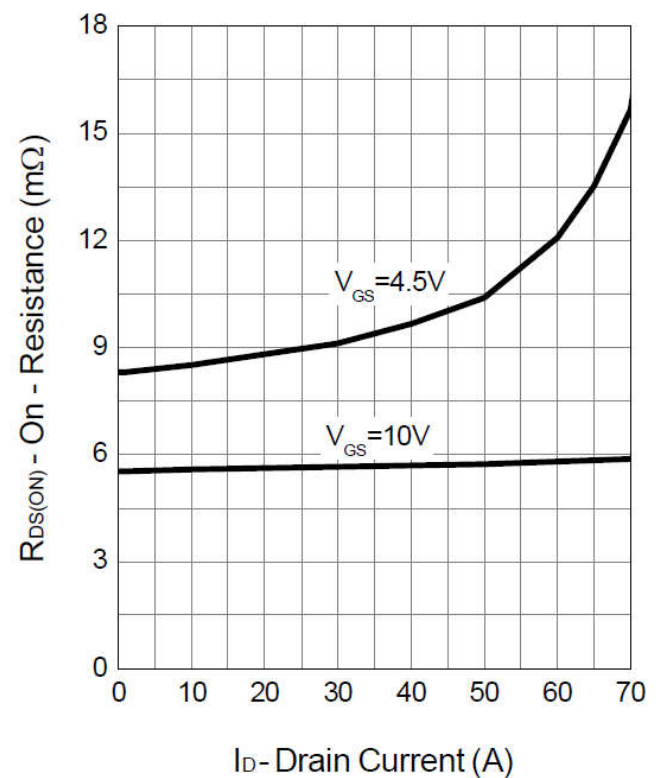
Thermal Transient Impedance



Output Characteristics

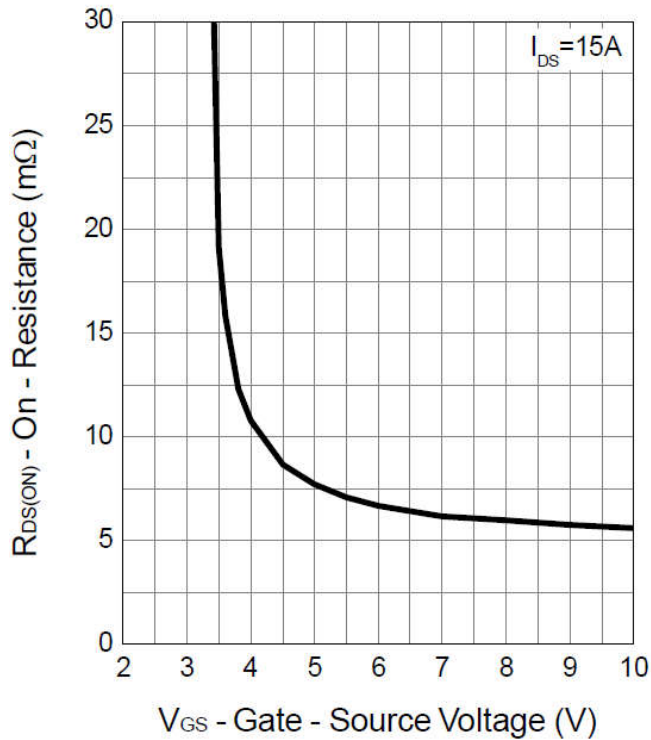


Drain-Source On Resistance

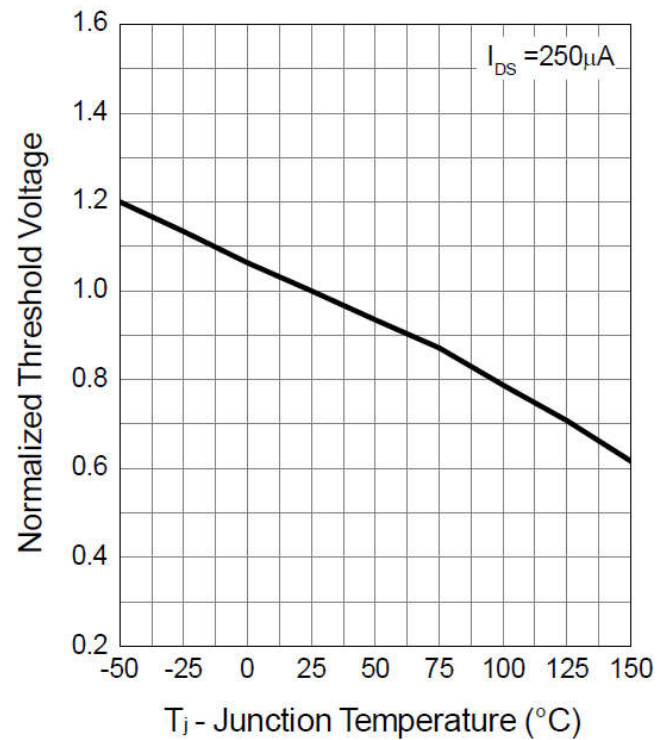


Typical Operating Characteristics (Cont.)

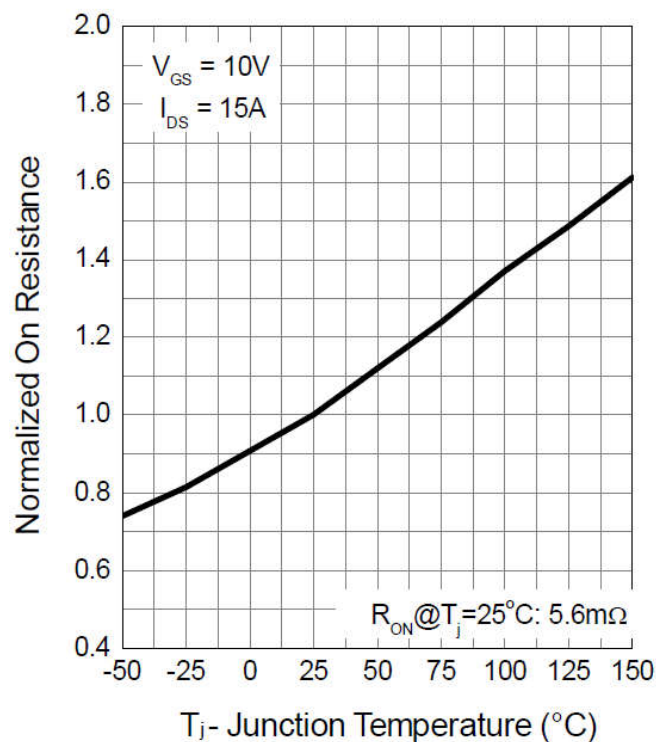
Gate-Source On Resistance



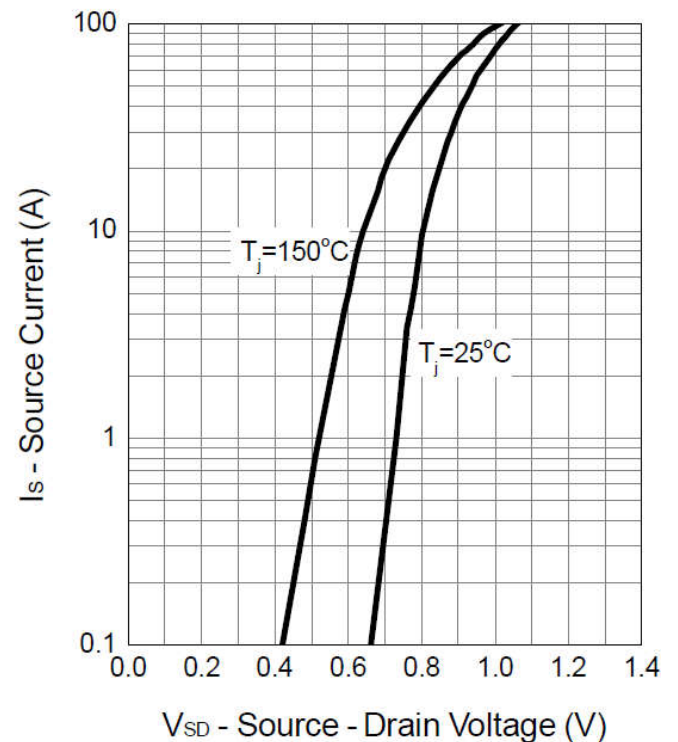
Gate Threshold Voltage



Drain-Source On Resistance

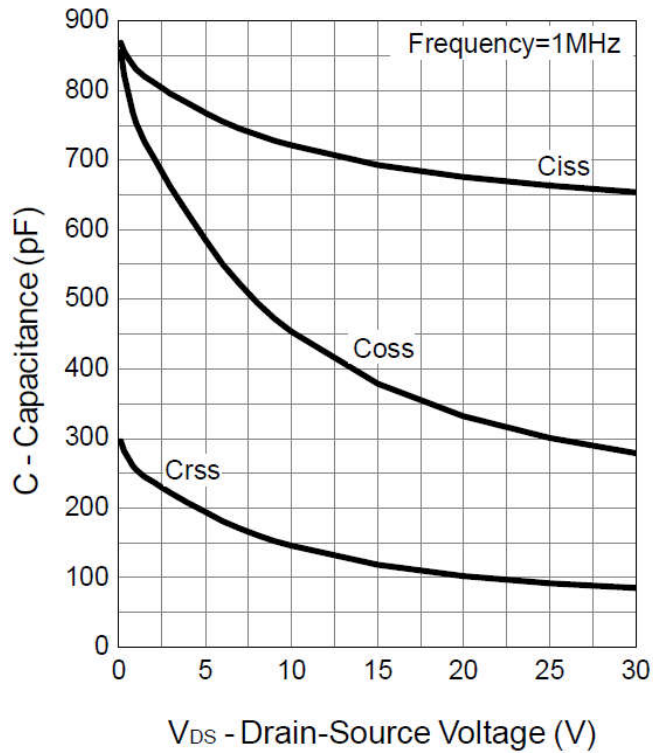


Source-Drain Diode Forward

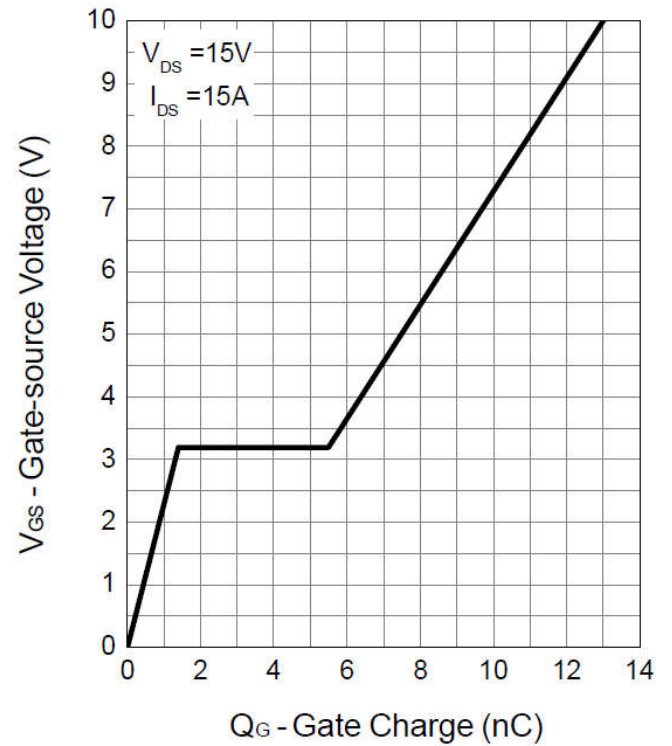


Typical Operating Characteristics (Cont.)

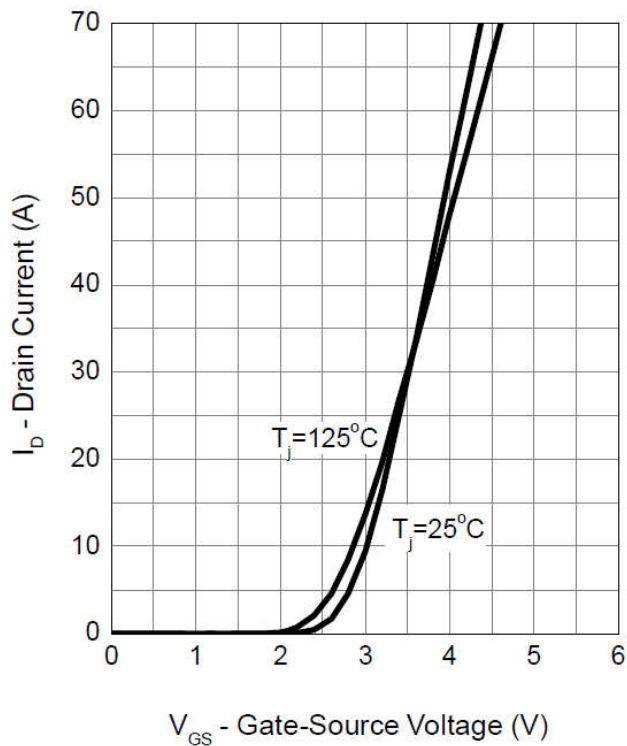
Capacitance



Gate Charge

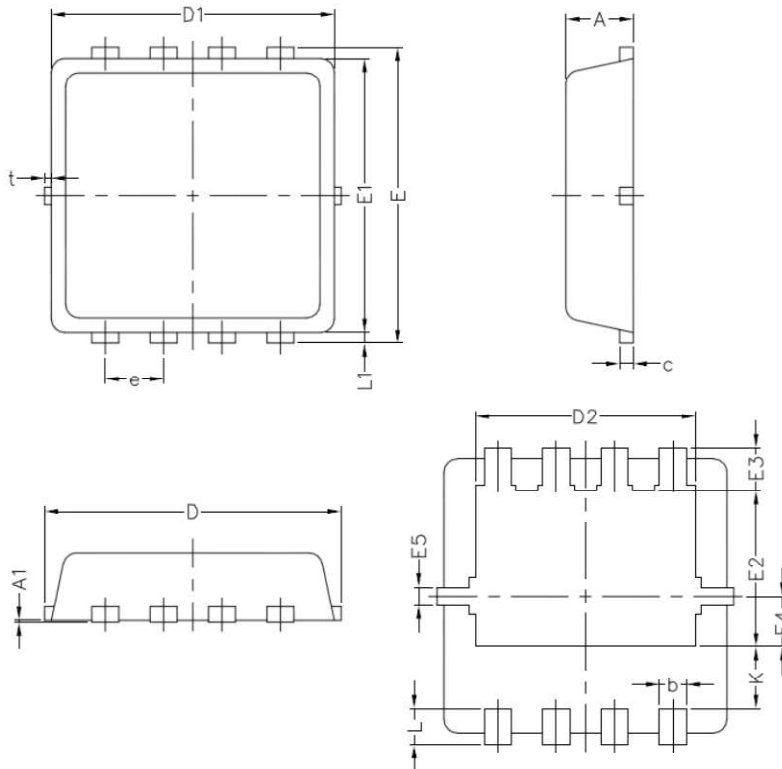


Transfer Characteristics



Package Information

PPAK-3*3-8 Package



Symbol	PPAK-3*3-8(mm)		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.3	3.45
D1	3.00	3.15	3.30
D2	2.25	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.68
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.49	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	/	/	0.13

Design Notes