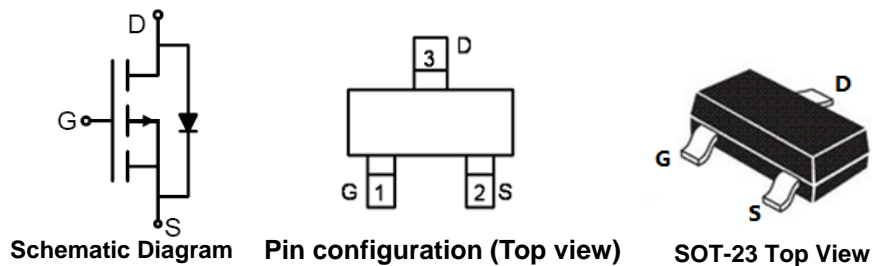**30V P-Channel Enhancement Mode MOSFET**

1. General description

The MP30T39MR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -0.8V. This device is suitable for use as aload switch or in PWM applications.

Schematic Diagram   Pin configuration (Top view)   SOT-23 Top View

2. Specification Features

- V_{DS} = -30V, I_D = -4.5A
- $R_{DS(ON)}$ < 75mΩ @ V_{GS} = -4.5V （TYPE: 65mΩ）
- $R_{DS(ON)}$ < 125mΩ @ V_{GS} = -2.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

3. Application

- PWM applications
- Load switch
- Power management

4. Package Marking and Ordering Information

Device Marking	Device	Package	Reel size	Tape width	Quantity
P3039	MP30T39MR	SOT-23	Ø180mm	8mm	3000

5. Absolute Maximum Ratings (TJ =25)

Characteristics		Symbol	Rating	Unit
DrainSource Voltage		VDSS	-30	V
GateSource Voltage		VGSS	±12	V
Continuous Drain Current (1)	Tc=25 (silicon limited)	ID	-4.5	A
	Tc=25 (package limited)		-3.6	
	Tc=100 (silicon limited)		-2.8	
Pulsed Drain Current (2)		IDM	-30	
Power Dissipation	Tc=25	PD	1.3	W
	Tc=100		0.85	
Single Pulse Avalanche Energy (3)		EAS		mJ
Junction and Storage Temperature Range		TJ, Tstg	-55~150	

6. Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, JunctiontoAmbient (1)	RθJA	96	/W
Thermal Resistance, JunctiontoCase	RθJC		

7. Electrical Characteristics (TJ =25)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
DrainSource Breakdown Voltag	BVDSS	ID = -250µA, VGS = 0V	-30	-33		V
Gate Threshold Voltage	VGS th	VDS = VGS, ID = -250µA	-0.5	-0.8	-1.2	
Drain CutOff Current	IDSS	VDS = -30V, VGS = 0V			1	µA
Gate Leakage Current	IGSS	VGS = ±12V, VDS = 0V			±0.1	
DrainSource ON Resistance	RDS ON	VGS = -10V, ID = -4.5A		52	60	mΩ
		VGS = -4.5V, ID= -4A		65	75	mΩ
		VGS = -2.5V, ID= -2A		86	125	mΩ
Forward Transconductance	gfs	VDS = -10V, ID =-4.5A		7.5		S
Dynamic Characteristics						
Total Gate Charge	Qg	VDS = -15V, ID =-4.5A, VGS = -10V		10		nC
GateSource Charge	Qgs			2.2		
GateDrain Charge	Qgd			3.1		
Input Capacitance	Ciss	VDS =-15V, VGS = 0V, f = 1.0MHz		575		pF
Reverse Transfer Capacitance	Crss			76		
Output Capacitance	Coss			96		
TurnOn Delay Time	td(on)	VGS = -10V, VDS = -15V RL=2.8Ω , RG = 6Ω		5		ns
Rise Time	tr			6		
TurnOff Delay Time	td(off)			28		
Fall Time	tf			7.2		
Gate Resistance	Rg	f=1 MHz				Ω
DrainSource Body Diode Characteristics						
SourceDrain Diode Forward Voltage	VSD	IS = -4.5A, VGS = 0V		-0.9	-1.2	V
Body Diode Reverse Recovery Time	trr	IF = -4.5A, dl/dt = 100A/µS		-		ns
Body Diode Reverse Recovery Charge	Qrr			-		nc

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

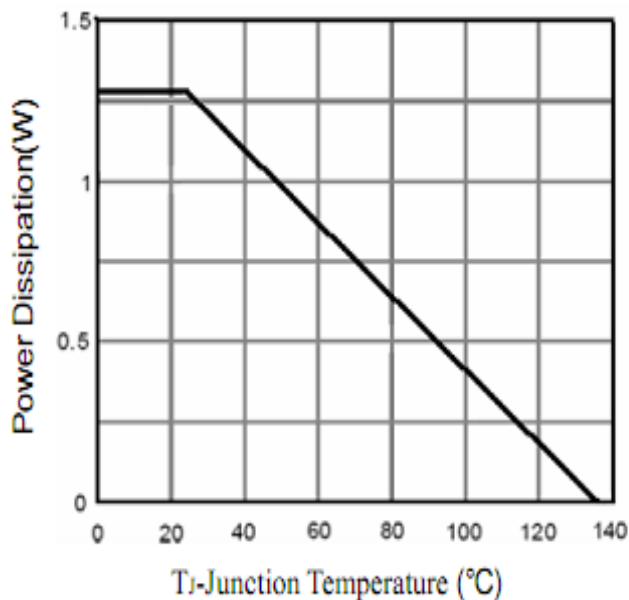## 8. Typical Electrical and Thermal Characteristics (Curves)
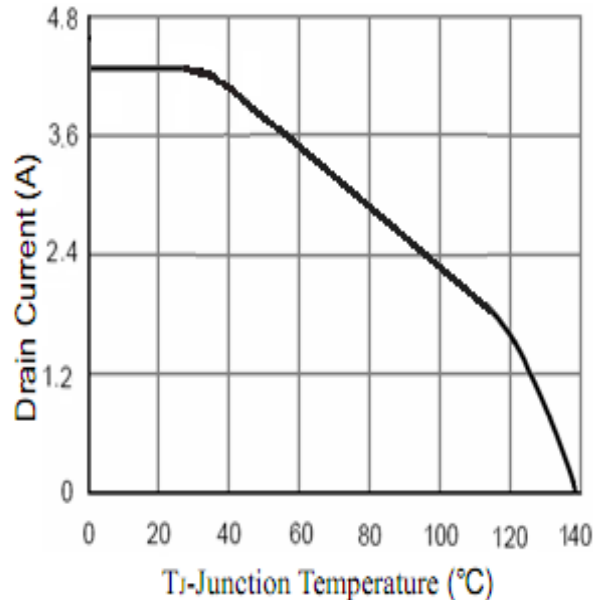
Figure1. Power Dissipation
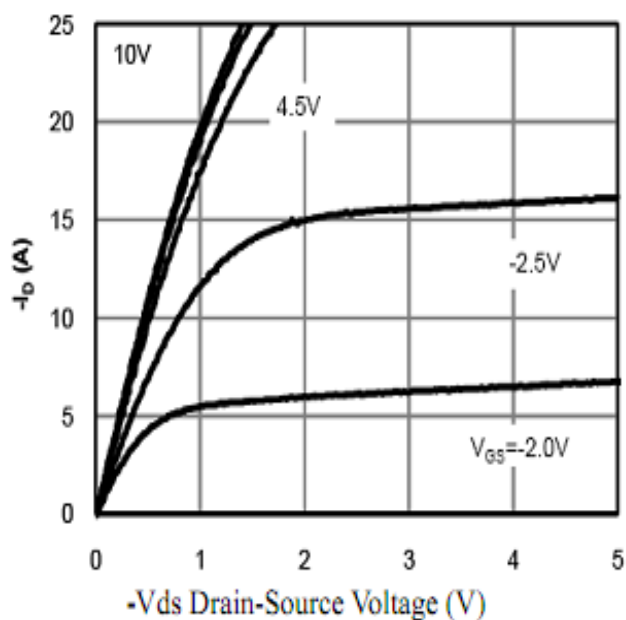
Figure2. Drain Current

Figure3. Output Characteristics
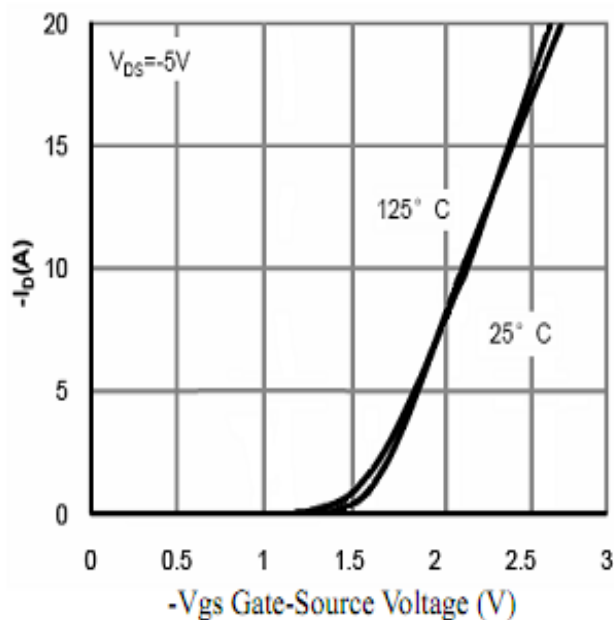
Figure4. Transfer Characteristics
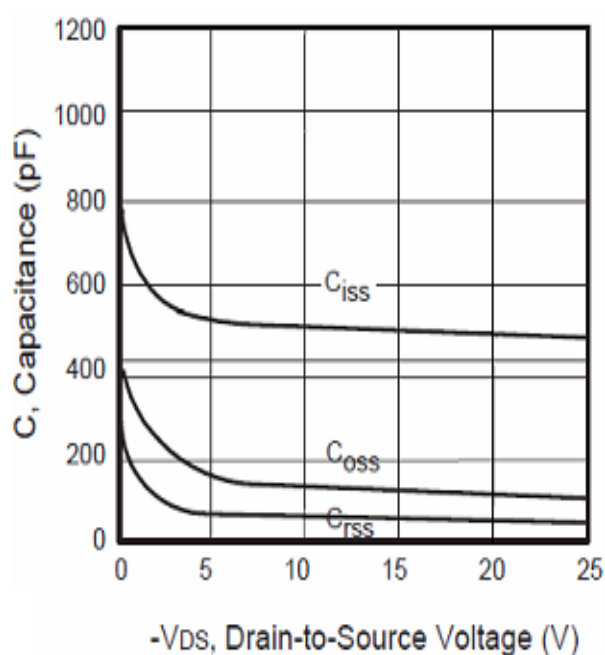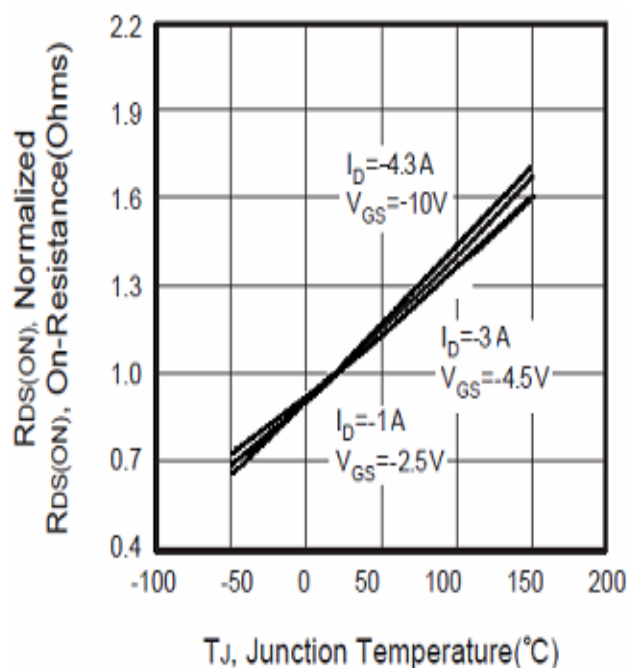
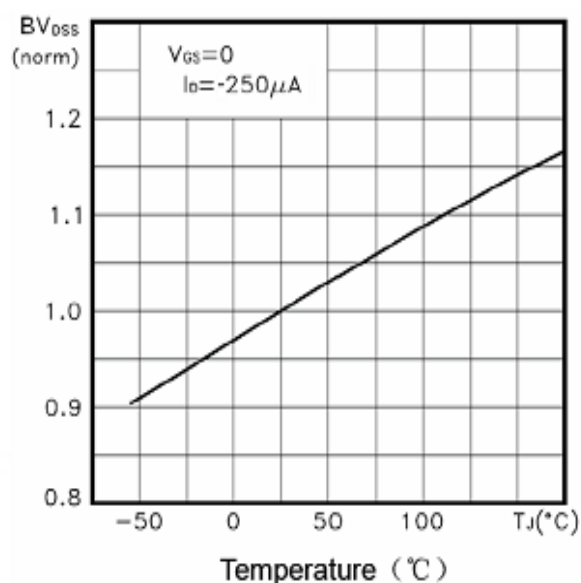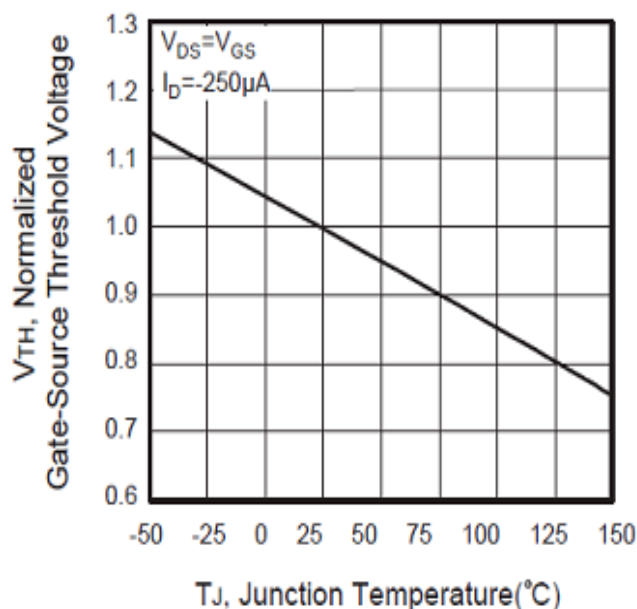## Figure5. Capacitance

Figure6. $R_{DS(ON)}$ vs Junction Temperature

Figure7. Max BV_{DSS} vs Junction Temperature

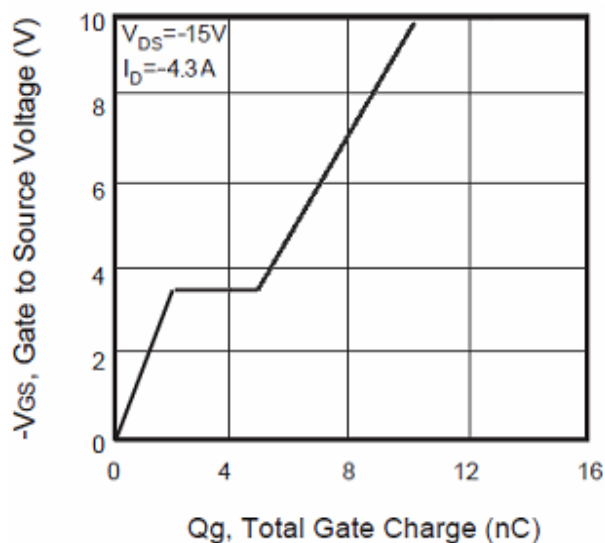## Figure8. $V_{GS(th)}$ vs Junction Temperature

Figure9. Gate Charge Waveforms

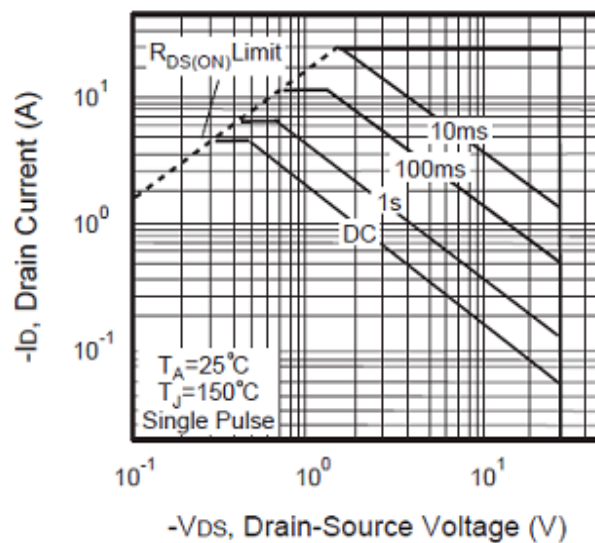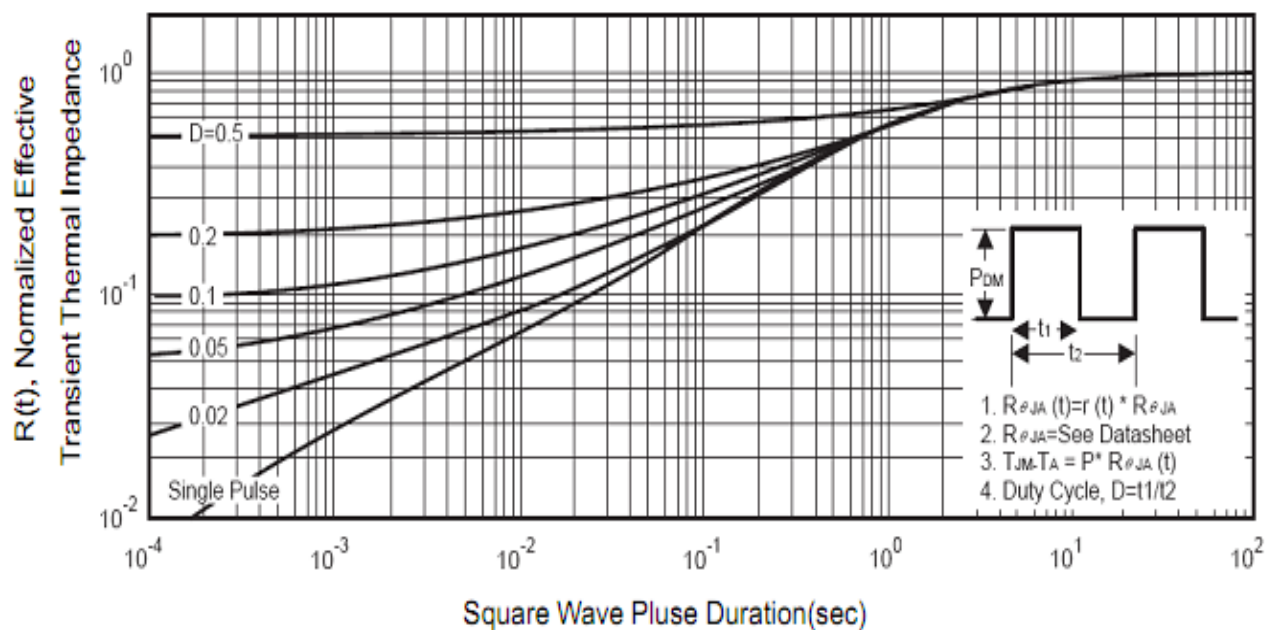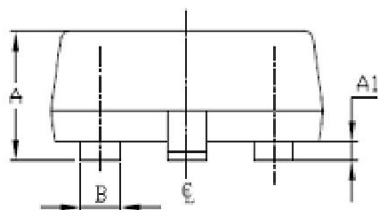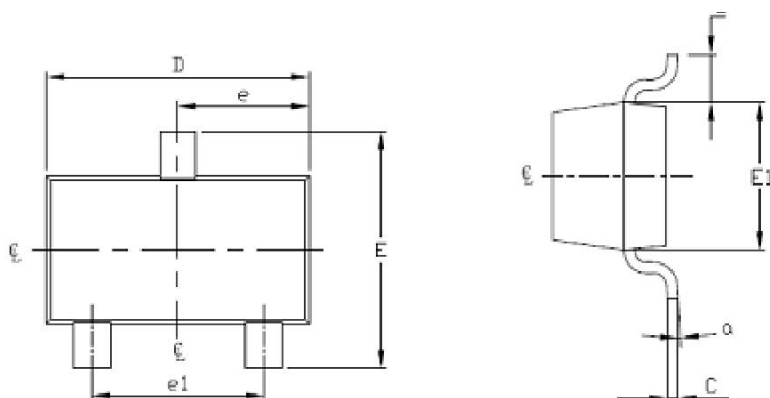## Figure10. Maximum Safe Operating Area

Figure11. Normalized Maximum Transient Thermal Impedance

9. Package Information

SOT-23   Package   Information

COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	0.9	1.0	1.1
A1	0.00	0.06	0.1
B	0.3	0.4	0.5
C	0.07	0.09	0.18
D	2.8	2.9	3.04
E	2.1	2.33	2.64
E1	1.2	1.3	1.4
e	1.4	1.45	1.5
e1	1.80	1.90	2.00
L	0.45	0.54	0.63
α	0°	2.5°	7°

10．RICTIONS ON PRODUCT USE

- The information contained herein is subject to change without notice.

- Millersemi Co., Ltd. exerts the greatest possible effort to ensure high quality and reliability. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing Millersemi products, to comply with the standards of safety in making a safe design for the entire system, including redundancy, fireprevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue. In developing your designs, please ensure that Millersemiproducts are used within specified operating ranges as set forth in the most recent Millersemi products specifications.

- The Millersemi products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These Millersemi products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of Millersemiproducts listed in this document shall be made at the customer's own risk.