CPH3351

Power MOSFET
–60V, 250mΩ, –1.8A, Single P-Channel

ON Semiconductor®

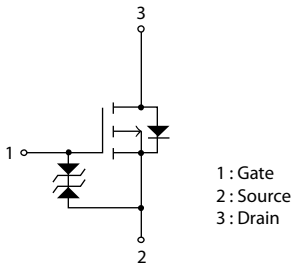
www.onsemi.com

V_{DSS}	R_{DS}(on) Max	I_D Max
–60V	250mΩ@ –10V	–1.8A
	330mΩ@ –4.5V	
	350mΩ@ –4V	

Features

- Low On-Resistance
- 4V Drive
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS Compliance

Electrical Connection
P-Channel

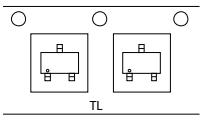


Specifications

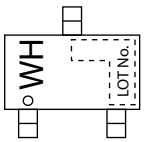
Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	–60	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	–1.8	A
Drain Current (Pulse) PW ≤ 10μs, duty cycle ≤ 1%	I_{DP}	–7.2	A
Power Dissipation When mounted on ceramic substrate (900mm^2 × 0.8mm)	P_D	1.0	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	–55 to +150	°C

Packing Type : TL



Marking



Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (900mm^2 × 0.8mm)	$R_{\theta JA}$	125	°C/W

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.

ORDERING INFORMATION

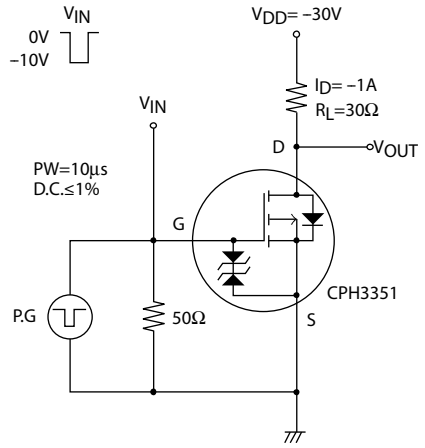
See detailed ordering and shipping information on page 5 of this data sheet.

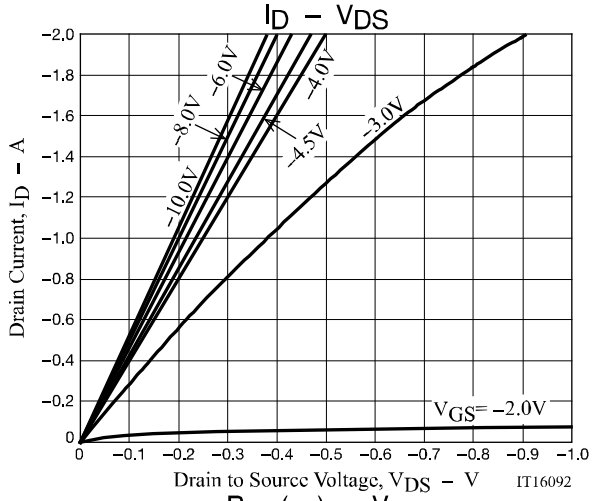
Electrical Characteristics at Ta = 25°C

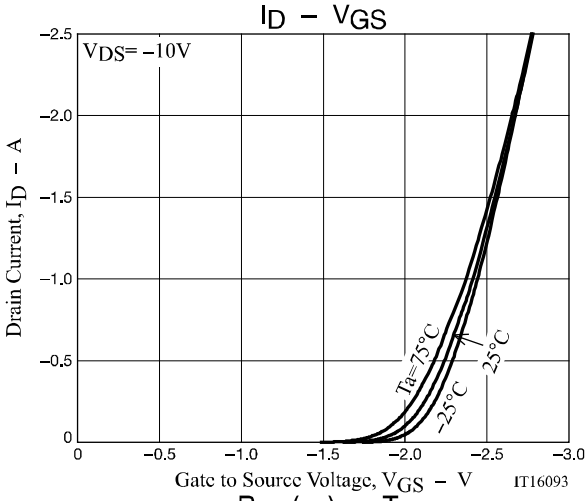
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=–1mA, V_{GS}=0V	–60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=–60V, V_{GS}=0V			–1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS}=–10V, I_D=–1mA	–1.2		–2.6	V
Forward Transconductance	g_{FS}	V_{DS}=–10V, I_D=–1A		2.7		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=–1A, V_{GS}=–10V		190	250	mΩ
	$R_{DS}(on)2$	I_D=–0.5A, V_{GS}=–4.5V		235	330	mΩ
	$R_{DS}(on)3$	I_D=–0.5A, V_{GS}=–4V		250	350	mΩ
Input Capacitance	Ciss	V_{DS}=–20V, f=1MHz		262		pF
Output Capacitance	Coss			29		pF
Reverse Transfer Capacitance	Crss			19		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		5.1		ns
Rise Time	t_r			5.4		ns
Turn-OFF Delay Time	$t_d(off)$			34		ns
Fall Time	t_f			19		ns
Total Gate Charge	Qg	V_{DS}=–30V, V_{GS}=–10V, I_D=–1.8A		6.0		nC
Gate to Source Charge	Qgs			0.83		nC
Gate to Drain “Miller” Charge	Qgd			1.3		nC
Forward Diode Voltage	V_{SD}	I_S=–1.8A, V_{GS}=0V		–0.82	–1.2	V

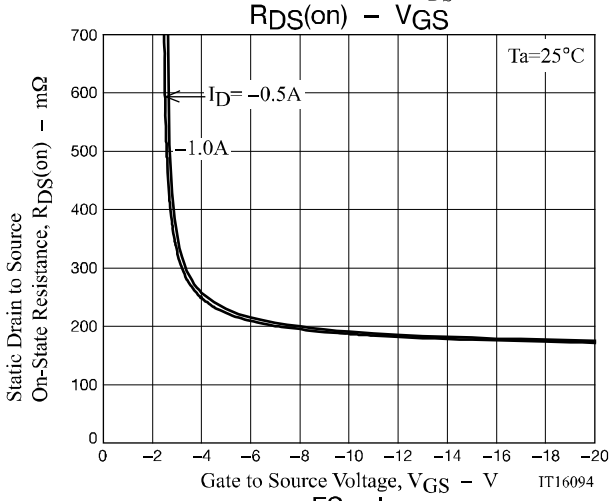
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

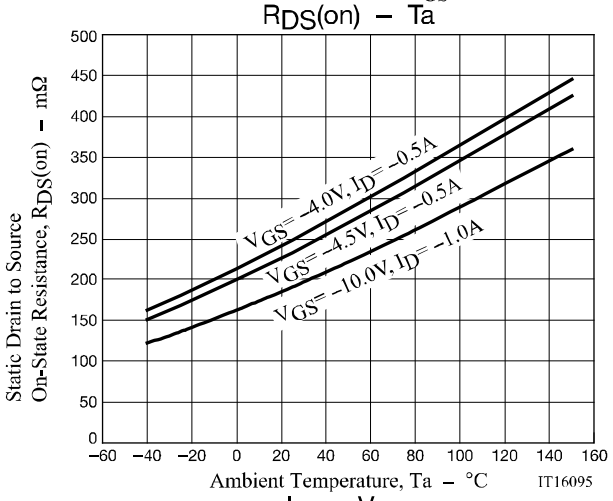
Switching Time Test Circuit

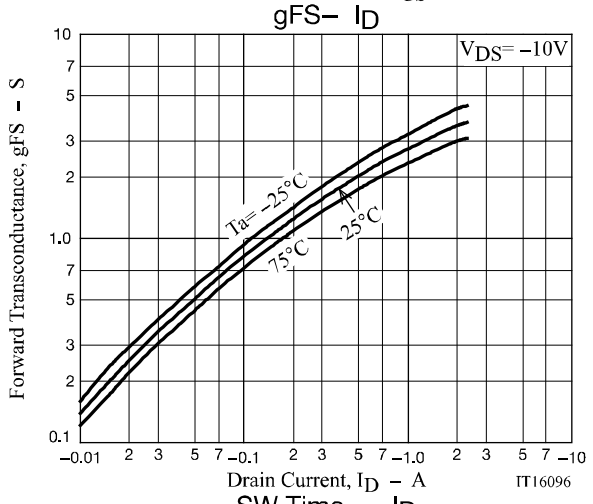


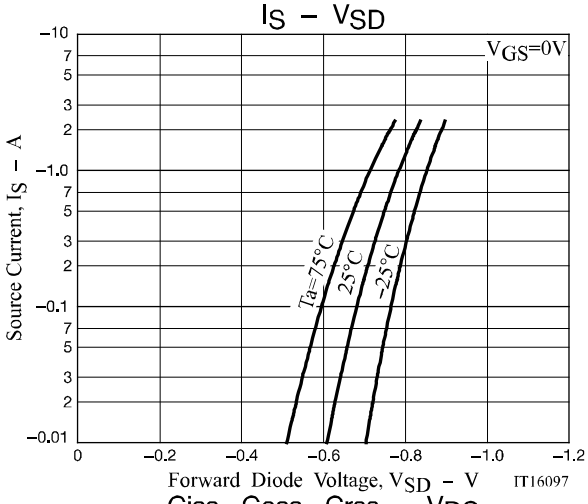

ID – VDS
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT16092
VGS= –2.0V
–3.0V
–4.0V
–4.5V
–6.0V
–8.0V
–10.0V

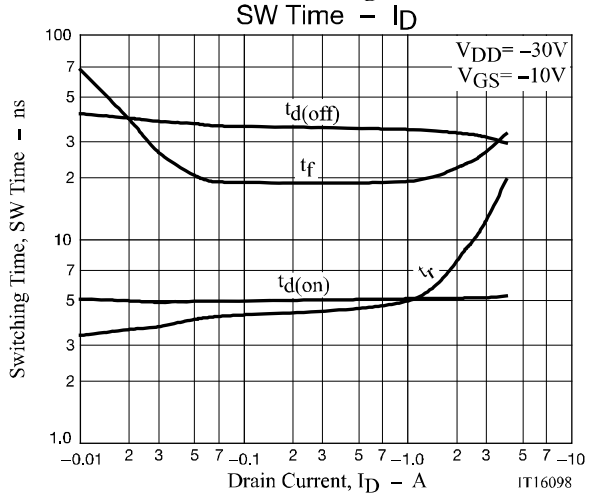

ID – VGS
VDS= –10V
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT16093
Ta=75°C
25°C
–25°C

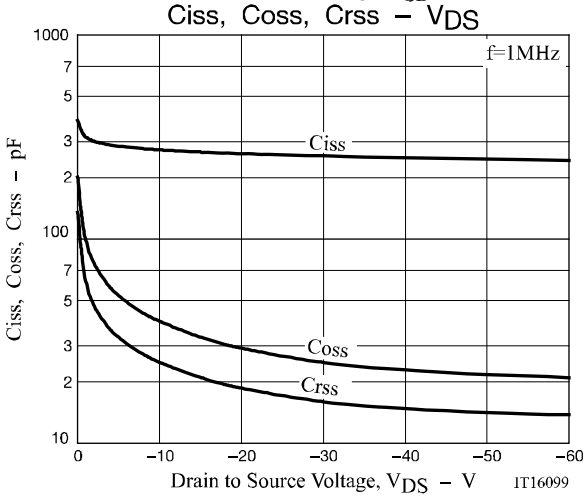

RDS(on) – VGS
Ta=25°C
ID= –0.5A
–1.0A
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT16094

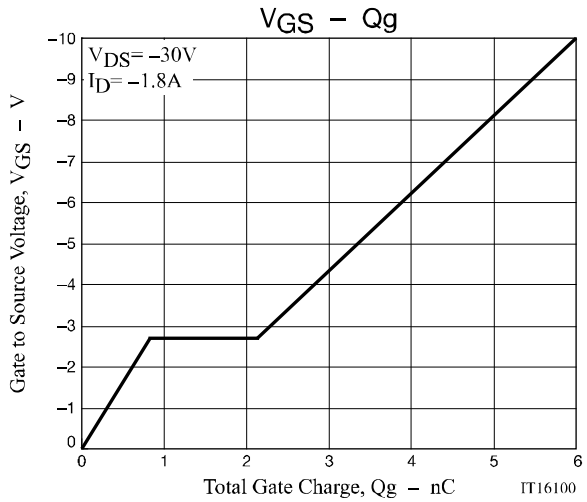

RDS(on) – Ta
VGS= –4.0V, ID= –0.5A
VGS= –4.5V, ID= –0.5A
VGS= –10.0V, ID= –1.0A
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT16095

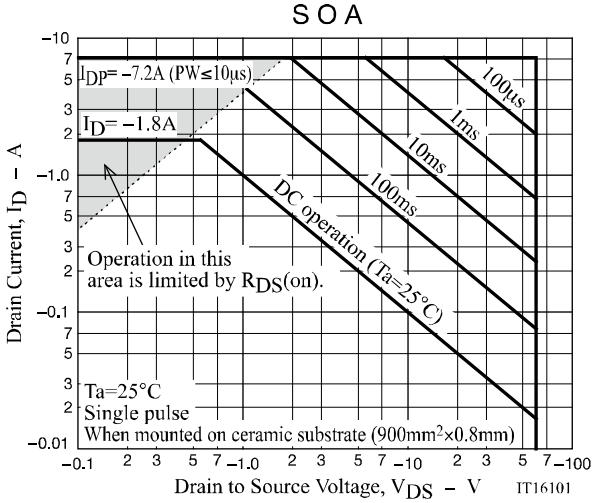

gFS– ID
VDS= –10V
Ta= –25°C
75°C
25°C
Forward Transconductance, gFS – S
Drain Current, ID – A
IT16096

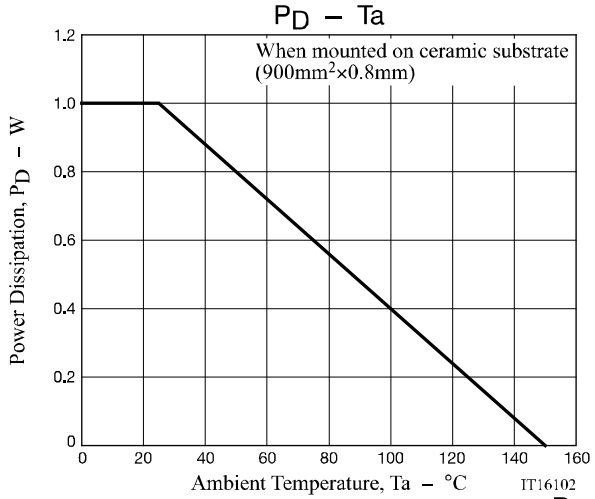

IS – VSD
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Forward Diode Voltage, VSD – V
IT16097

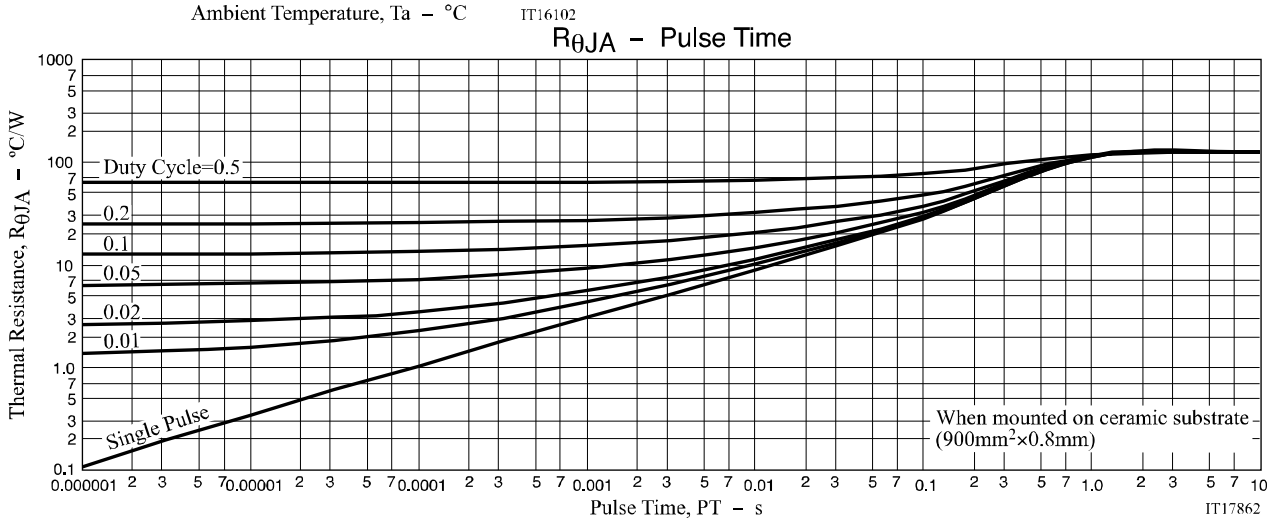

SW Time – ID
VDD= –30V
VGS= –10V
td(off)
tf
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT16098


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT16099


VGS – Qg
VDS= –30V
ID= –1.8A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16100


S O A
IDP= –7.2A (PW≤10μs)
ID= –1.8A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm²×0.8mm)
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT16101


PD – Ta
When mounted on ceramic substrate (900mm²×0.8mm)
Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT16102


RθJA – Pulse Time
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
When mounted on ceramic substrate (900mm²×0.8mm)
Thermal Resistance, RθJA – °C/W
Pulse Time, PT – s
IT17862

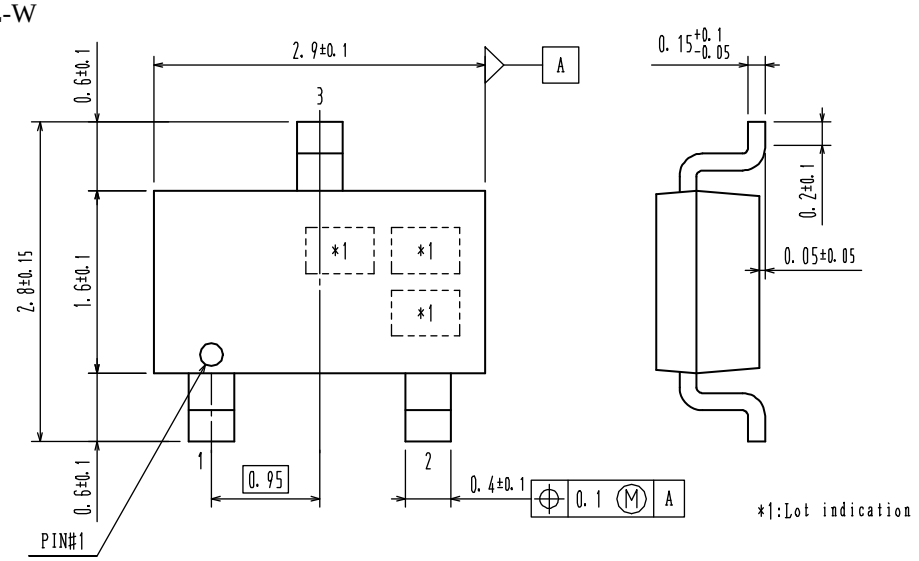
Package Dimensions

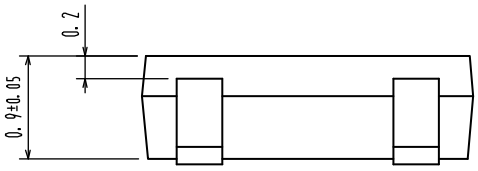
CPH3351-TL-H / CPH3351-TL-W

CPH3
CASE 318BA
ISSUE O

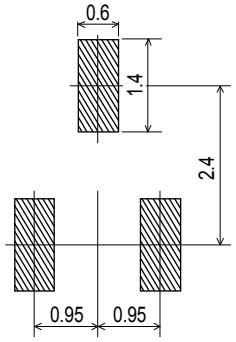
unit : mm

1 : Gate
2 : Source
3 : Drain





Recommended Soldering Footprint



ORDERING INFORMATION

Device	Package	Shipping	Note
CPH3351-TL-H	CPH3, SC-59 SOT-23, TO-236	3,000 pcs. / Tape & Reel	Pb-Free and Halogen Free
CPH3351-TL-W			

Note on usage : Since the CPH3351 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.