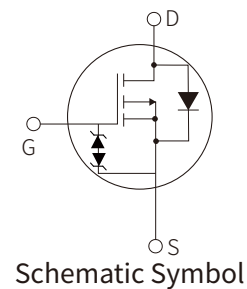
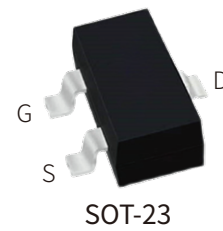


## FEATURES

- | High Density Cell Design For Low  $R_{DS(On)}$
- | Voltage Controlled Small Signal Switch
- | Rugged and Reliable
- | High Saturation Current Capability
- | ESD Protected



## APPLICATION

- | Direct logic-level interface: TTL/CMOS
- | Drivers: relays, solenoids, lamps
- | hammers, display, memories, etc.
- | Battery operated systems
- | Solid-state relays

## APPROVALS

<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003

## ABSOLUTE MAXIMUM RATINGS

Parameter	Conditions	Symbol	Value	Unit
Drain-Source Voltage	$T_A=25^\circ\text{C}$	$V_{DS}$	-20	V
Drain Current- Pulsed	$T_A=25^\circ\text{C}$	$V_{GS}$	$\pm 8$	V
Drain Current	$T_A=25^\circ\text{C}, V_{GS}=-4.5\text{V}$	$I_D^*$	-4	A
Pulsed Drain Current	$T_A=25^\circ\text{C}, V_{GS}=-4.5\text{V}$	$I_{DM}^{**}$	-16	A
Total Power Dissipation	$T_A=25^\circ\text{C}$	$P_{tot}$	0.83	W
	$T_A=100^\circ\text{C}$		0.3	W
Junction Temperature		$T_J$	150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 to 150	$^\circ\text{C}$
Maximum Resistance - Junction to Ambient	$T_A=25^\circ\text{C}$	$I_S$	-1	A
Thermal Resistance- Junction to Ambient		$R_{\theta JA}^*$	150	$^\circ\text{C/W}$

Notes:

\* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10$  sec

\*\* Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA	-20			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA	-0.5		-1	V
Drain Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V			-1	μA
Drain Leakage Current (T <sub>J</sub> =85°C)					-30	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±10	μA
On-State Resistance	R <sub>DS(on)</sub> <sup>a</sup>	V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-4A		30	37	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>DS</sub> =-3A		42	52	mΩ
		V <sub>GS</sub> =-1.8V, I <sub>DS</sub> =-2A		57	72	mΩ
<b>Diode Characteristics</b>						
Diode Forward Voltage	V <sub>SD</sub> <sup>a</sup>	I <sub>SD</sub> =0.2A, V <sub>GS</sub> =0V	-0.5		-1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>SD</sub> = -4A, dI <sub>SD</sub> /dt=100 A/μs		49.5		ns
Reverse Recovery Charge	Q <sub>rr</sub>			16.5		nC
<b>Dynamic Characteristics<sup>b</sup></b>						
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, Frequency = 1 MHz		1121		pF
Output capacitance	C <sub>oss</sub>			161		pF
Reverse transfer capacitance	C <sub>rss</sub>			148		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DS</sub> =-10V, V <sub>GEN</sub> =-4.5V R <sub>G</sub> =3.3Ω, R <sub>L</sub> =2.5Ω, I <sub>DS</sub> =-4A		5.5		ns
Turn-on Rise Time	t <sub>r</sub>			60.5		ns
Turn-Off Delay Time	t <sub>d(off)</sub>			89		ns
Turn-Off Fall Time	t <sub>f</sub>			73		ns
<b>Gate Charge Characteristics<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>DS</sub> =-4A		17.4		nC
Gate-Source Charge	Q <sub>gs</sub>			1.9		nC
Gate-Drain Charge	Q <sub>gd</sub>			4.1		nC

Notes:

a : Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

# PARAMETER CHARACTERISTIC CURVE

Figure1: Power Dissipation

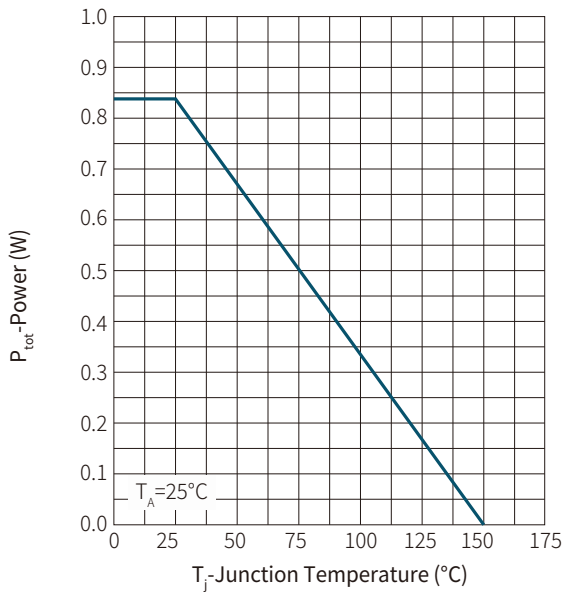


Figure2: Current Capability

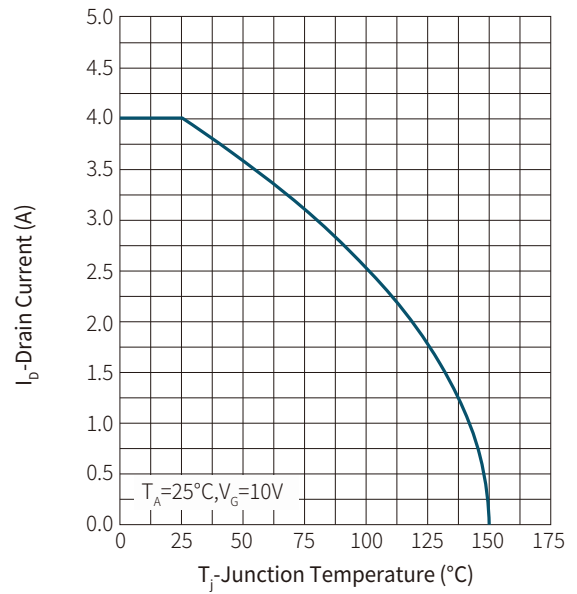


Figure3: Safe Operation Area

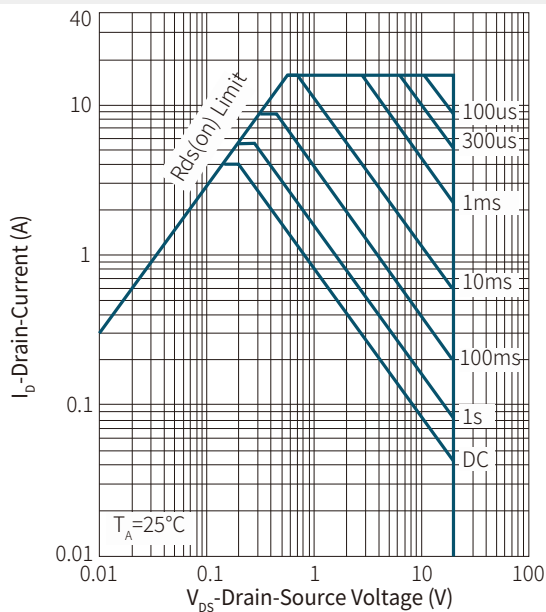


Figure 4: Transient Thermal Impedance

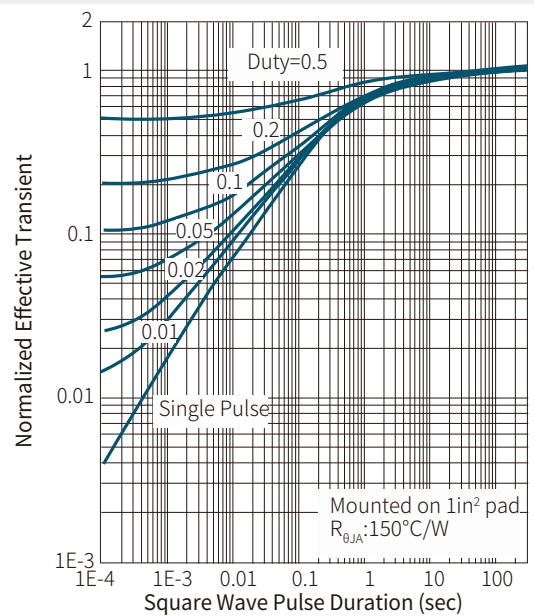


Figure 5: Output Characteristics

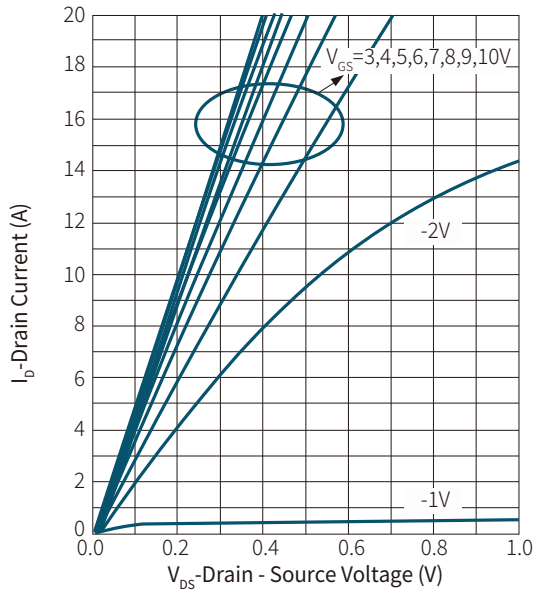


Figure 6: Drain-Source On Resistance

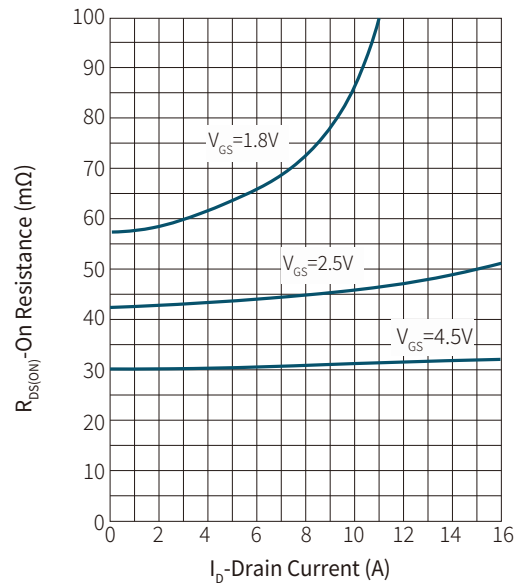


Figure 7: Transfer Characteristics

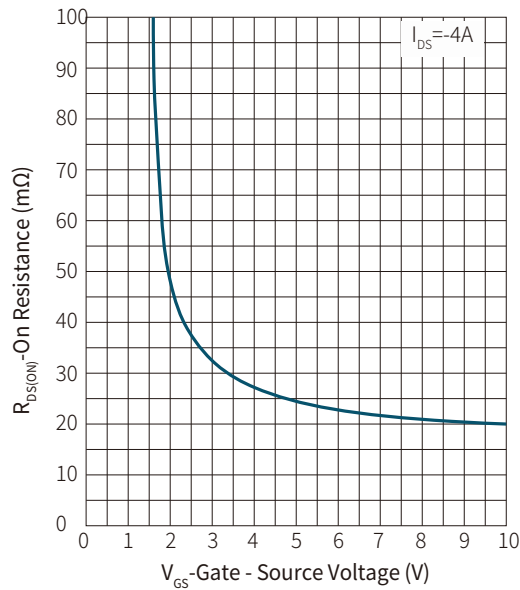
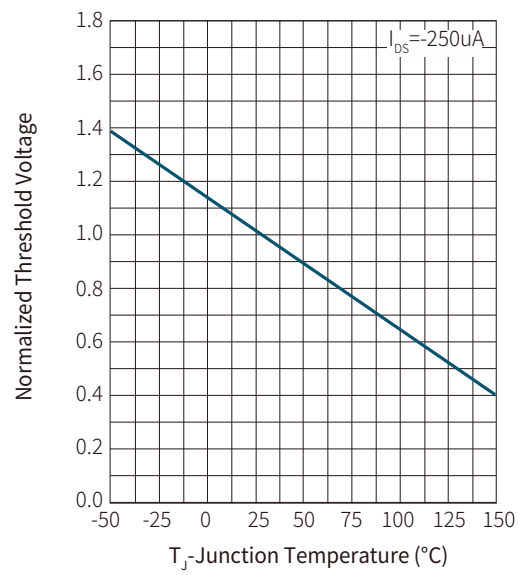
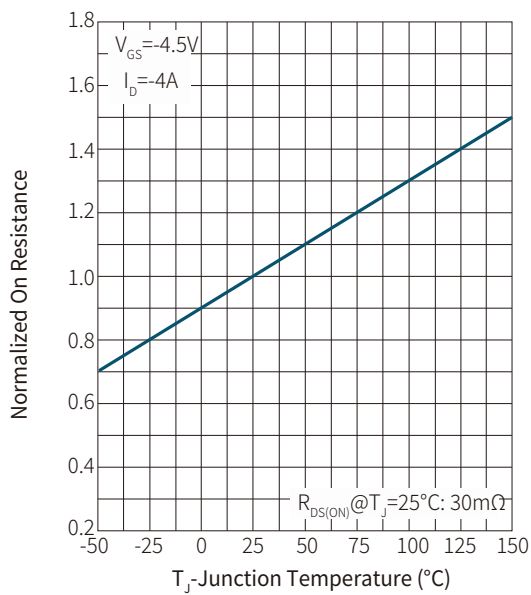
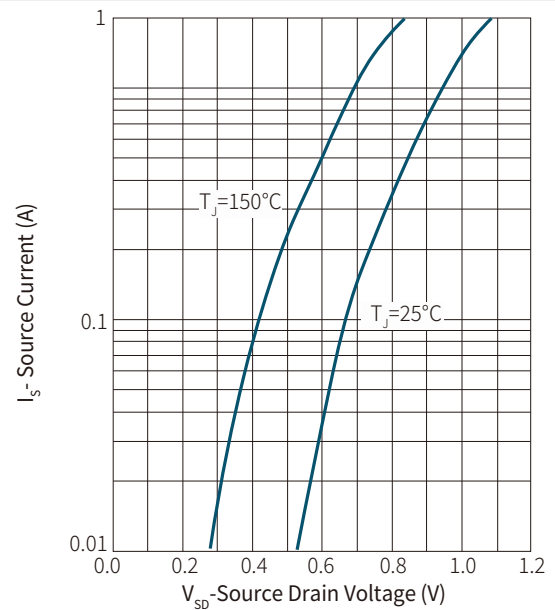
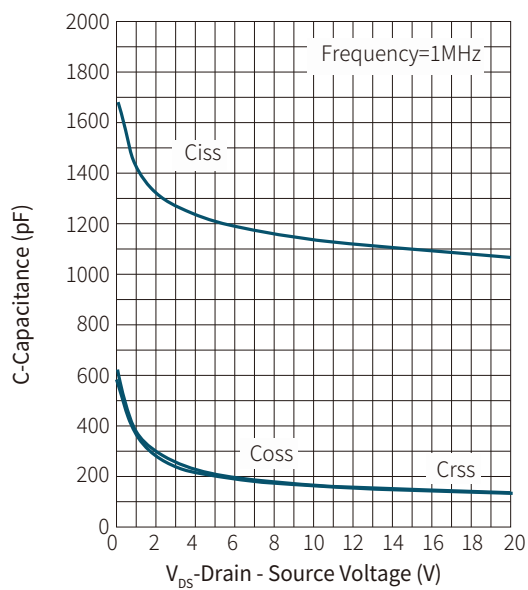
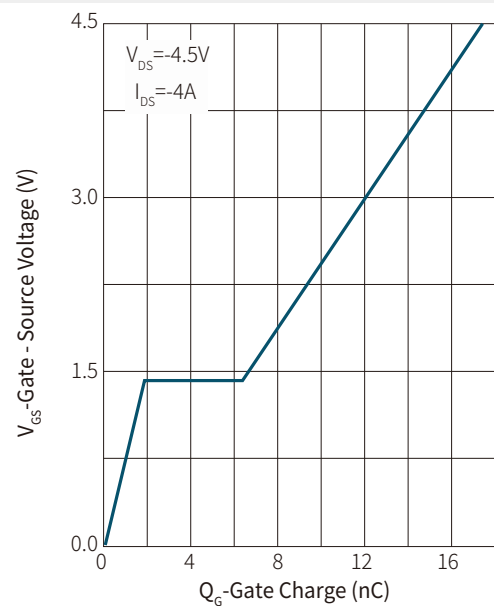
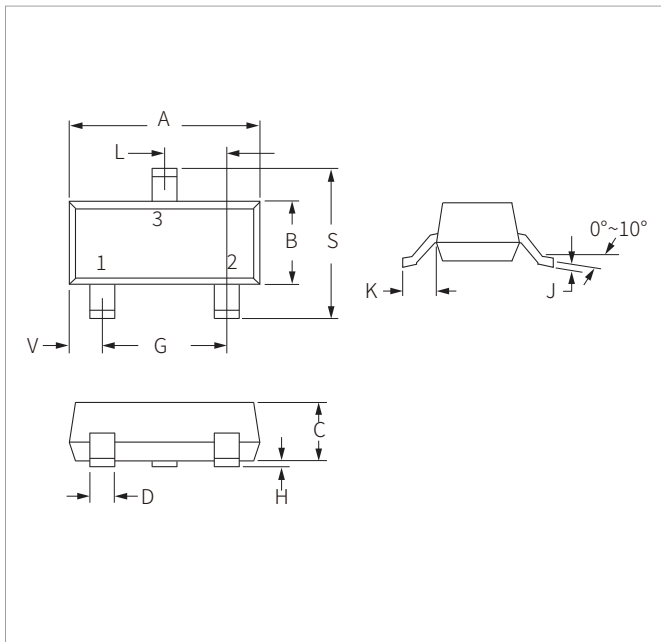


Figure 8: Normalized Threshold Voltage



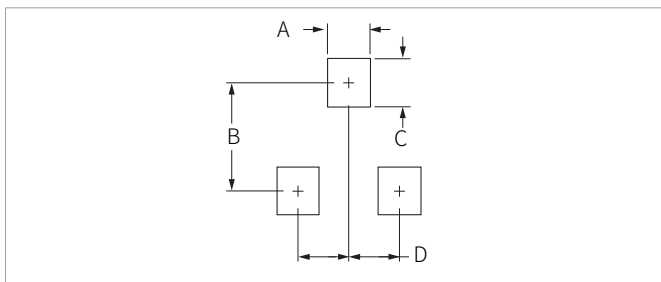
**Figure 9: Normalized On Resistance**

**Figure 10: Current Diode Forward**

**Figure 11: Capacitance**

**Figure 12: Gate Charge**


## SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.04	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.89	1.11	0.035	0.044
D	0.37	0.50	0.015	0.020
G	1.78	2.04	0.070	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.64	0.083	0.104
V	0.45	0.60	0.018	0.024

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
PM3415E	SOT-23	3000PCS	7"

To find your local partner within Semiwell' s website : [www.semiwell.com](http://www.semiwell.com)

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