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MCH3333A

MOSFET – Power, Single P-Channel -30 V, 215 mΩ, -2.0 A

ON Semiconductor®

www.onsemi.com

This Power MOSFET is produced using ON Semiconductor's trench technology, which is specifically designed to minimize gate charge and low on resistance. This device is suitable for applications with low gate charge driving or low on resistance requirements.

Features

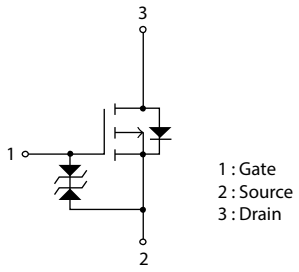
- Low On-Resistance
- 1.8V drive
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS compliance

Typical Applications

- Load Switch

V_{DSS}	R_{DS}(on) Max	I_D Max
–30V	215mΩ@ –4V	–2A
	280mΩ@ –2.5V	
	430mΩ@ –1.8V	

ELECTRICAL CONNECTION P-Channel



SPECIFICATIONS

ABSOLUTE MAXIMUM RATING at Ta = 25°C (Note 1)

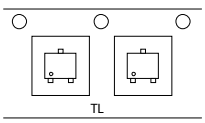
Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	–30	V
Gate to Source Voltage	V_{GSS}	±10	V
Drain Current (DC)	I_D	–2.0	A
Drain Current (Pulse) PW ≤ 10μs, duty cycle ≤ 1%	I_{DP}	–8.0	A
Power Dissipation When mounted on ceramic substrate (1000mm^2 × 0.8mm)	P_D	0.9	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	–55 to +150	°C

Note 1 : Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

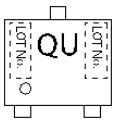
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (1000mm^2 × 0.8mm)	$R_{\theta JA}$	138.8	°C/W

PACKING TYPE : TL



MARKING



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

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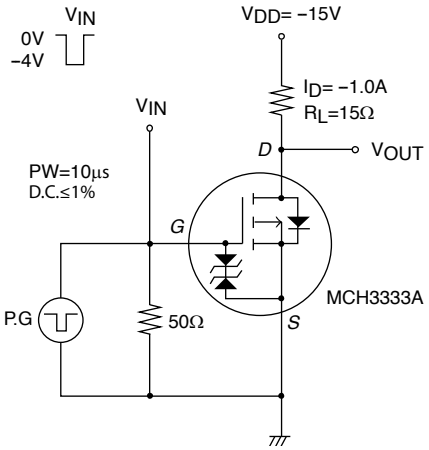
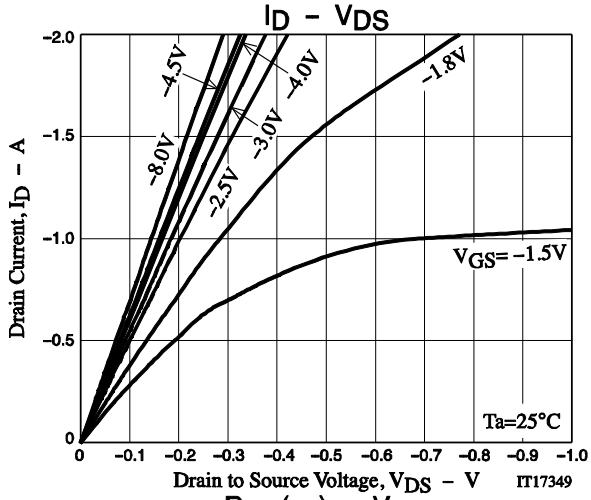
ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 2)

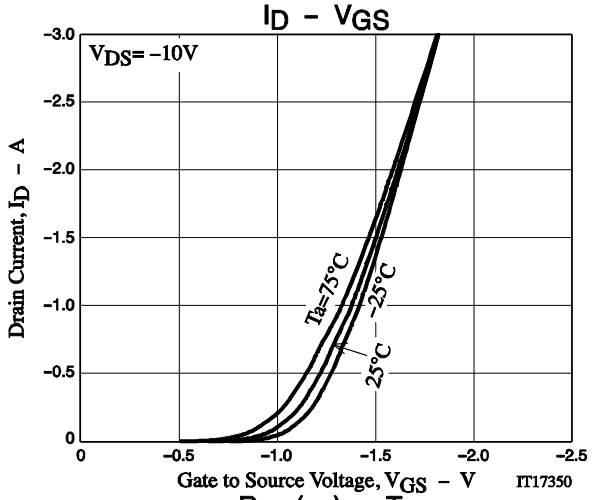
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0V	−30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−30V, V_{GS}=0V			−1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			□±10	μA
Gate Threshold Voltage	V_{GS}(th)	V_{DS}=−10V, I_D=−1mA	−0.4		−1.3	V
Forward Transconductance	g_{FS}	V_{DS}=−10V, I_D=−1.0A		2.5		S
Static Drain to Source On-State Resistance	R_{DS}(on)1	I_D=−1.0A, V_{GS}=−4V		165	215	mΩ
	R_{DS}(on)2	I_D=−0.5A, V_{GS}=−2.5V		200	280	mΩ
	R_{DS}(on)3	I_D=−0.2A, V_{GS}=−1.8V		270	430	mΩ
Input Capacitance	Ciss	V_{DS}=−10V, f=1MHz		240		pF
Output Capacitance	Coss			39		pF
Reverse Transfer Capacitance	Crss			31		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit		5.7		ns
Rise Time	t_r			9.7		ns
Turn-OFF Delay Time	t_d(off)			27		ns
Fall Time	t_f			16		ns
Total Gate Charge	Qg	V_{DS}=−15V, V_{GS}=−4V, I_D=−2.0A		2.8		nC
Gate to Source Charge	Qgs			0.3		nC
Gate to Drain “Miller” Charge	Qgd			0.95		nC
Forward Diode Voltage	V_{SD}	I_S=−2.0A, V_{GS}=0V		−0.87	−1.5	V

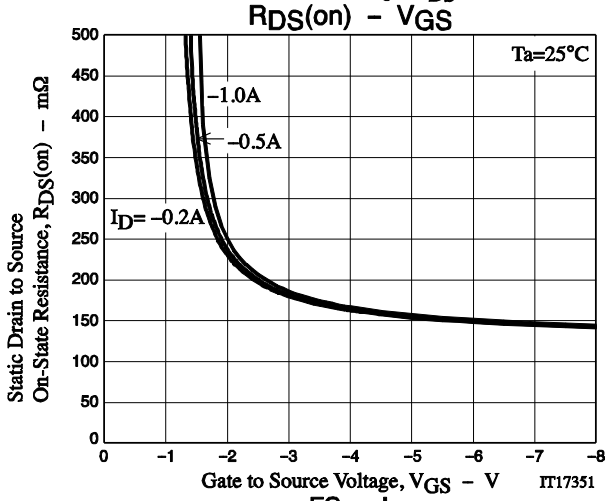
Note 2 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

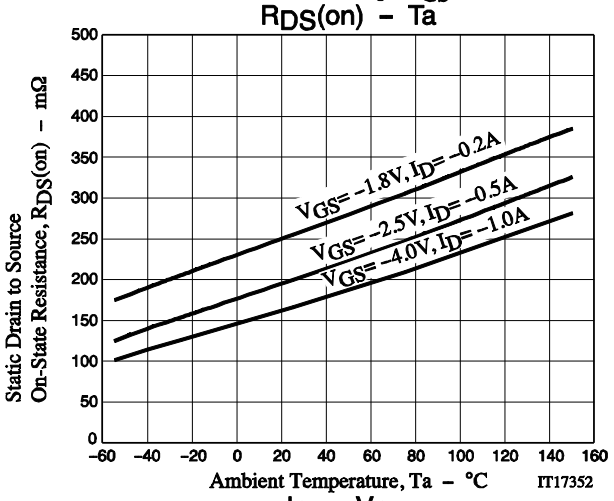
Switching Time Test Circuit

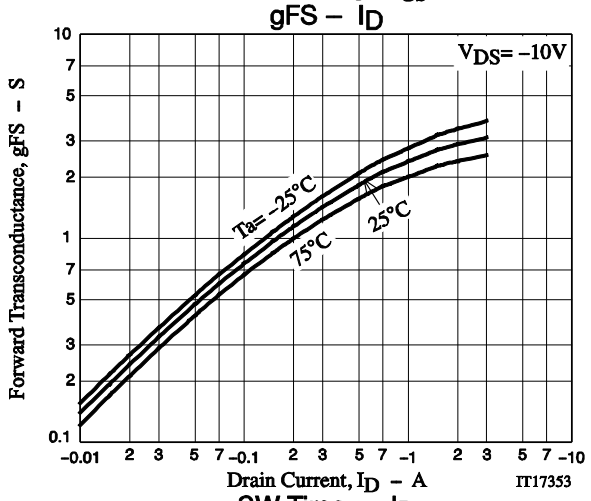


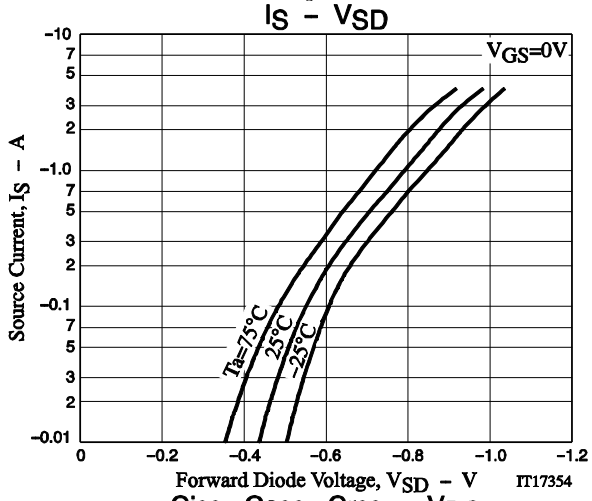

ID – VDS
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17349
–4.5V
–8.0V
–4.0V
–3.0V
–2.5V
–1.8V
VGS= –1.5V
Ta=25°C

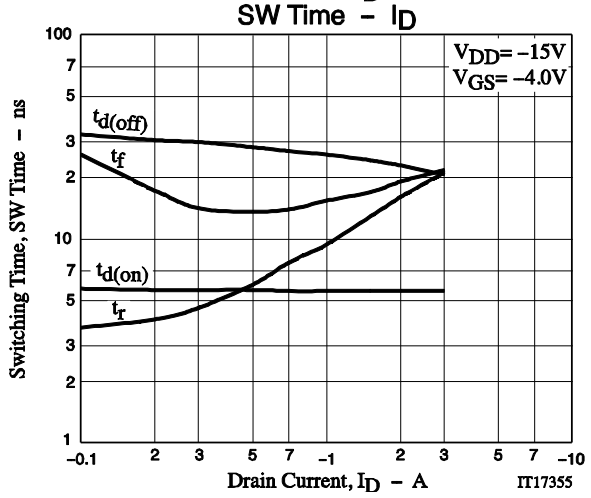

ID – VGS
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT17350
VDS= –10V
Ta=75°C
–25°C
25°C

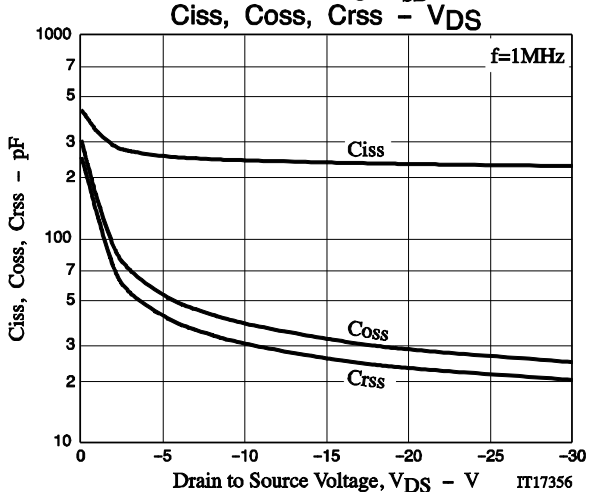

RDS(on) – VGS
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT17351
Ta=25°C
–1.0A
–0.5A
ID= –0.2A

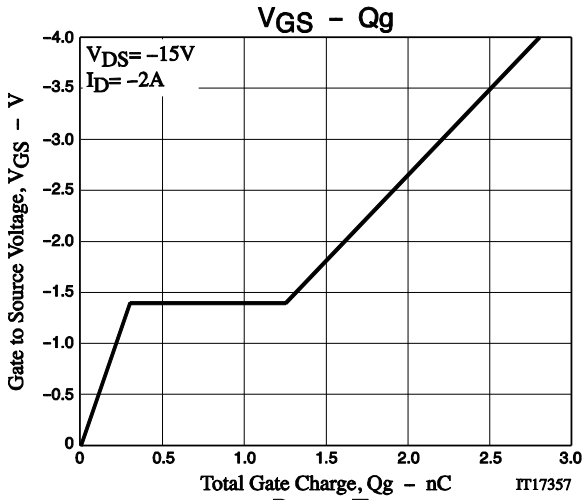

RDS(on) – Ta
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT17352
VGS= –1.8V, ID= –0.2A
VGS= –2.5V, ID= –0.5A
VGS= –4.0V, ID= –1.0A

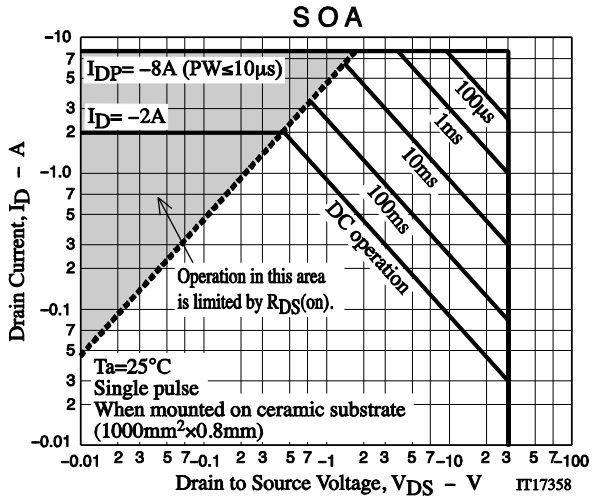

gFS – ID
Forward Transconductance, gFS – S
Drain Current, ID – A
IT17353
VDS= –10V
Ta= –25°C
25°C
75°C

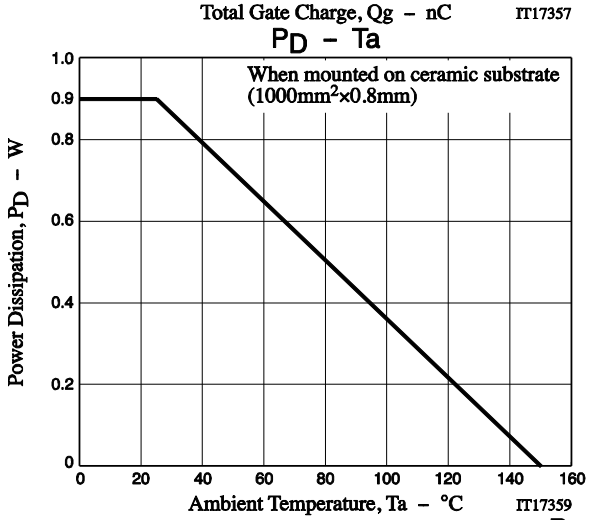

IS – VSD
Source Current, IS – A
Forward Diode Voltage, VSD – V
IT17354
VGS=0V
Ta=75°C
25°C
–25°C

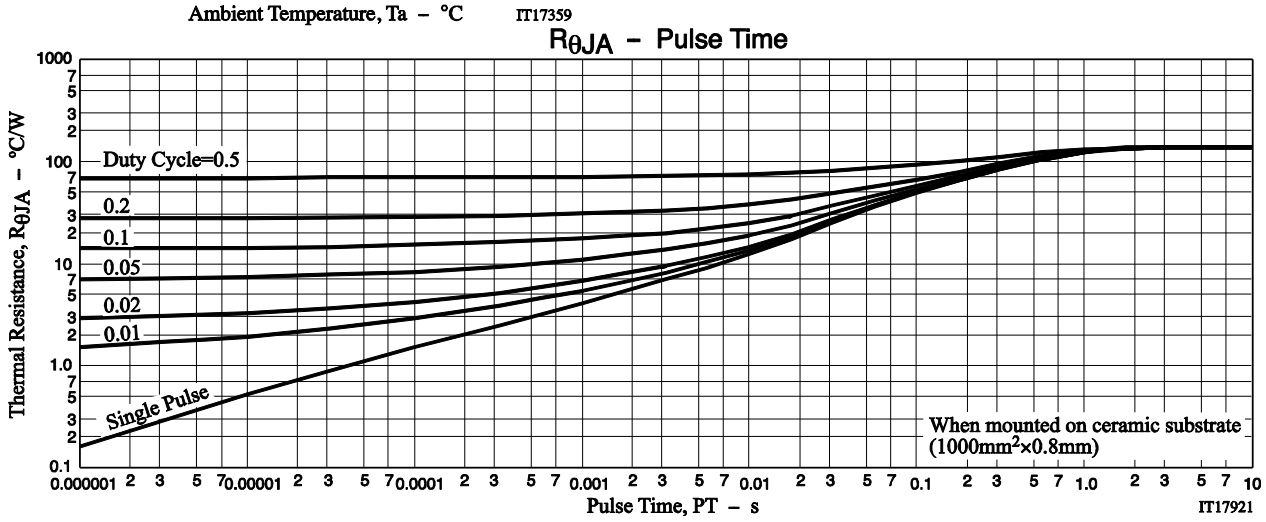

SW Time – ID
Switching Time, SW Time – ns
Drain Current, ID – A
IT17355
VDD= –15V
VGS= –4.0V
td(off)
tf
td(on)
tr


Ciss, Coss, Crss – VDS
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT17356
f=1MHz
Ciss
Coss
Crss


VGS – Qg
VDS= –15V
ID= –2A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT17357


S O A
IDP= –8A (PW≤10μs)
ID= –2A
100μs
1ms
10ms
100ms
DC operation
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(1000mm2×0.8mm)
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17358

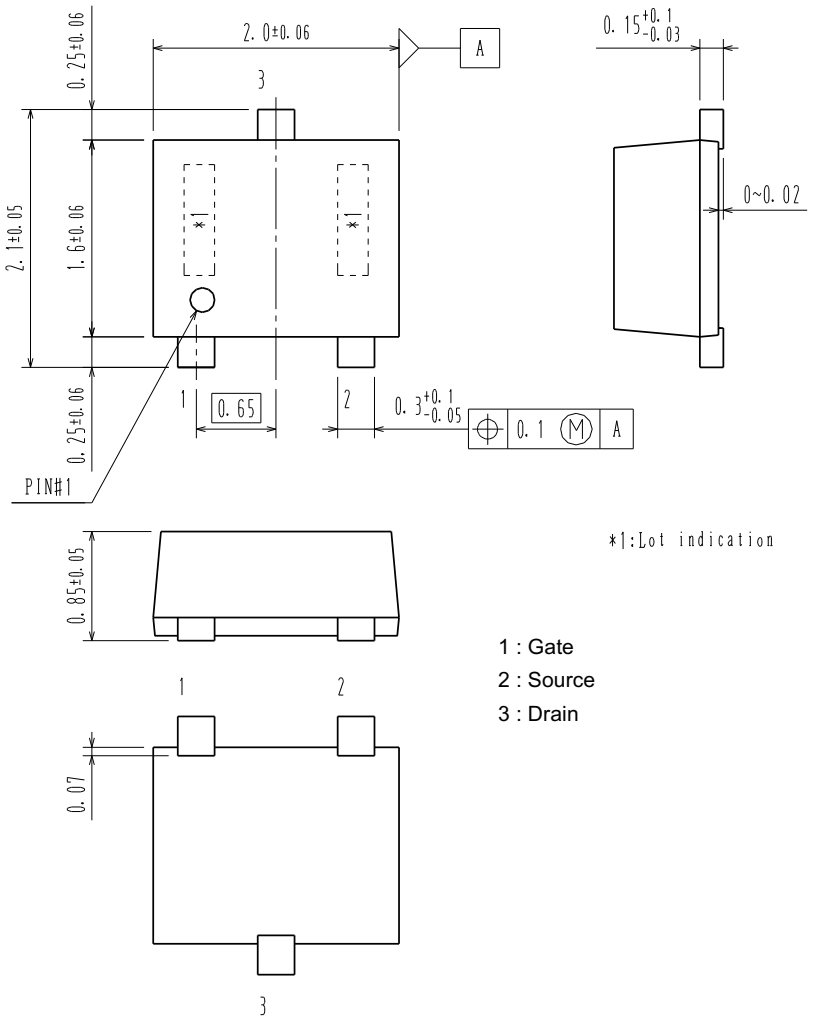

PD – Ta
When mounted on ceramic substrate
(1000mm2×0.8mm)
Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT17359


RθJA – Pulse Time
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
When mounted on ceramic substrate
(1000mm2×0.8mm)
Thermal Resistance, RθJA – °C/W
Pulse Time, PT – s
IT17921

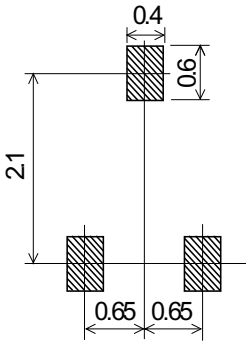
PACKAGE DIMENSIONS

unit : mm

SC-70FL / MCPH3
CASE 419AQ
ISSUE O



Recommended Soldering Footprint



ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
MCH3333A-TL-H	QU	SC-70FL / MCPH3 (Pb-Free / Halogen Free)	3,000 / Tape & Reel
MCH3333A-TL-W			

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF

Note on usage : Since the MCH3333A is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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