

N-Channel Enhancement Mode MOSFET

TDM3478

DESCRIPTION

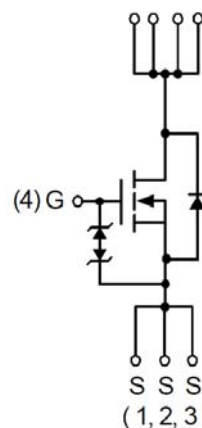
The TDM3478 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

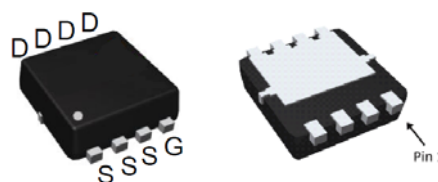
- RDS(ON) < 9.7mΩ @ VGS=4.5V
RDS(ON) < 6mΩ @ VGS=10V
- High Power and current handling capability
- ESD Protection
- Surface Mount Package
- Lead Free and Green Devices available(RoHS Compliant)

Application

- PWM applications
- Load switch
- Power management
- Powered Systems



N-Channel MOSFET



PPAK-3*3-8

ABSOLUTE MAXIMUM RATINGS(T_A=25°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°C)	54	A
	I _D (T _c =100°C)	34	
Drain Current @ Current-Pulsed (Note 1)	I _{DP} (T _c =25°C)	100	
Maximum Power Dissipation	P _D (T _c =25°C)	26.6	W
	P _D (T _c =100°C)	10.6	
Drain Current @ Continuous	I _D (T _A =25°C)	15.2	A
	I _D (T _A =70°C)	12.1	
Maximum Power Dissipation	P _D (T _A =25°C)	2.08	W
	P _D (T _A =70°C)	1.3	
Thermal Resistance,Junction-to-Ambient (Note 2)	R _{θJA} (t≤10s)	40	°C/W
	R _{θJA} (Steady State)	60	
Thermal Resistance,Junction-to-Case	R _{θJC} (Steady State)	4.7	°C/W
Maximum Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55 To 150	°C

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

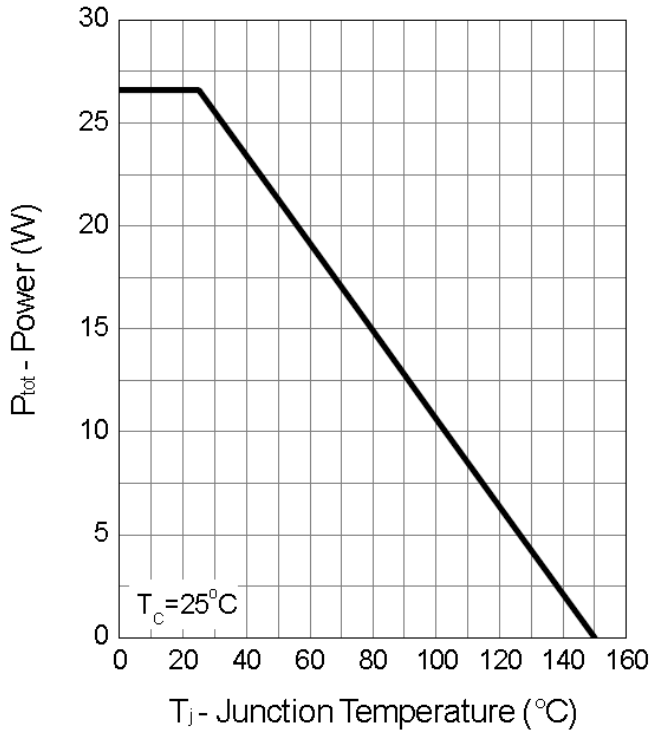
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.4	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=9A$	-	7.5	9.7	m Ω
		$V_{GS}=10V, I_D=12A$	-	5	6	
		$T_J=125^{\circ}\text{C}$	-	7.6	-	
DYNAMIC CHARACTERISTICS (Note3)						
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	1.8	3	Ω
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, F=1.0\text{MHz}$	-	750	-	PF
Output Capacitance	C_{oss}		-	530	-	PF
Reverse Transfer Capacitance	C_{rss}		-	37	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=15\Omega, V_{GEN}=10V, R_G=1\Omega$ $I_D=1A$	-	7.8	-	nS
Turn-on Rise Time	t_r		-	8.4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	18	-	nS
Turn-Off Fall Time	t_f		-	17	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=12A, V_{GS}=4.5V$	-	5.5	-	nC
Gate-Source Charge	Q_{gs}		-	1.9	-	nC
Gate-Drain Charge	Q_{gd}		-	2.2	-	nC
Body Diode Reverse Recovery Time	T_{rr}	$I_F=5A, dI/dt=100A/\mu s$	-	11	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	13	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 2)	V_{SD}	$V_{GS}=0V, I_S=10A$	-	0.8	1.1	V

NOTES:

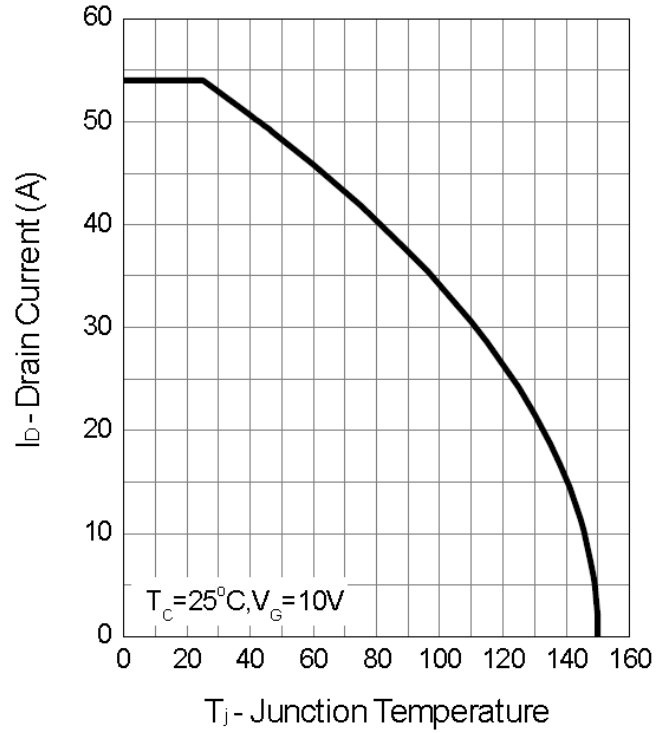
1. Pulse width limited by max. junction temperature.
2. $R_{\theta JA}$ steady state=999s. $R_{\theta JA}$ is measured with the device mounted on 1in2, Fr-4 board with 2oz.Copper
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

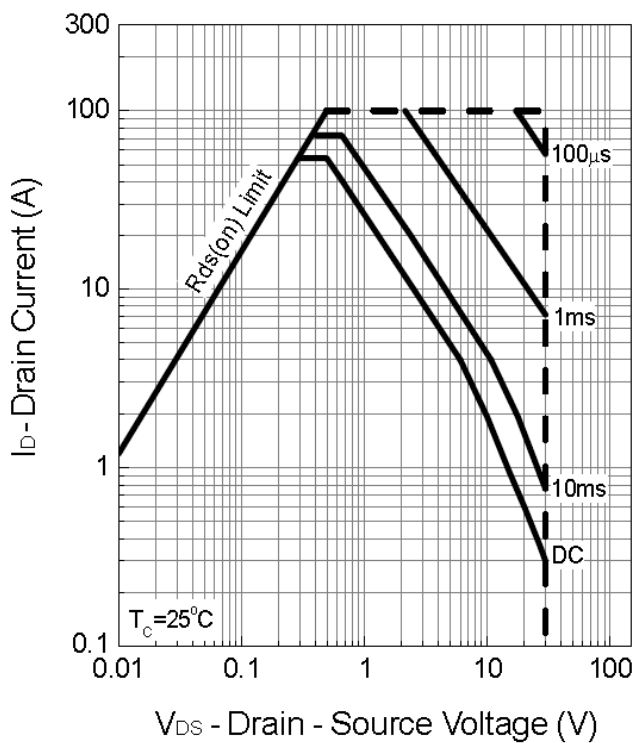
Power Dissipation



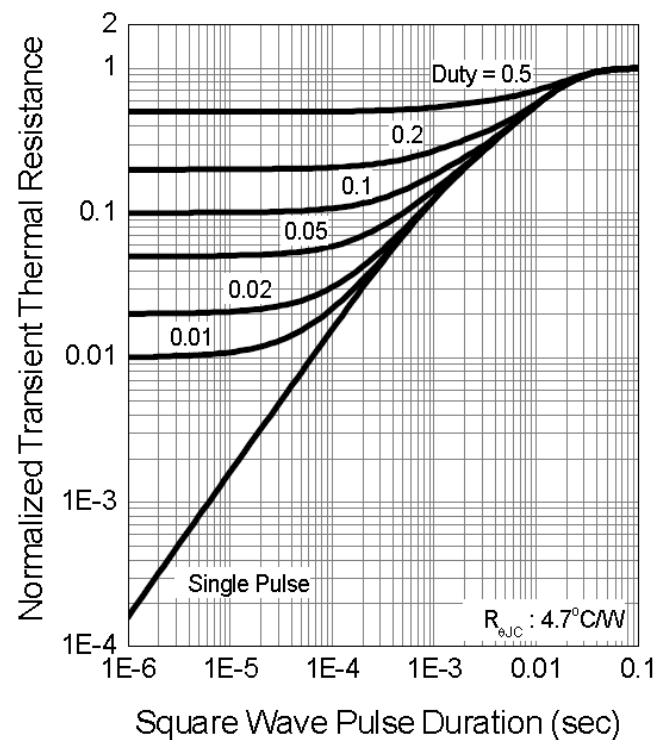
Drain Current



Safe Operation Area

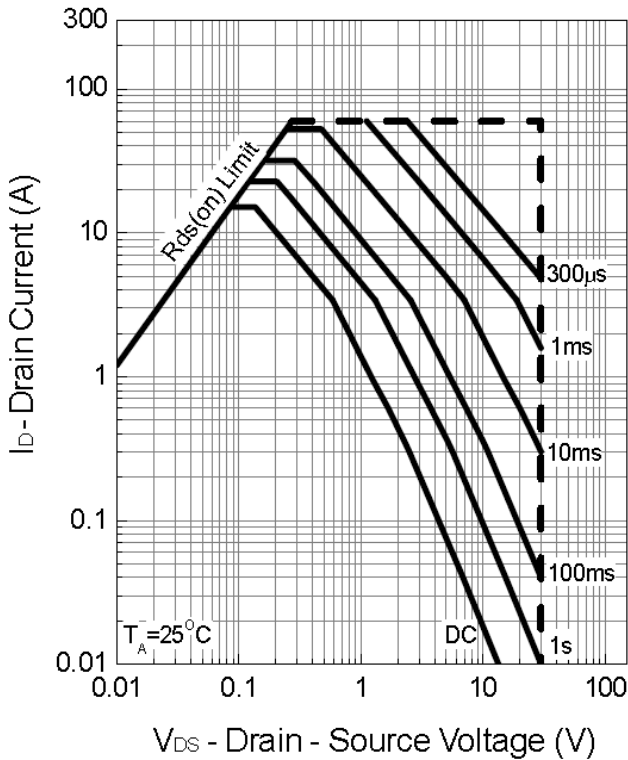


Thermal Transient Impedance

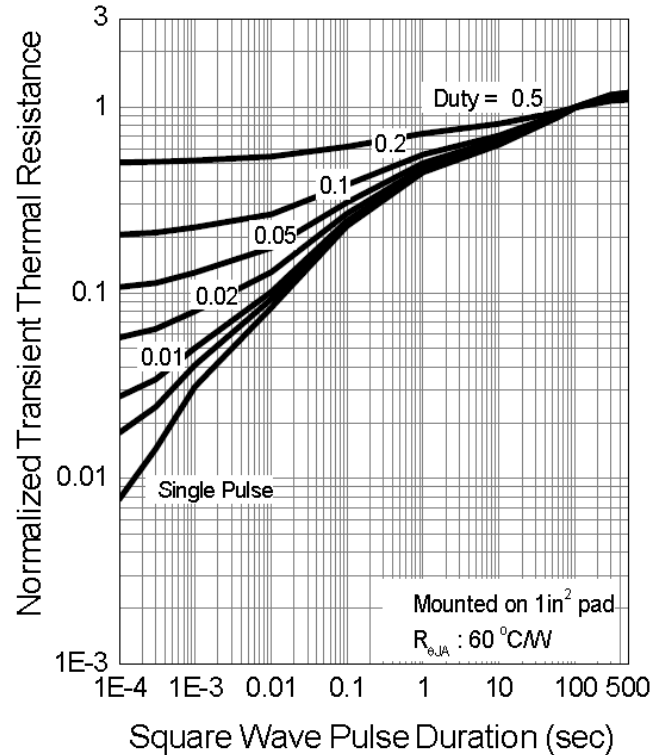


Typical Operating Characteristics(Cont.)

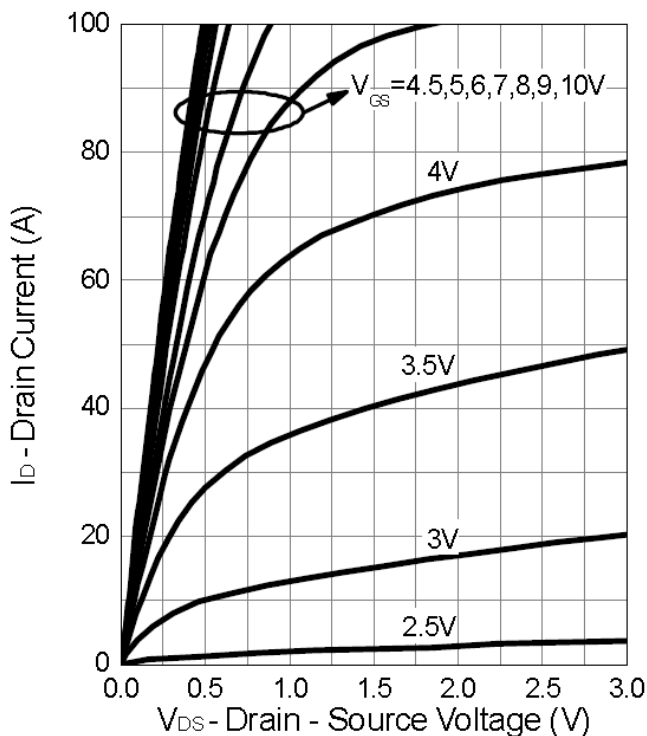
Safe Operation Area



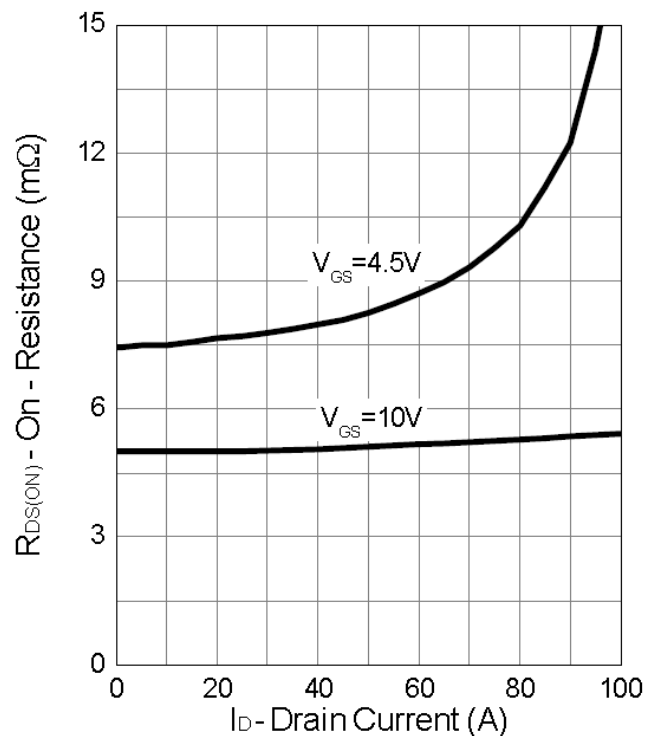
Thermal Transient Impedance



Output Characteristics

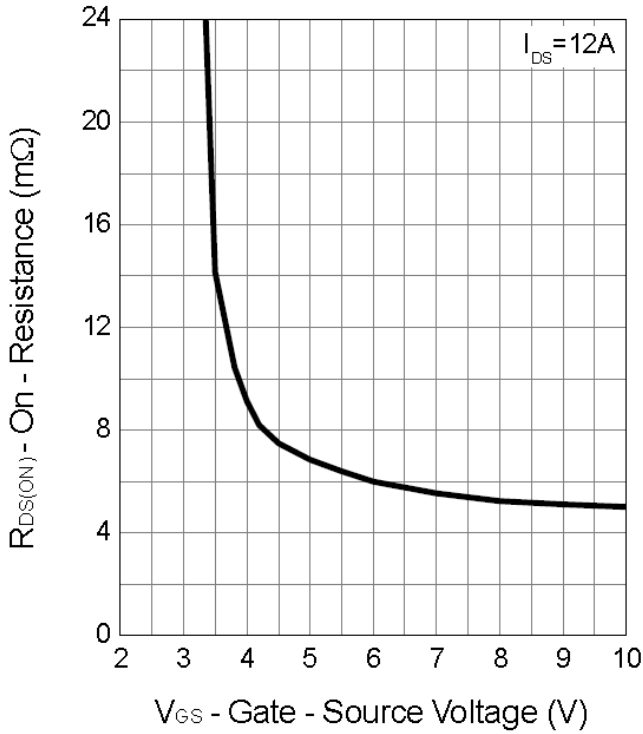


Drain-Source On Resistance

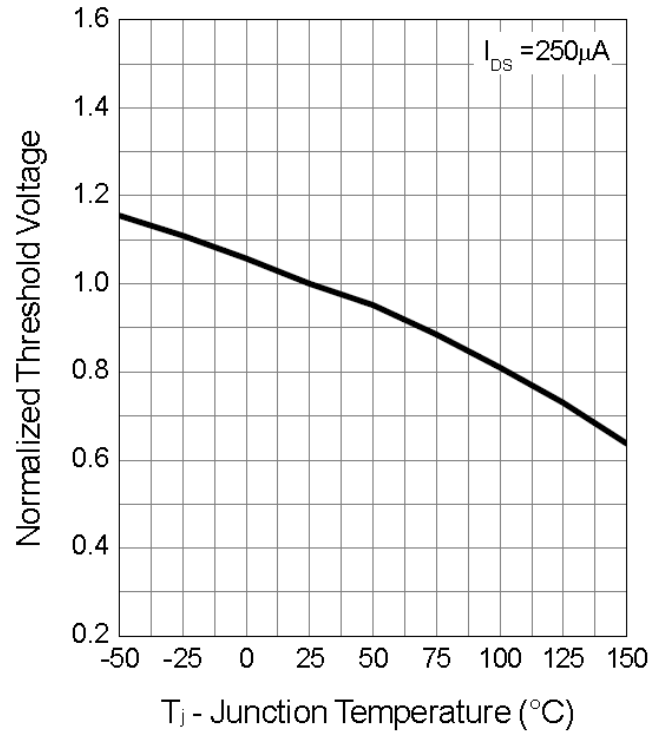


Typical Operating Characteristics (Cont.)

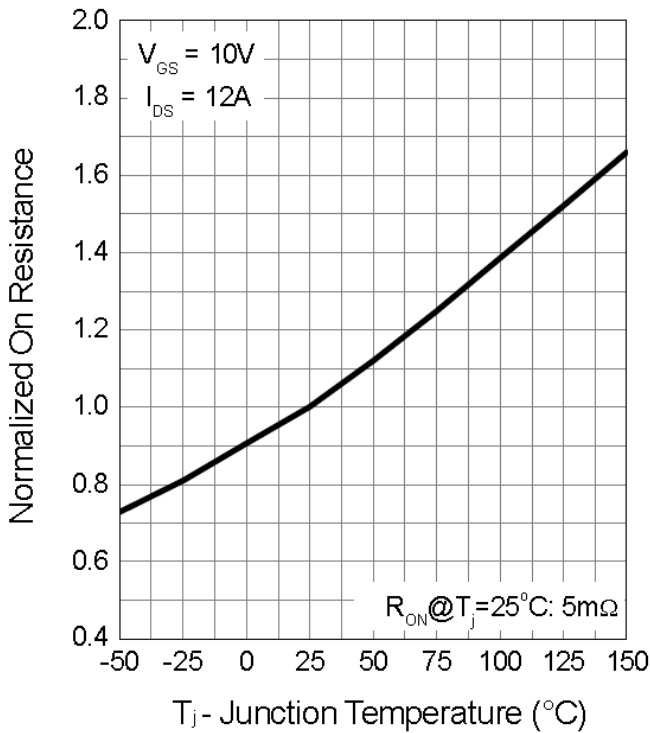
Gate-Source On Resistance



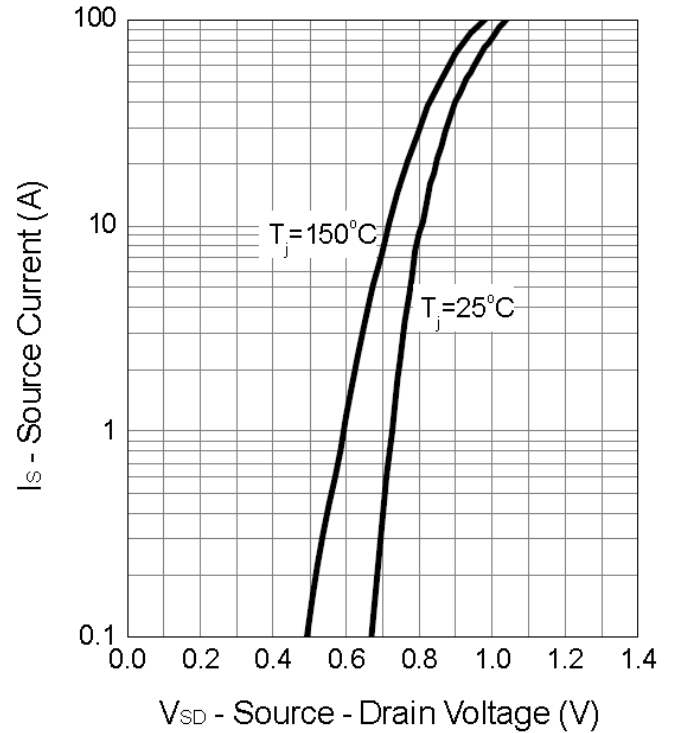
Gate Threshold Voltage



Drain-Source On Resistance

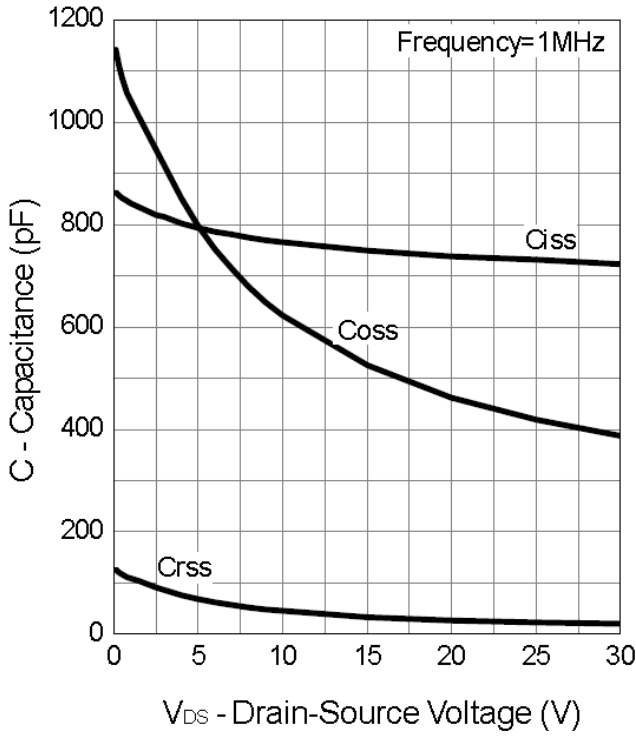


Source-Drain Diode Forward

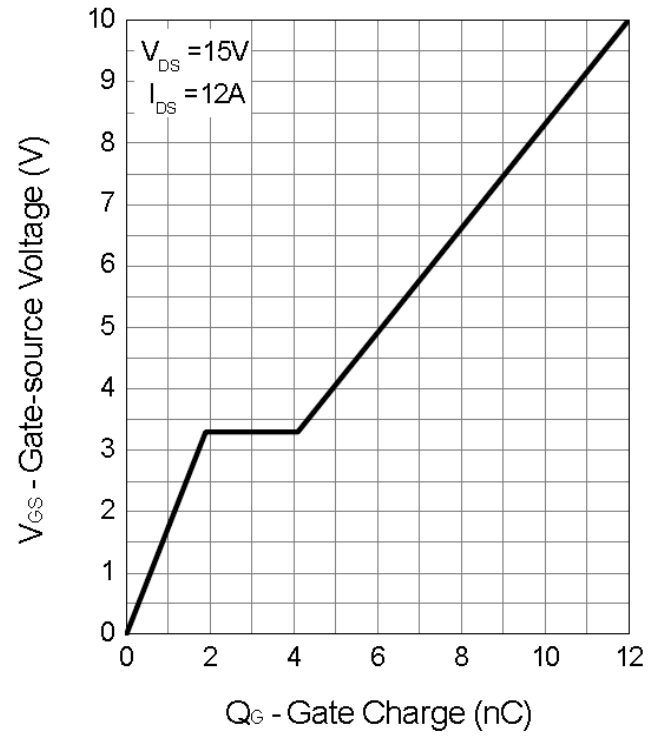


Typical Operating Characteristics (Cont.)

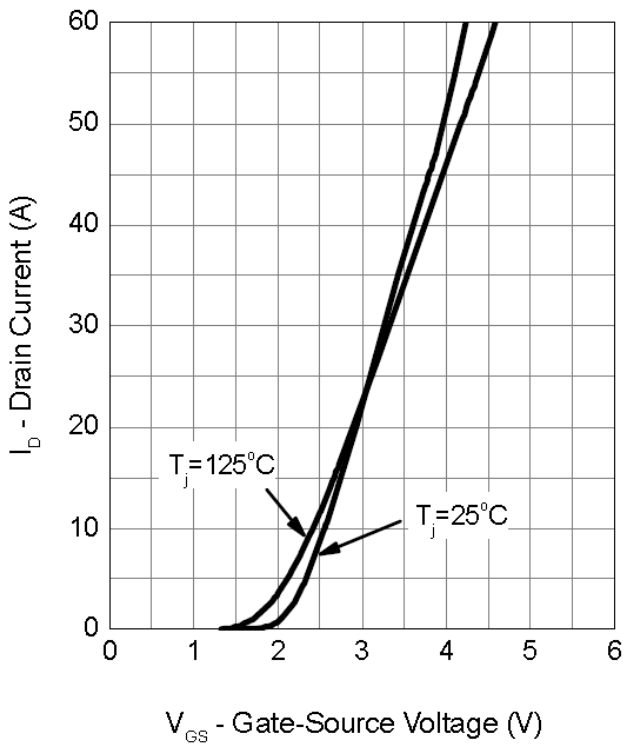
Capacitance



Gate Charge

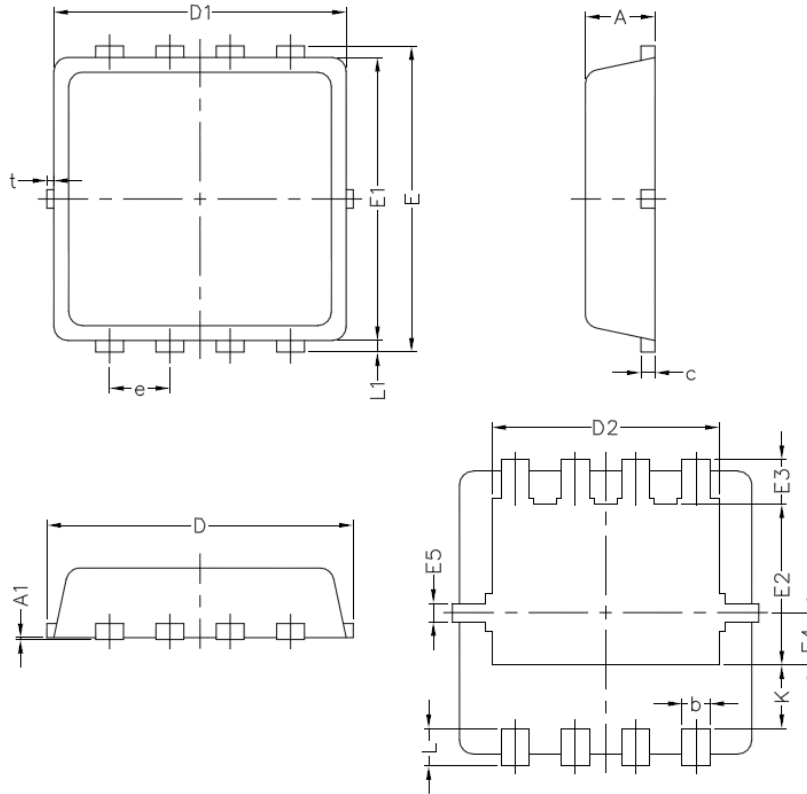


Transfer Characteristics



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