

N-Channel Enhancement Mode MOSFET

TDM3478

DESCRIPTION

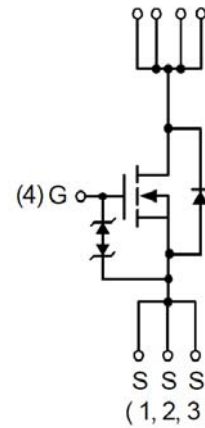
The TDM3478 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

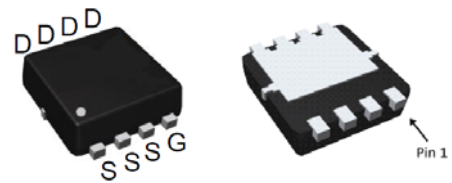
- $R_{DS(ON)} < 9.7m\Omega$ @ $V_{GS}=4.5V$
 $R_{DS(ON)} < 6m\Omega$ @ $V_{GS}=10V$
- High Power and current handling capability
- ESD Protection
- Surface Mount Package
- Lead Free and Green Devices available(RoHS Compliant)

Application

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



N-Channel MOSFET



PPAK-3*3-8

ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	54	A
	I_D ($T_C=100^\circ\text{C}$)	34	
Drain Current @ Current-Pulsed (Note 1)	I_{DP} ($T_C=25^\circ\text{C}$)	100	
Maximum Power Dissipation	P_D ($T_C=25^\circ\text{C}$)	26.6	W
	P_D ($T_C=100^\circ\text{C}$)	10.6	
Drain Current @ Continuous	I_D ($T_A=25^\circ\text{C}$)	15.2	A
	I_D ($T_A=70^\circ\text{C}$)	12.1	
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)	$R_{\theta JA}(t \leq 10s)$	40	$^\circ\text{C}/\text{W}$
	$R_{\theta JA}(\text{Steady State})$	60	
Thermal Resistance,Junction-to-Case	$R_{\theta JC}(\text{Steady State})$	4.7	$^\circ\text{C}/\text{W}$
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)

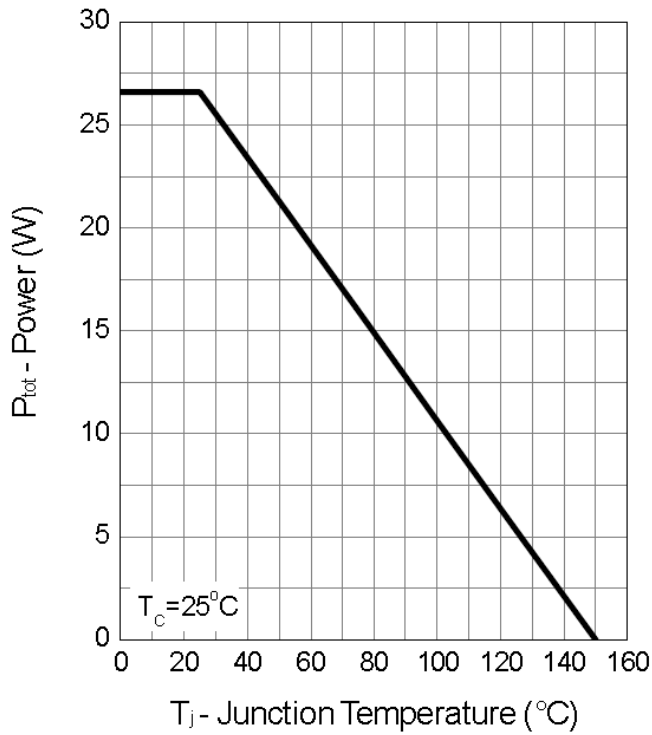
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V,V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±10	μ A
ON CHARACTERISTICS						
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 =9A	-	7.5	9.7	mΩ
		V _{GS} =10V, I _D =12A	-	5	6	
		T _J =125℃	-	7.6	-	
DYNAMIC CHARACTERISTICS (Note3)						
Gate Resistance	R _G	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	1.8	3	Ω
Input Capacitance	C _{iss}	V _{DS} =15V,V _{GS} =0V, F=1.0MHz	-	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 =15Ω, V _{GEN} =10V,R _G =1Ω 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/μs	-	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:

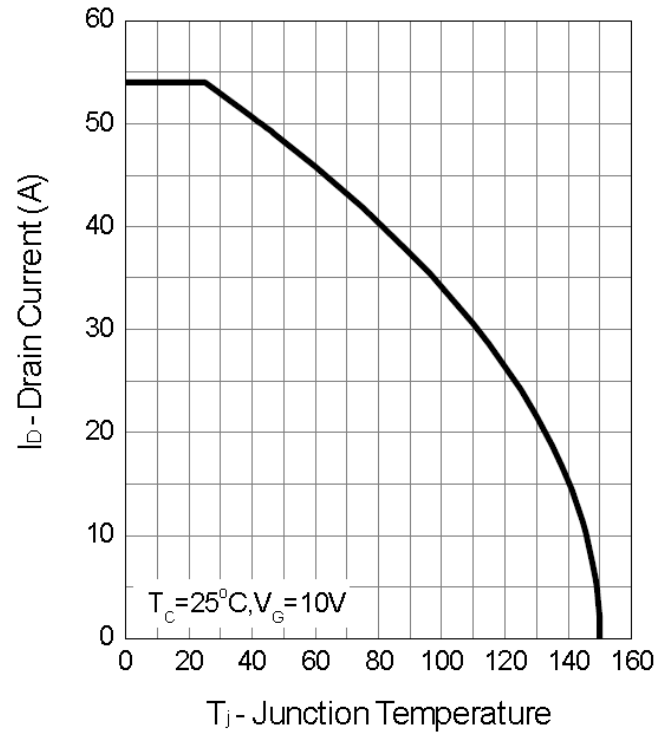
1. Pulse width limited by max. junction temperature.
2. $R_{\theta JA}$ steady state=999s. $R_{\theta JA}$ is measured with the device mounted on 1in2, Fr-4 board with 2oz.Copper
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

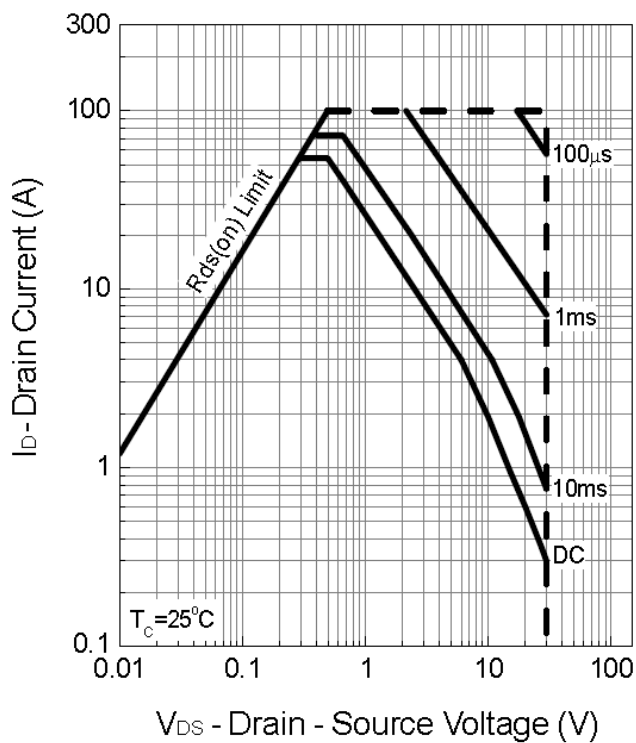
Power Dissipation



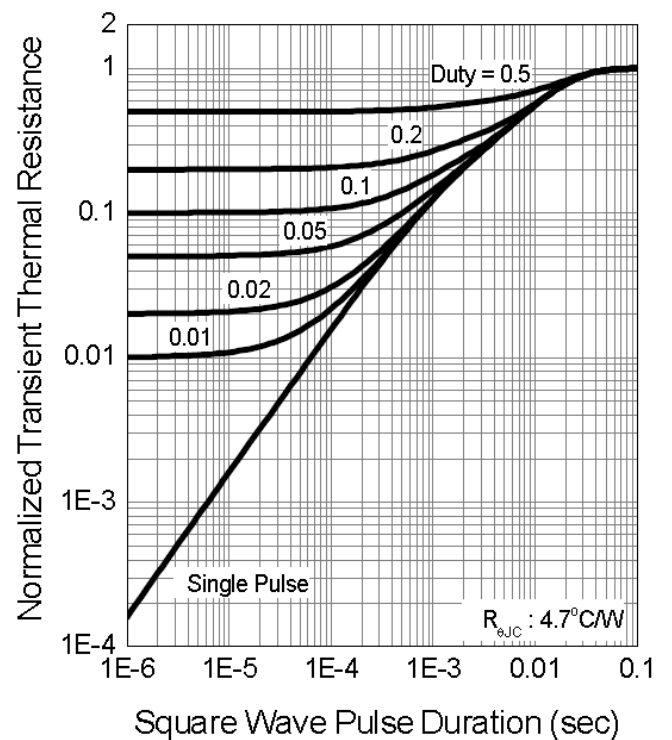
Drain Current



Safe Operation Area

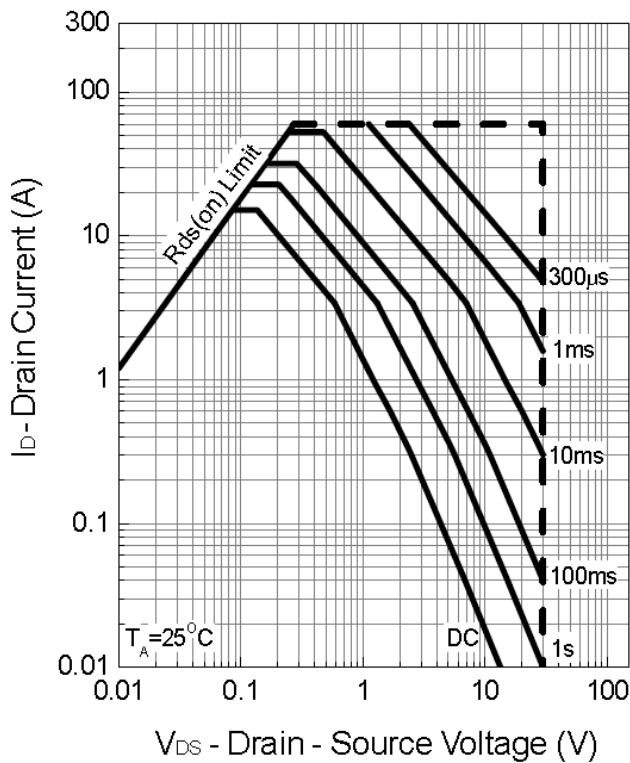


Thermal Transient Impedance

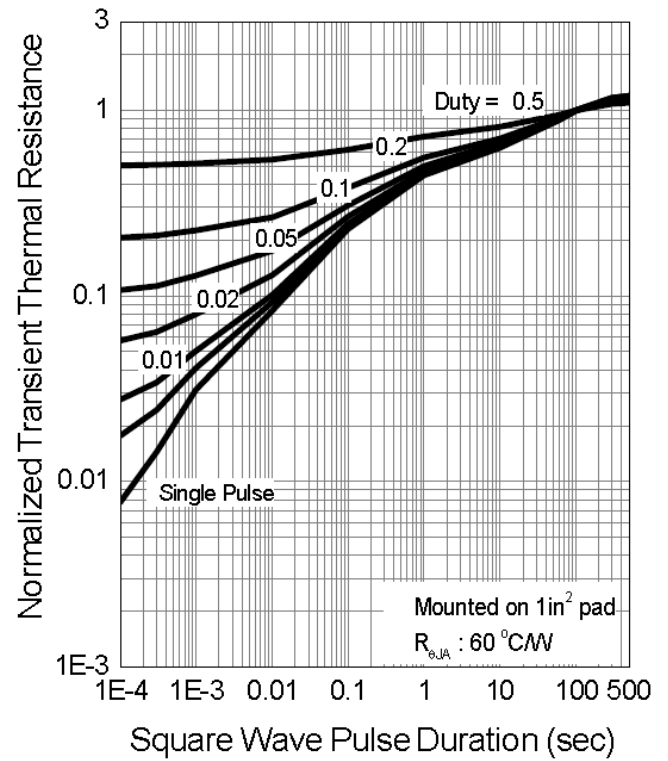


Typical Operating Characteristics(Cont.)

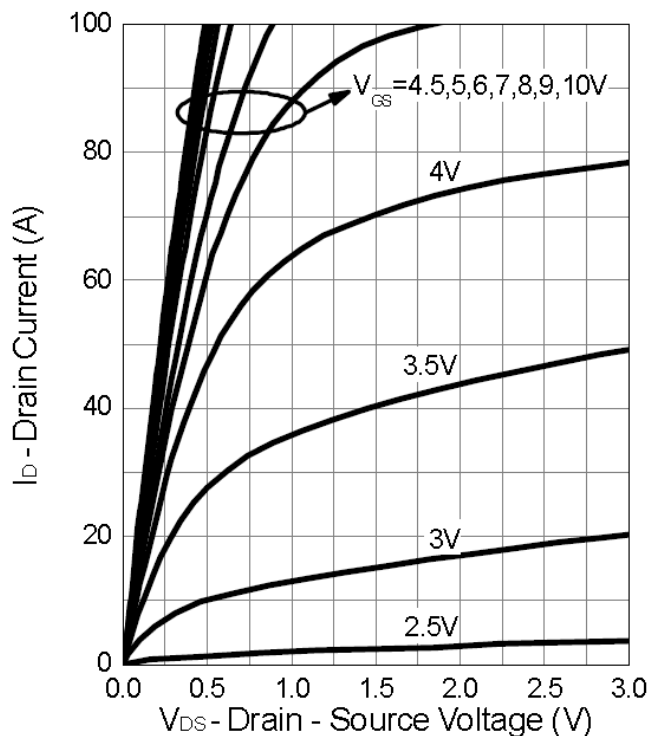
Safe Operation Area



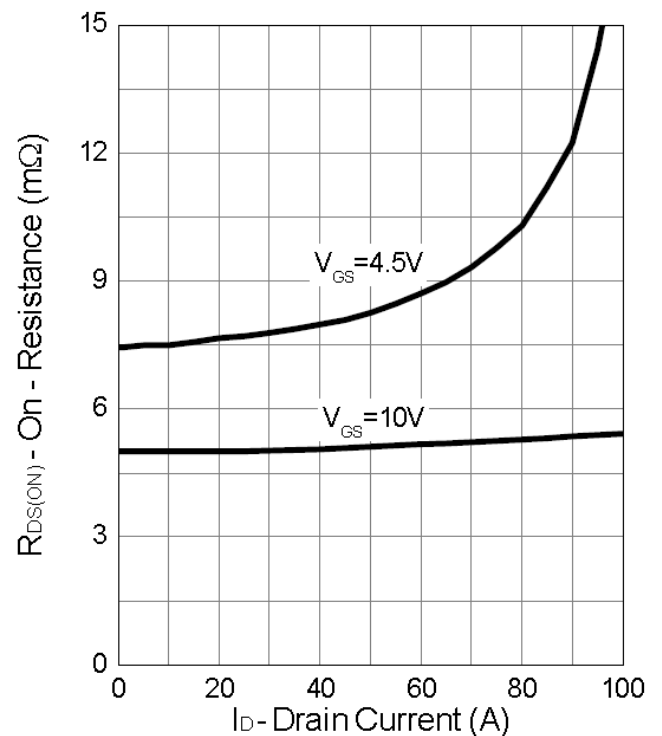
Thermal Transient Impedance



Output Characteristics



Drain-Source On Resistance

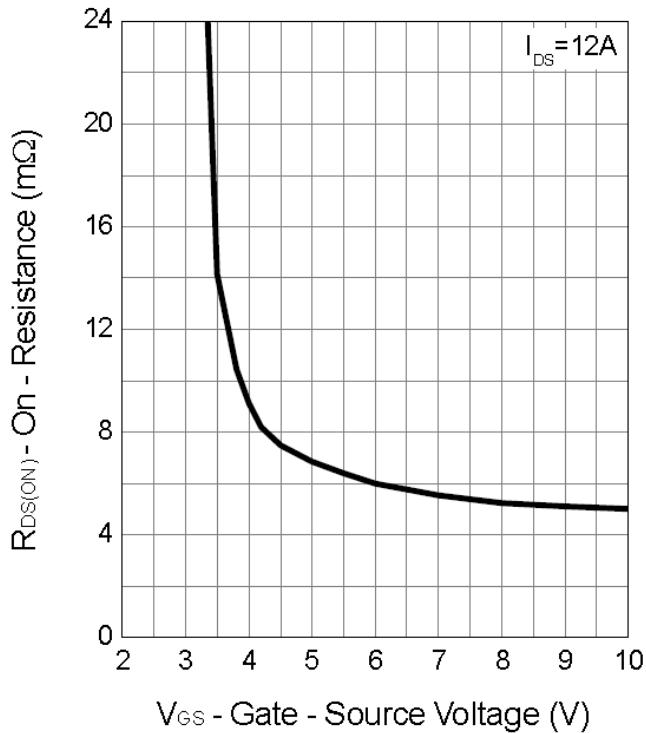


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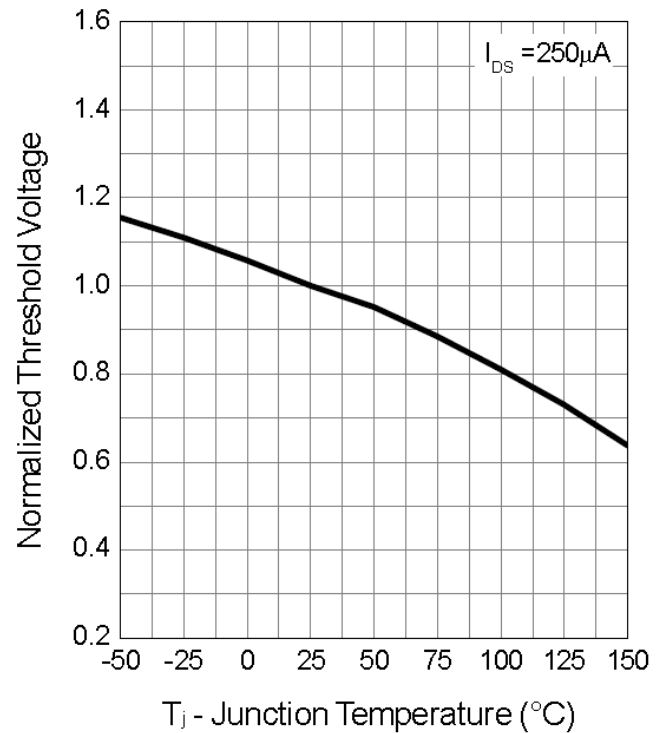
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Typical Operating Characteristics (Cont.)

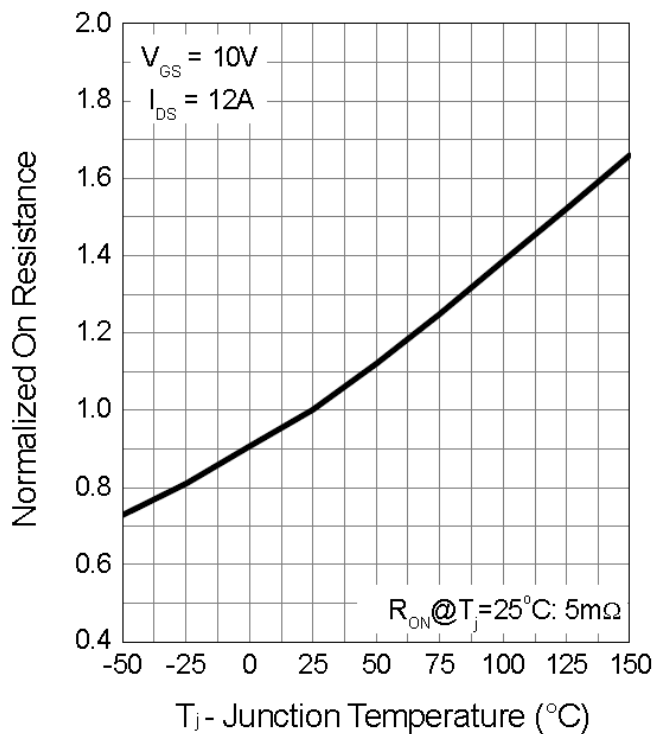
Gate-Source On Resistance



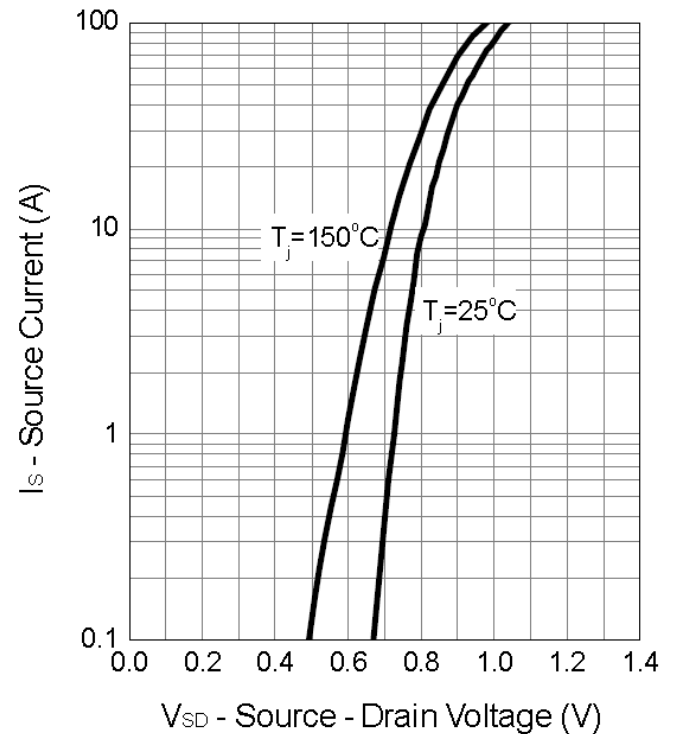
Gate Threshold Voltage



Drain-Source On Resistance

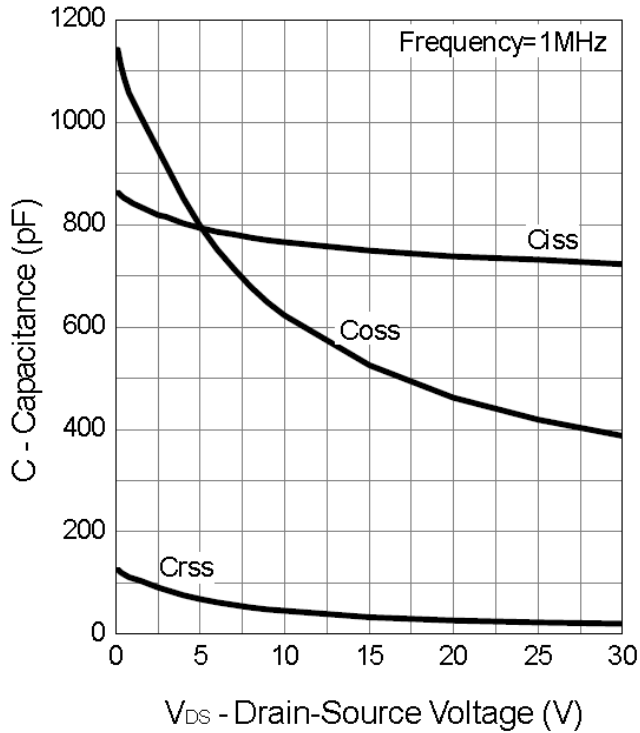


Source-Drain Diode Forward

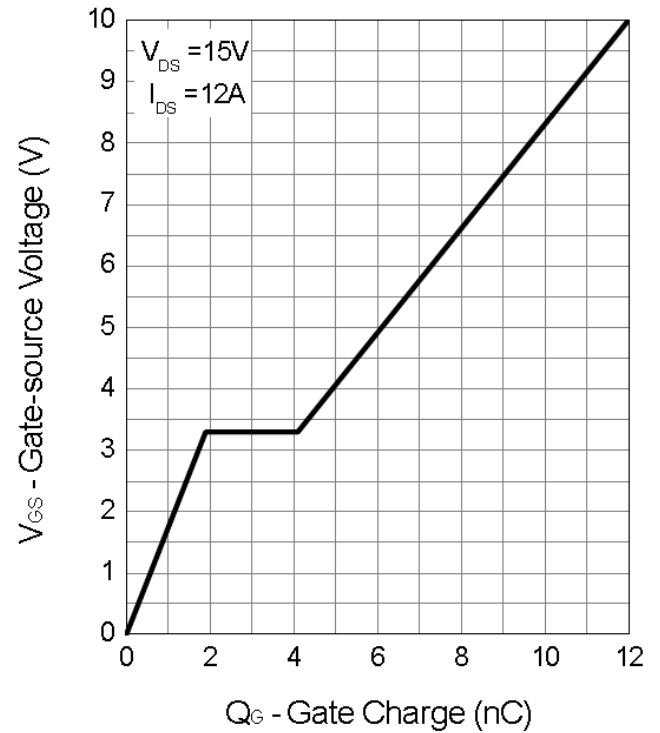


Typical Operating Characteristics (Cont.)

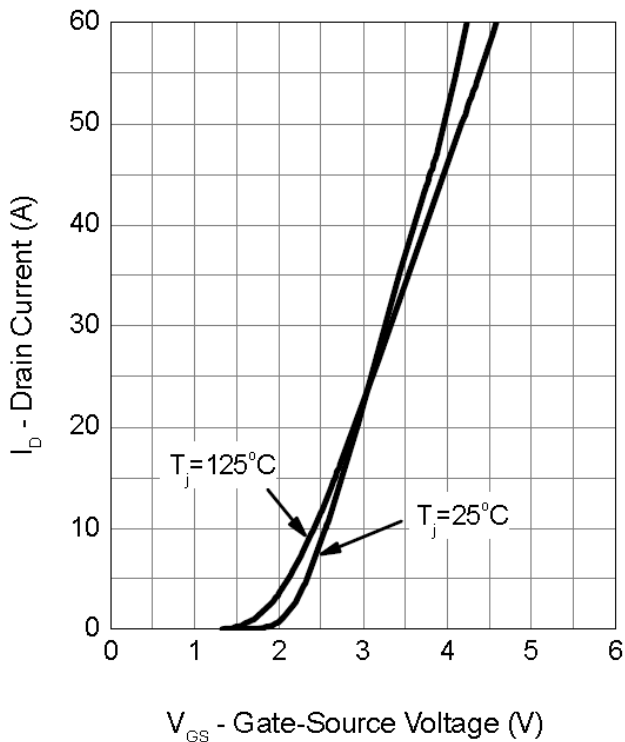
Capacitance



Gate Charge



Transfer Characteristics

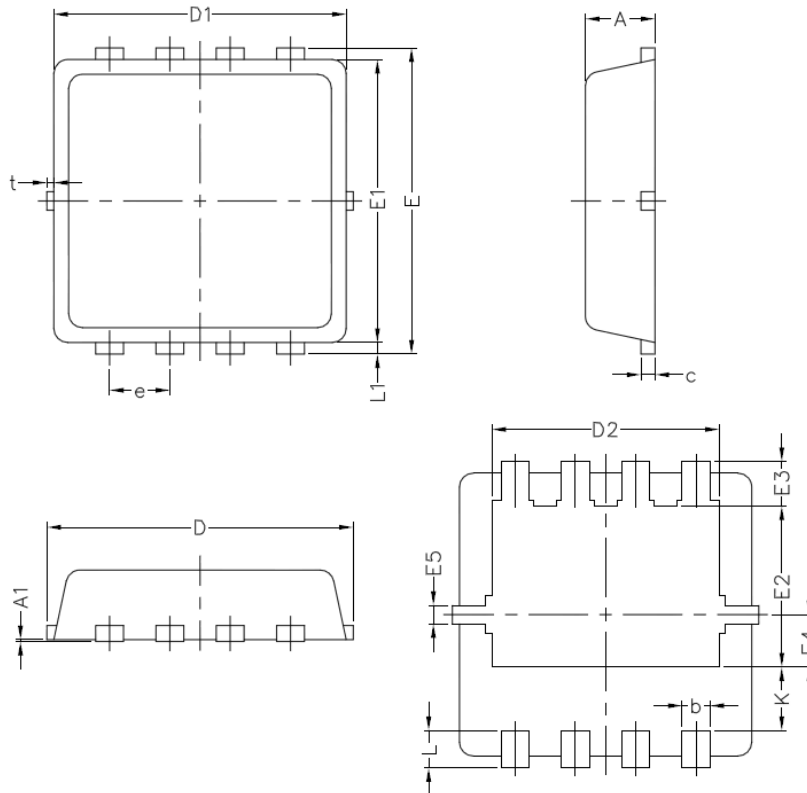


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Package Information

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