

N-Channel Enhancement Mode MOSFET

TDM2418

DESCRIPTION

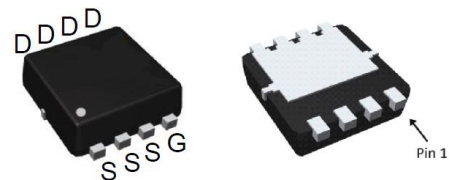
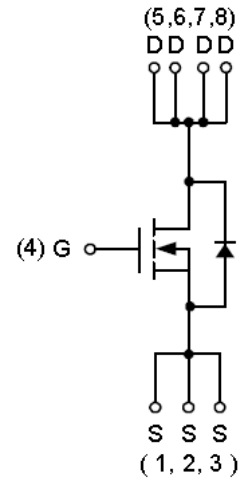
The TDM2418 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- $R_{DS(ON)} < 5m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 7.3m\Omega$ @ $V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- Power Management in Desktop Computer or DC/DC Converters.



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}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Operating Junction Temperature Range	T_J	-55 To 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To 150	$^\circ\text{C}$
Diode Continuous Forward Current	I_S ($T_C=25^\circ\text{C}$)	40	A
Drain Current @ Continuous	I_D ($T_C=25^\circ\text{C}$)	88	A
	I_D ($T_C=100^\circ\text{C}$)	62	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM} ($T_C=25^\circ\text{C}$)	353	A
Maximum Power Dissipation	P_D ($T_C=25^\circ\text{C}$)	68	W
	P_D ($T_C=100^\circ\text{C}$)	34	W
Thermal Resistance-Junction to Case	$R_{\theta JC}$ (Steady State)	4.7	$^\circ\text{C/W}$
Drain Current @ Continuous	I_D ($T_A=25^\circ\text{C}$)	16.4	A
	I_D ($T_A=70^\circ\text{C}$)	13.7	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM} ($T_A=25^\circ\text{C}$)	65	A

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ABSOLUTE MAXIMUM RATINGS Cont. (T_A=25°C unless otherwise noted)

Maximum Power Dissipation (Note 2)	P _D (T _A =25°C)	2.3	W
	P _D (T _A =70°C)	1.6	W
Thermal Resistance-Junction to Ambient (Note 2)	R _{θJA} (t ≤ 10s)	40	°C/W
	R _{θJA} (Steady State)	60	°C/W
Avalanche Current, Single pulse (Note3)	I _{AS} (L=0.1mH)	27	A
Avalanche Energy, Single pulse (Note3)	E _{AS} (L=0.1mH)	36	mJ

Note 1: Pulse width is limited by max. junction temperature.

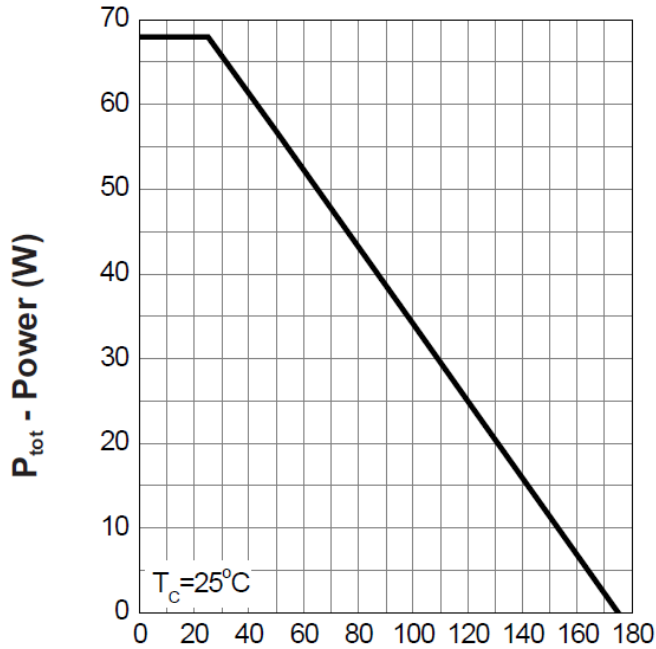
Note 2: Surface mounted on 1in² pad area, steady state t = 999s.Note 3: UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V,V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.4	1.8	2.5	V
Drain-Source On-State Resistance (Note4)	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	4.2	5	mΩ
		V _{GS} =4.5V, I _D =15A	-	5.6	7.3	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{iss}	V _{DS} =20V,V _{GS} =0V, F=1.0MHz	-	1370	1781	PF
Output Capacitance	C _{oss}		-	317	-	PF
Reverse Transfer Capacitance	C _{rss}		-	46	-	PF
SWITCHING CHARACTERISTICS						
Turn-on Delay Time	t _{d(on)}	V _{DS} =20V, R _L =20Ω, V _{GEN} =10V,R _G =6Ω I _D =1A	-	13.3	24	nS
Turn-on Rise Time	t _r		-	7.9	15	nS
Turn-Off Delay Time	t _{d(off)}		-	29.1	53	nS
Turn-Off Fall Time	t _f		-	21	38	nS
Total Gate Charge	Q _g	V _{DS} =20V,I _D =20A,V _{GS} =10V	-	22	30.8	nC
Gate-Source Charge	Q _{gs}		-	4.2	-	nC
Gate-Drain Charge	Q _{gd}		-	3	-	nC
Body Diode Reverse Recovery Time	T _{rr}	I _F =20A, dI/dt=100A/μs	-	23	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}		-	15	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 4)	V _{SD}	V _{GS} =0V,I _S =20A	-	0.85	1.1	V

NOTES:4 Pulse test ; pulse width≤300ms, duty cycle≤2%

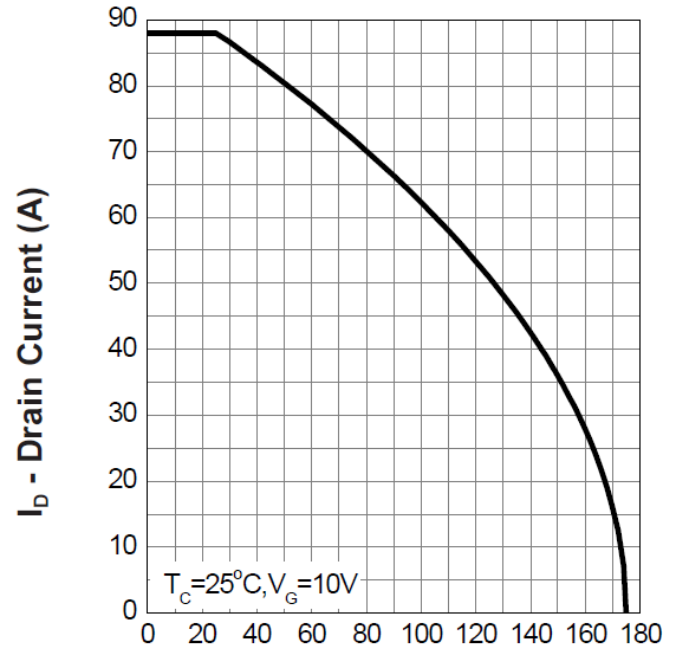
Typical Operating Characteristics

Power Dissipation



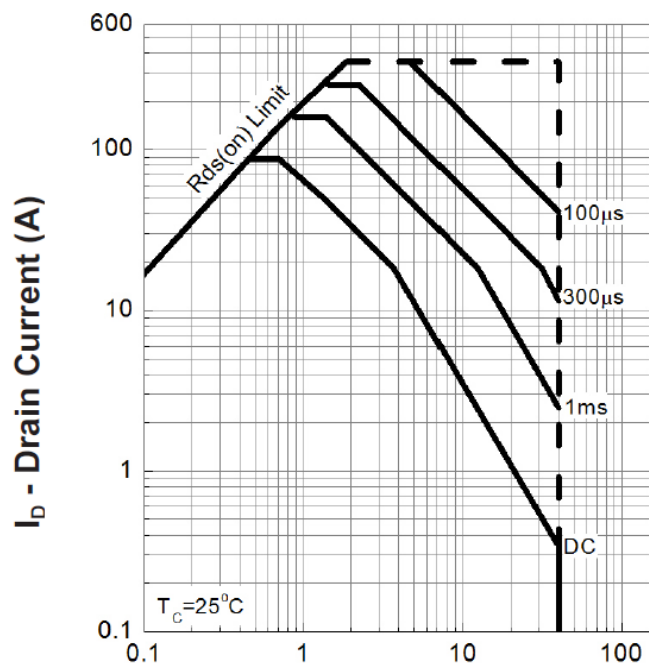
T_j - Junction Temperature (°C)

Drain Current



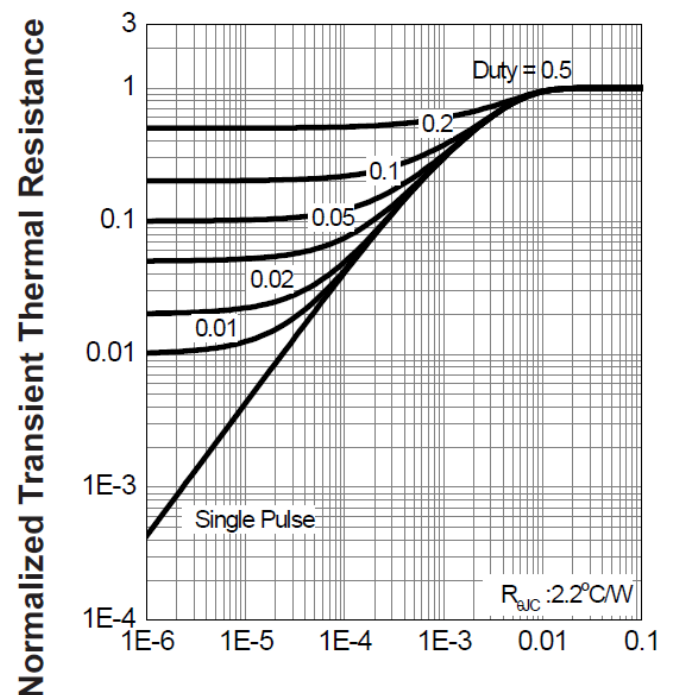
T_j - Junction Temperature (°C)

Safe Operation Area



V_{DS} - Drain - Source Voltage (V)

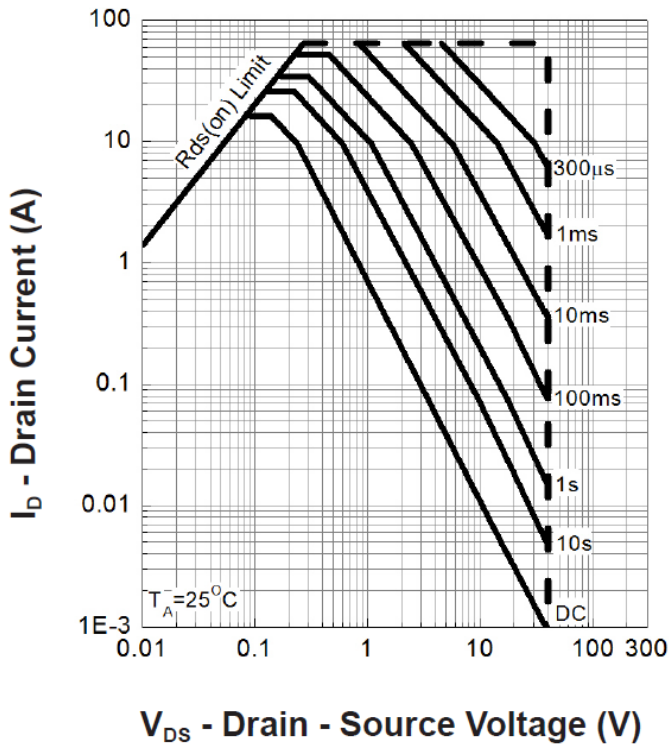
Thermal Transient Impedance



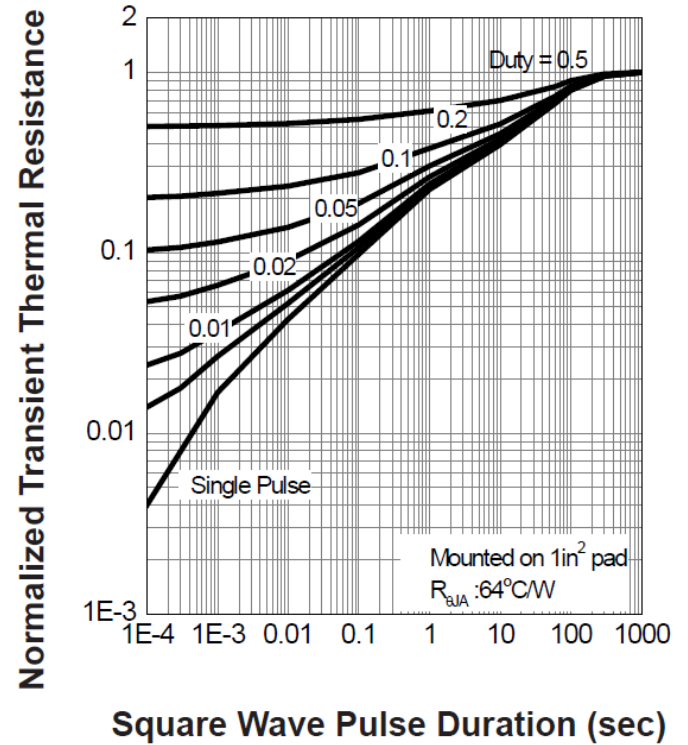
Square Wave Pulse Duration (sec)

Typical Operating Characteristics(Cont.)

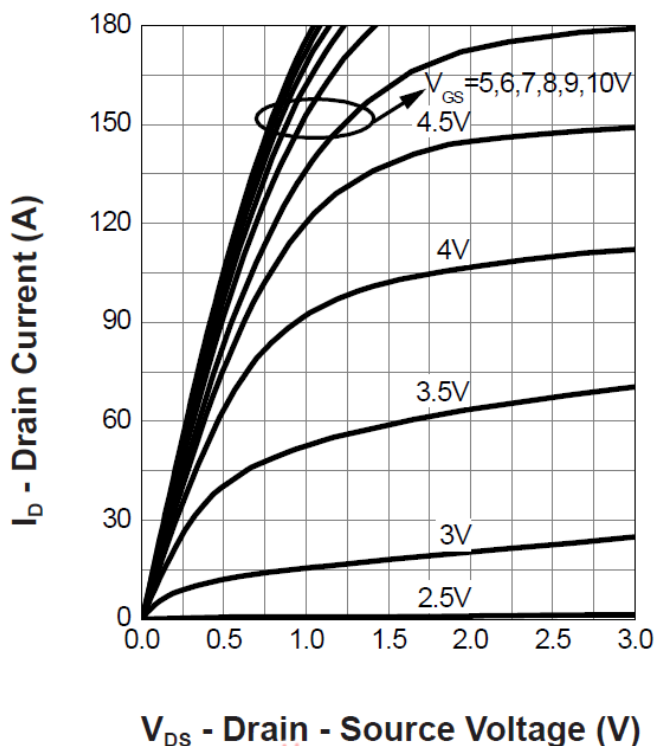
Safe Operation Area



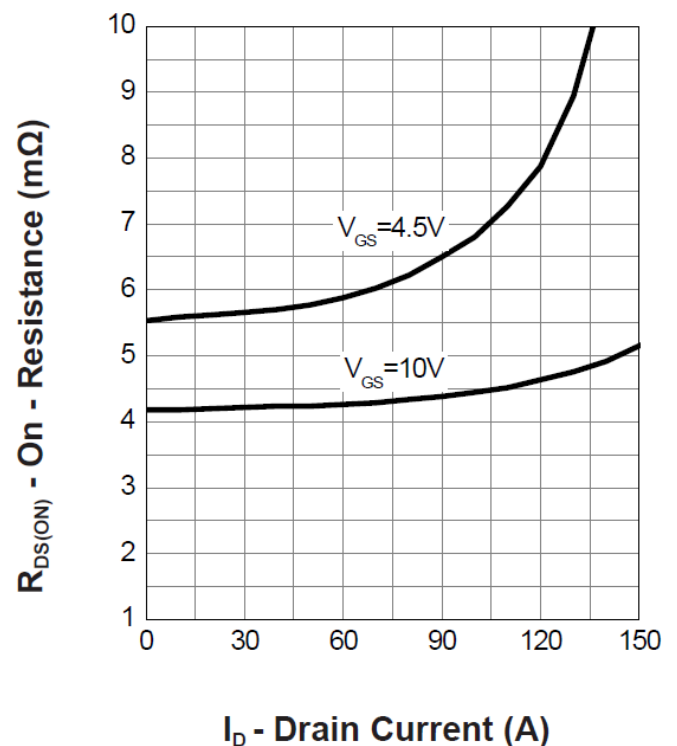
Thermal Transient Impedance



Output Characteristics

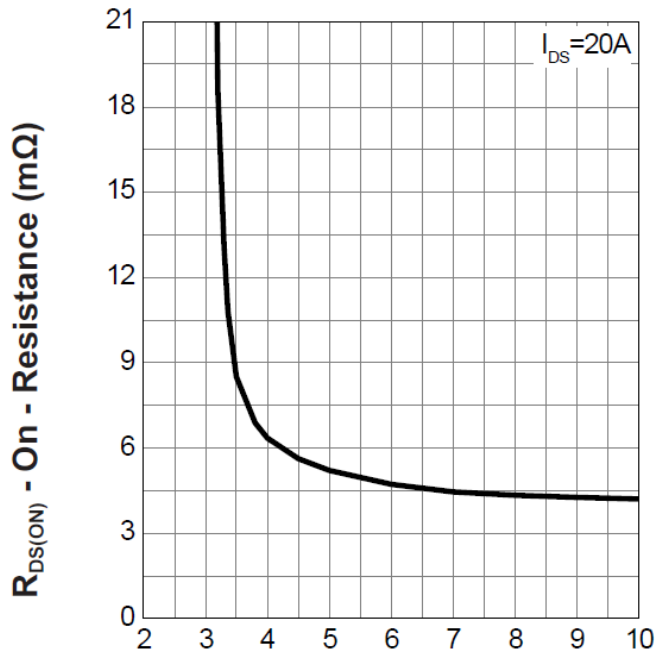


Drain-Source On Resistance

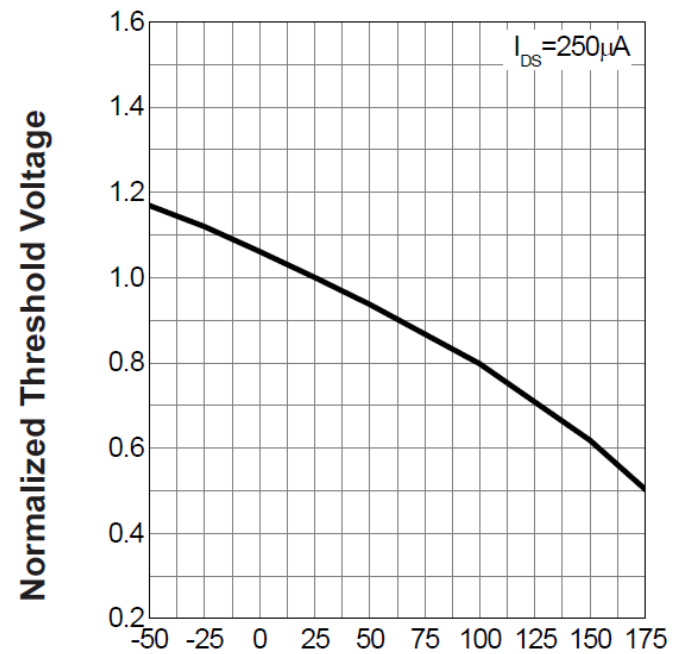


Typical Operating Characteristics (Cont.)

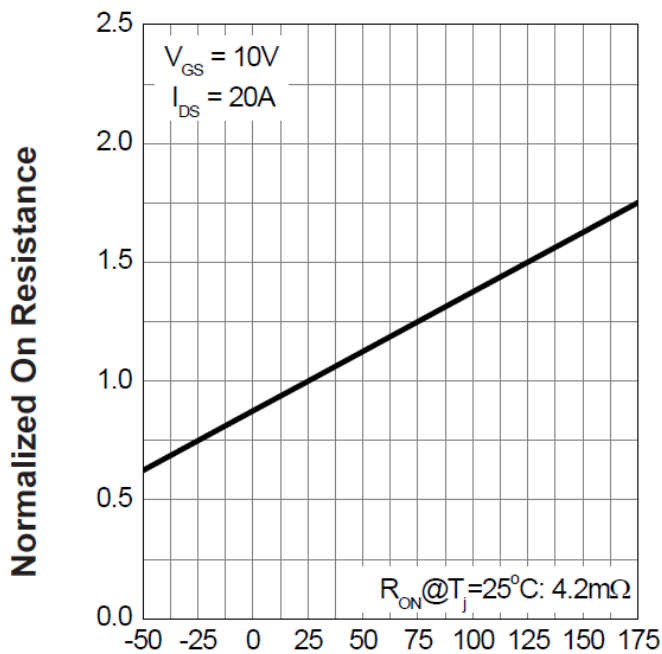
Gate-Source On Resistance

 V_{GS} - Gate - Source Voltage (V)

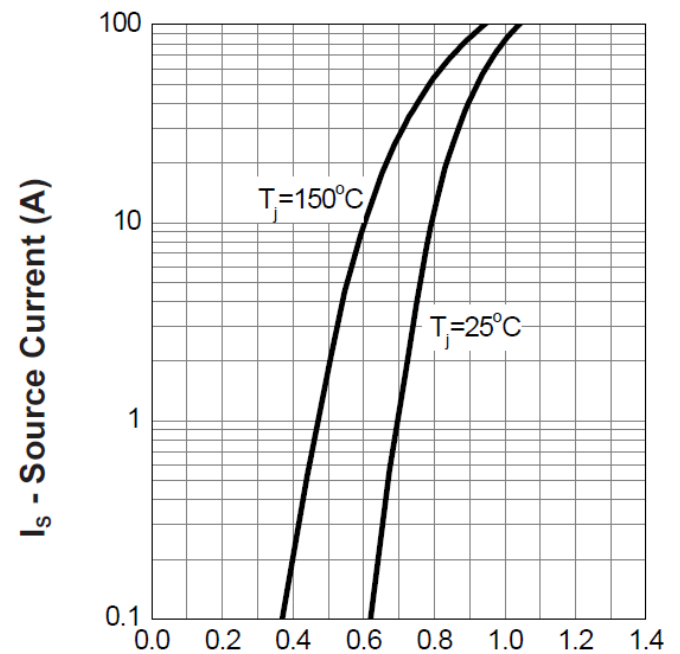
Gate Threshold Voltage

 T_J - Junction Temperature ($^{\circ}C$)

Drain-Source On Resistance

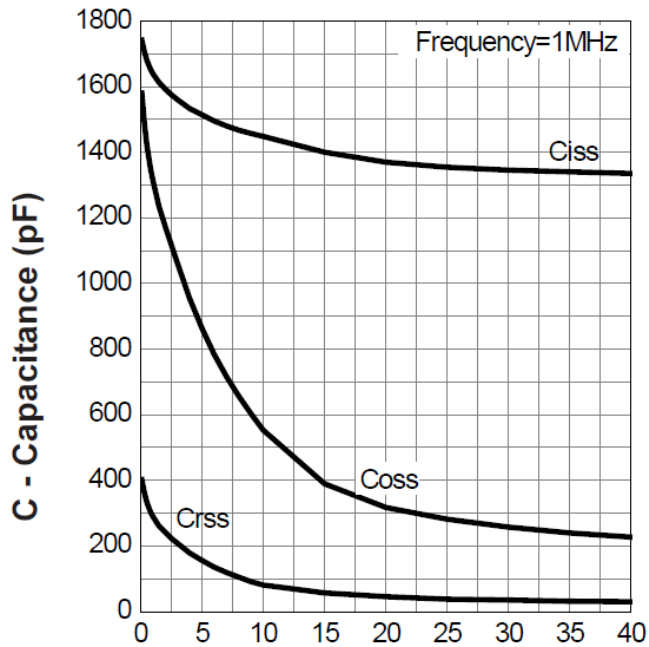
 T_J - Junction Temperature ($^{\circ}C$)

Source-Drain Diode Forward

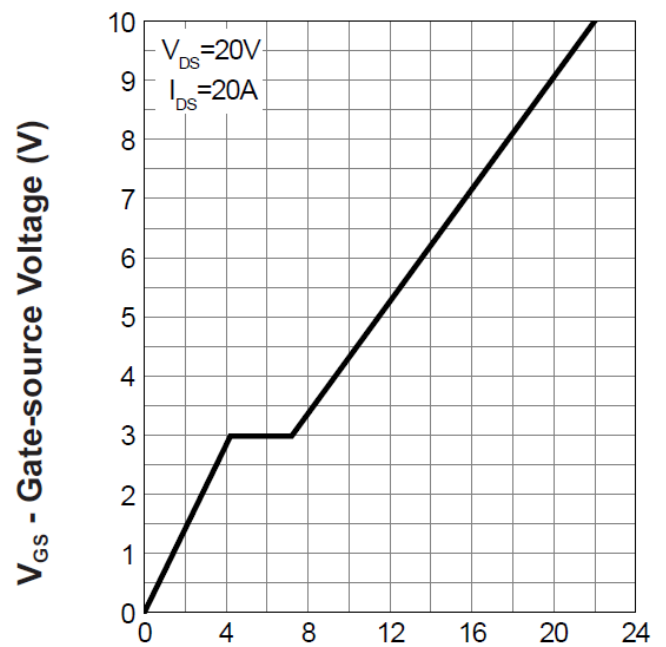
 V_{SD} - Source - Drain Voltage (V)

Typical Operating Characteristics (Cont.)

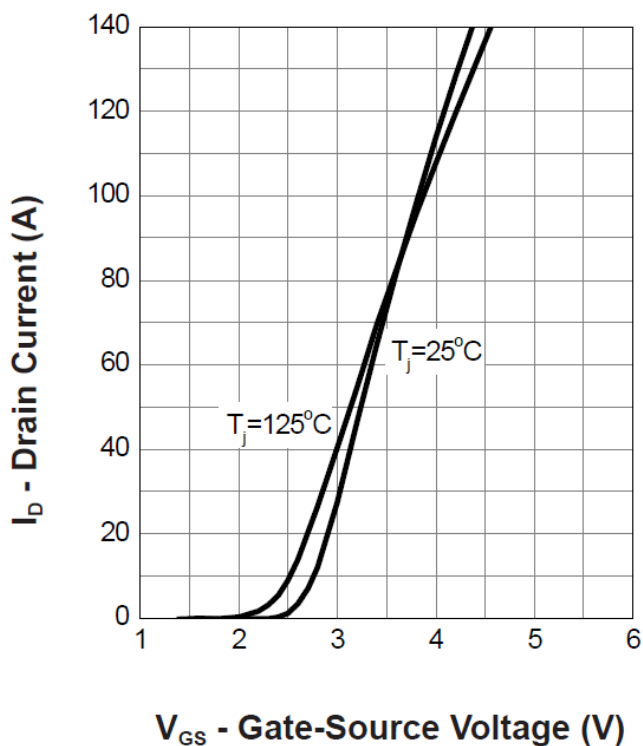
Capacitance



Gate Charge



Transfer Characteristics

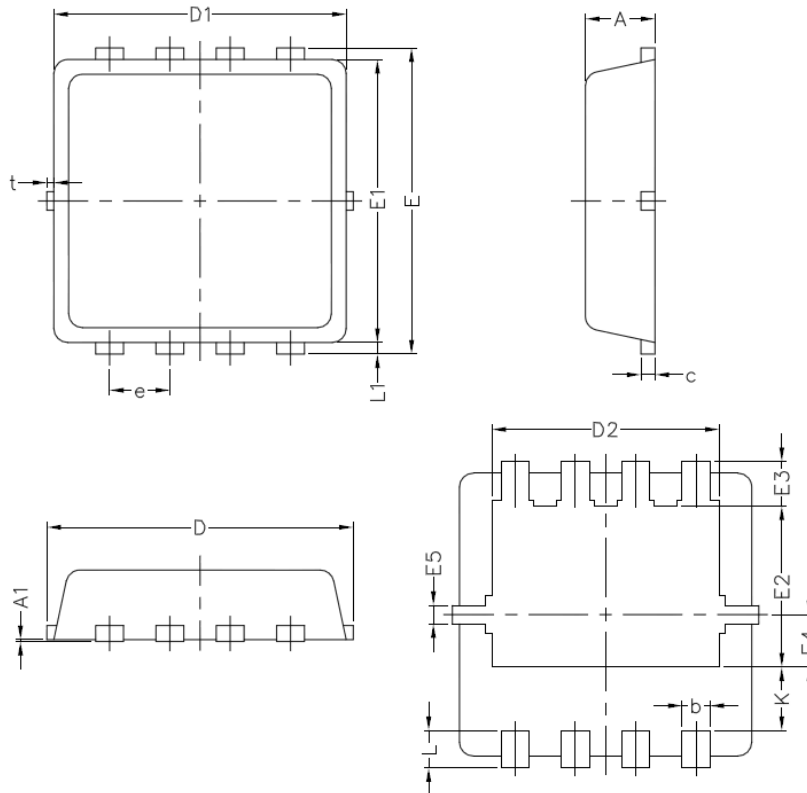


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Package Information

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