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Ordering number : ENA2294A

PCP1403

N-Channel Power MOSFET 60V, 4.5A, 117mΩ, Single PCP

ON Semiconductor®

http://onsemi.com

Features

- On-resistance $R_{DS}(on)1$=92mΩ(typ.)
- 4V drive
- Protection Diode in
- Halogen free compliance

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Value	Unit
Drain to Source Voltage	V_{DSS}		60	V
Gate to Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		4.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	18	A
Power Dissipation	P_D	Tc=25°C	3.5	W
		When mounted on ceramic substrate (600mm^2×0.8mm)	1.3	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		- 55 to +150	°C

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 Case Steady State	$R_{\theta JC}$	35.7	°C /W
Junction to Ambient When mounted on ceramic substrate (600mm^2×0.8mm)	$R_{\theta JA}$	96.1	°C /W

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=2A		2.5		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=2A, V_{GS}=10V		92	117	mΩ
	$R_{DS}(on)2$	I_D=1A, V_{GS}=4.5V		120	168	mΩ
	$R_{DS}(on)3$	I_D=1A, V_{GS}=4V		132	185	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		310		pF
Output Capacitance	Coss			40		pF
Reverse Transfer Capacitance	Crss			25		pF

Continued on next page.

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

Continued from preceding page.

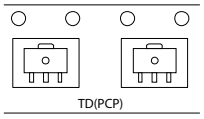
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Turn-ON Delay Time	$t_{d}(on)$	See specified Test Circuit		5.6		ns
Rise Time	t_{r}			7.0		ns
Turn-OFF Delay Time	$t_{d}(off)$			26		ns
Fall Time	t_{f}			14		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_{D}=4.5A		6.7		nC
Gate to Source Charge	Qgs			1.0		nC
Gate to Drain “Miller” Charge	Qgd			1.6		nC
Forward Diode Voltage	V_{SD}	I_{S}=4.5A, V_{GS}=0V		0.88	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.

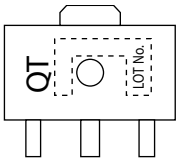
Ordering & Package Information

Device	Package	Shipping	note
PCP1403-TD-H	PCP, SC-62 SOT-89, TO-243	1,000 pcs. / reel	Pb-Free and Halogen Free

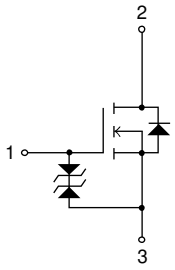
Packing Type:TD



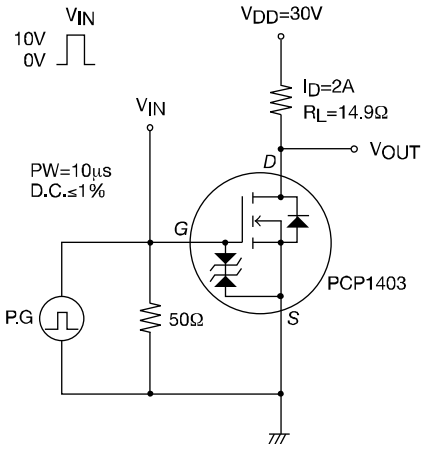
Marking

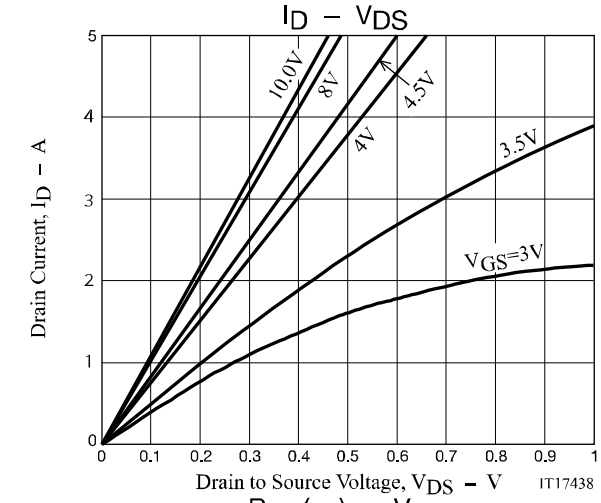


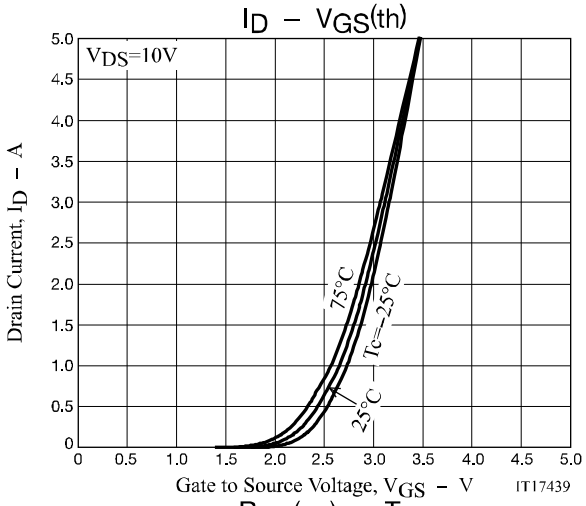
Electrical Connection

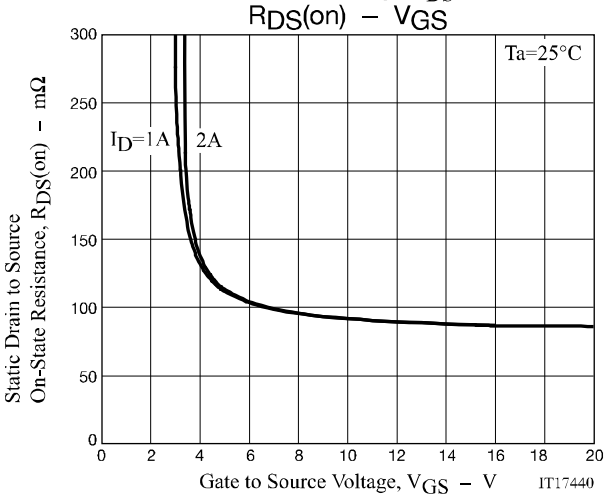


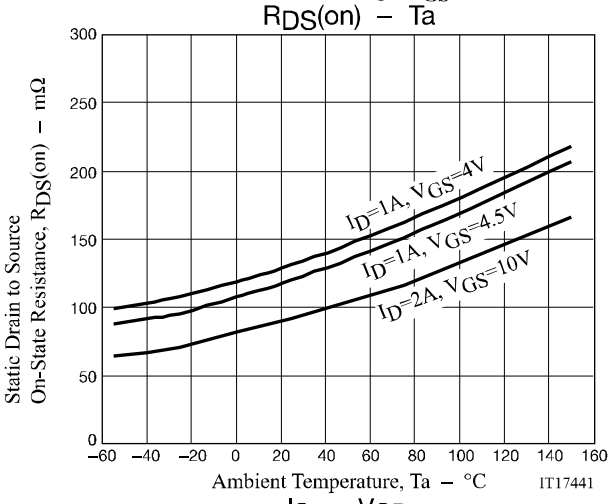
Switching Time Test Circuit

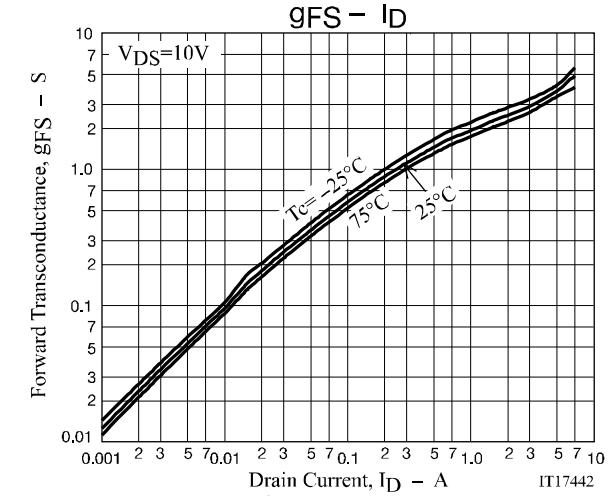


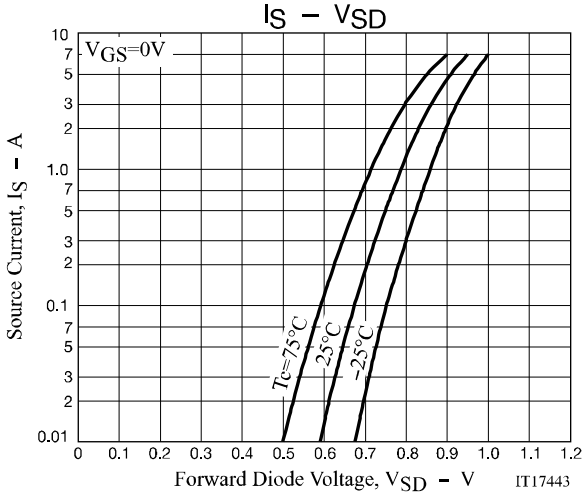

ID – VDS
Drain Current, ID – A
Drain to Source Voltage, VDS – V
10.0V
8V
4.5V
4V
3.5V
VGS=3V
IT17438

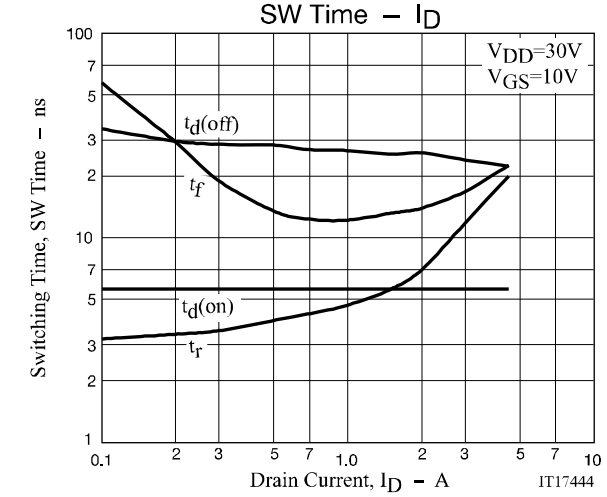

ID – VGS(th)
VDS=10V
Drain Current, ID – A
Gate to Source Voltage, VGS – V
75°C
Tc=–25°C
25°C
IT17439

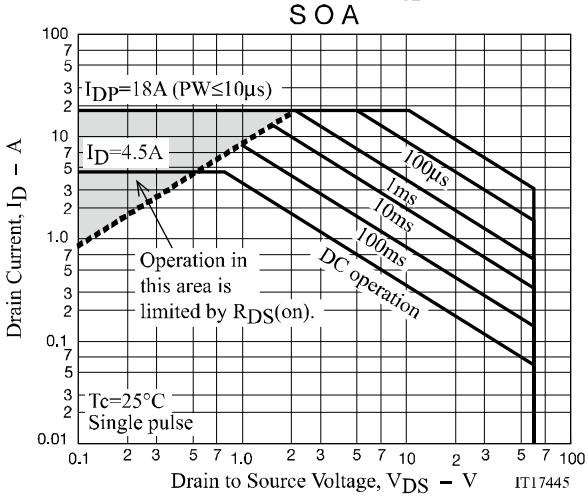

RDS(on) – VGS
Ta=25°C
ID=1A
2A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT17440

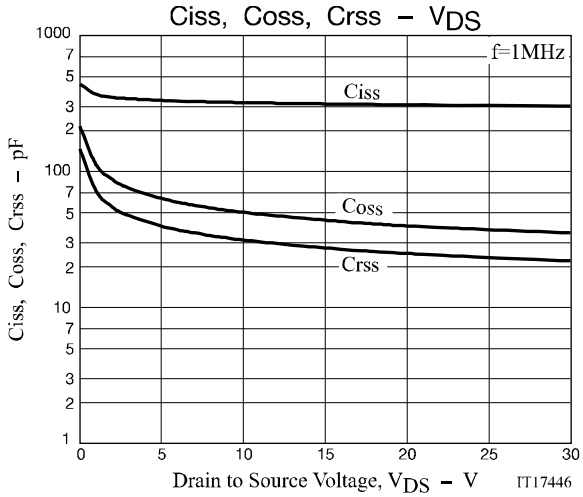

RDS(on) – Ta
ID=1A, VGS=4V
ID=1A, VGS=4.5V
ID=2A, VGS=10V
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT17441

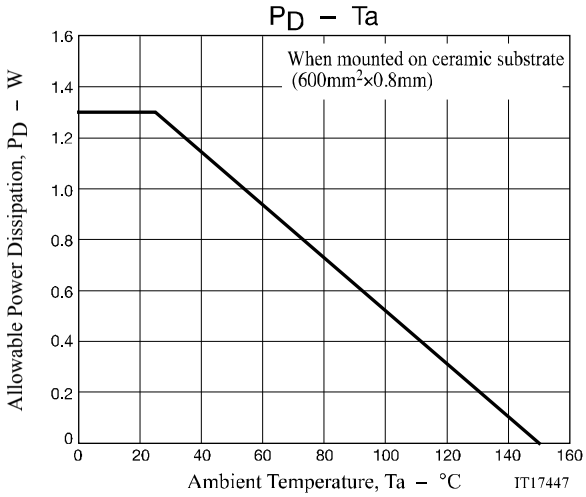

gFS – ID
VDS=10V
Tc=–25°C
75°C
25°C
Forward Transconductance, gFS – S
Drain Current, ID – A
IT17442

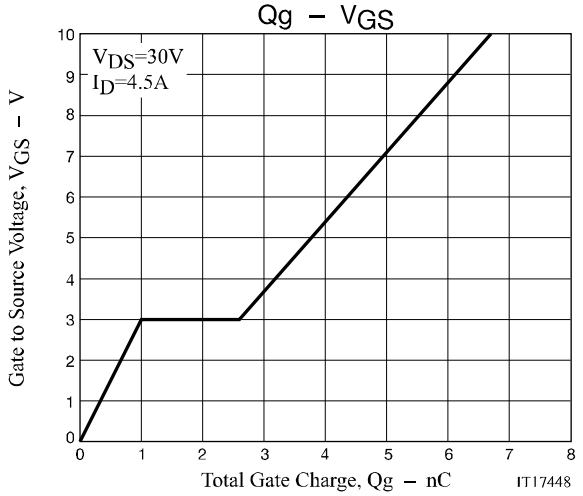

IS – VSD
VGS=0V
Tc=75°C
25°C
–25°C
Source Current, IS – A
Forward Diode Voltage, VSD – V
IT17443

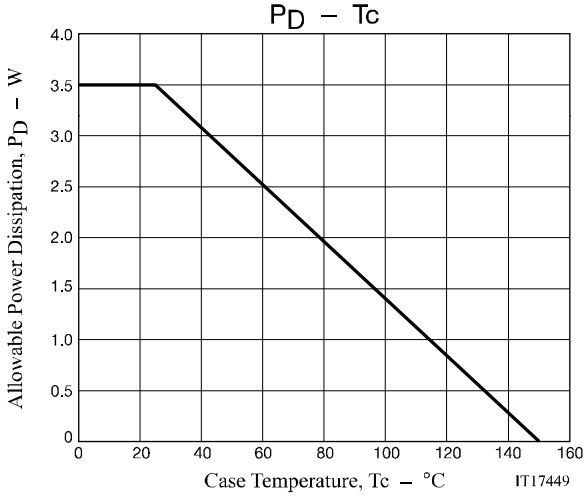

SW Time – ID
VDD=30V
VGS=10V
td(off)
tf
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT17444

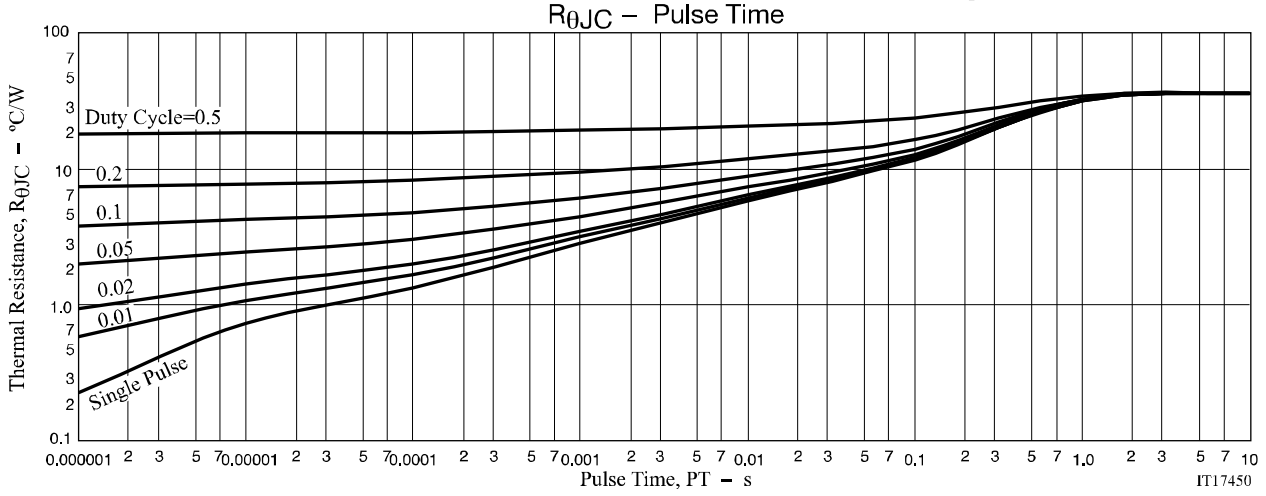

S O A
IDP=18A (PW≤10μs)
ID=4.5A
100μs
1ms
10ms
100ms
DC operation
Operation in this area is limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17445


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT17446


PD – Ta
When mounted on ceramic substrate
(600mm²×0.8mm)
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT17447


Qg – VGS
VDS=30V
ID=4.5A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT17448


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT17449


RθJC – Pulse Time
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Thermal Resistance, RθJC – °C/W
Pulse Time, PT – s
IT17450

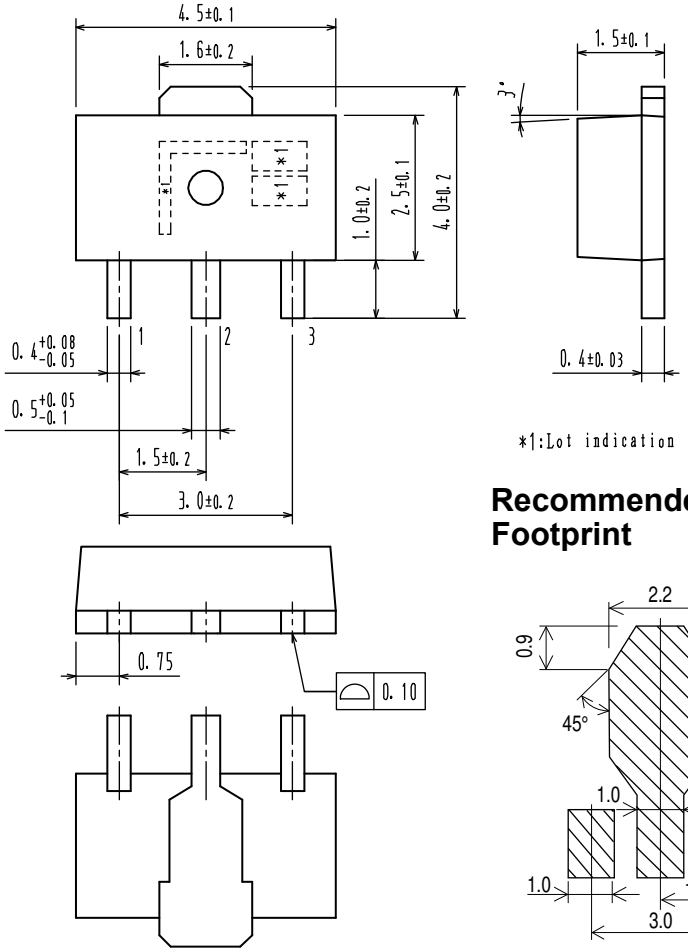
Package Dimensions

PCP1403-TD-H

SOT-89/PCP-1

CASE 419AU
ISSUE O
Unit : mm

1: Gate
2: Drain
3: Source



Recommended Soldering Footprint

Note on usage : Since the PCP1403 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.