

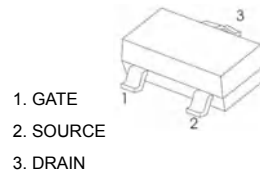
## FEATURES

- High density cell design for low  $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability

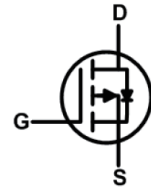
$V_{DSS}$  -30 V  
 $I_D$  -4.1 A  
 $R_{DS(ON)}$  48 m $\Omega$

3407

### SOT-23



### Equivalent Circuit



## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-4.1	A
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	-20	A
Maximum Power Dissipation	$P_D$	1.2	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ\text{C}$

### Thermal Characteristic

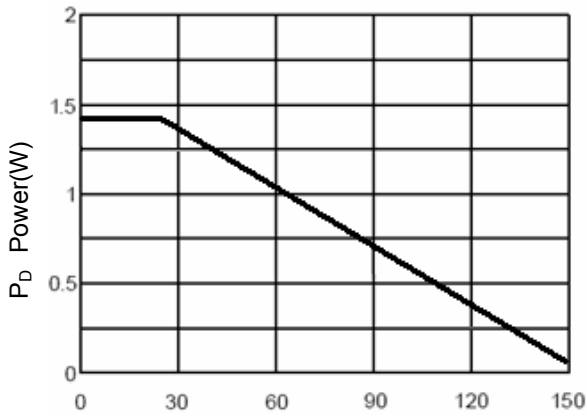
Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	90	$^\circ\text{C/W}$
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**Electrical Characteristics ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

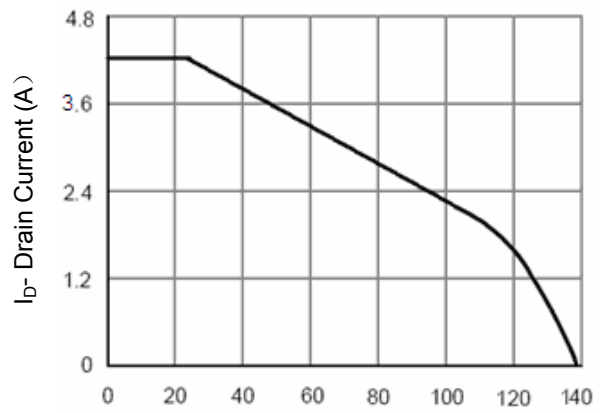
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-33	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V, V_{GS}=0V$	-	-	-1	$\mu A$

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-4.1A$	-	48	65	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$	-	60	95	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4.1A$	5.5	-	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	650	-	PF
Output Capacitance	$C_{oss}$		-	105	-	PF
Reverse Transfer Capacitance	$C_{riss}$		-	65	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=3.6\Omega$ $V_{GS}=-10V, R_{GEN}=3\Omega$	-	8.5	-	nS
Turn-on Rise Time	$t_r$		-	4.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	$t_f$		-	12.5	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-4A, V_{GS}=-10V$	-	12.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.8	-	nC
Gate-Drain Charge	$Q_{gd}$		-	2.7	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-4.1A$	-	-	-1.2	V

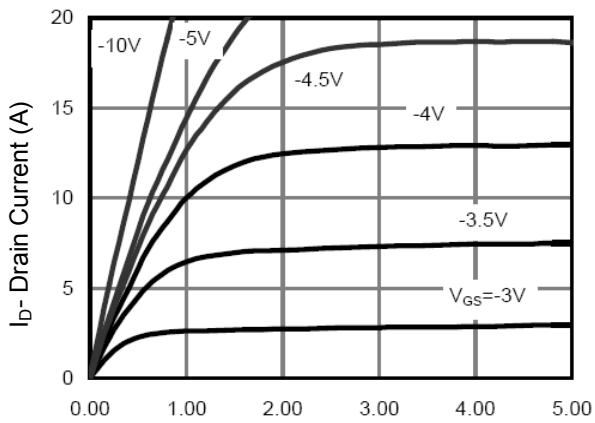
RATING AND CHARACTERISTIC CURVES



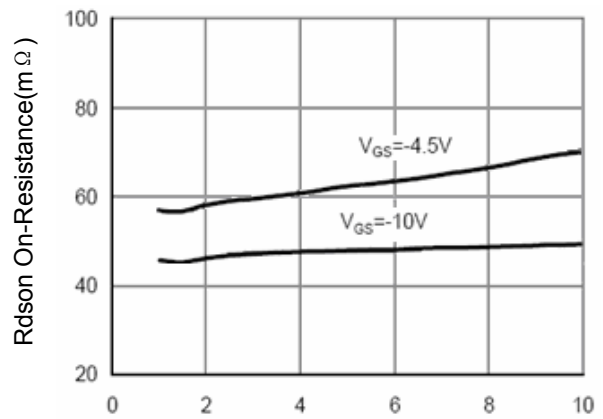
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 1 Power Dissipation**



T<sub>J</sub>-Junction Temperature(°C)  
**Figure 2 Drain Current**

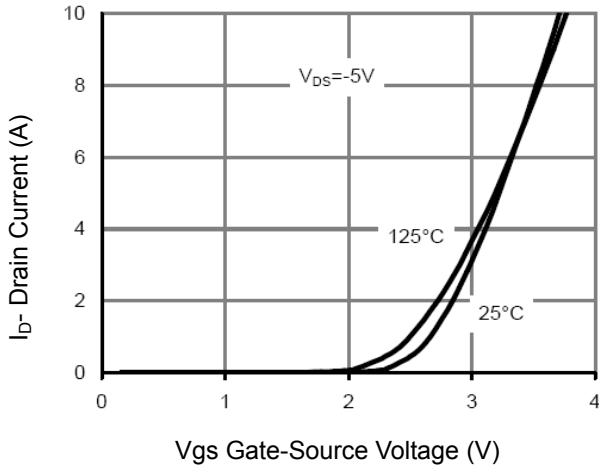


V<sub>ds</sub> Drain-Source Voltage (V)  
**Figure 3 Output Characteristics**

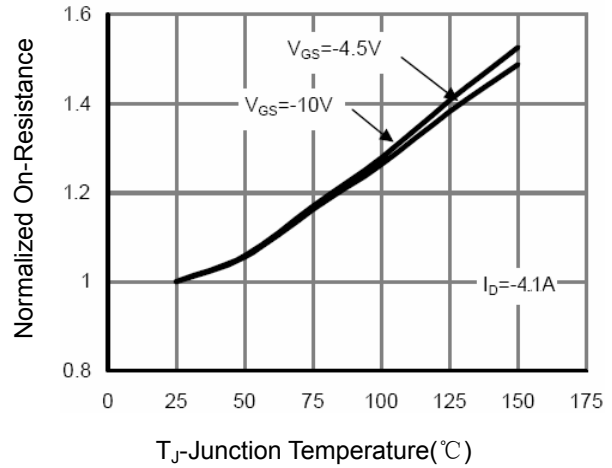


Id- Drain Current (A)  
**Figure 4 Drain-Source On-Resistance**

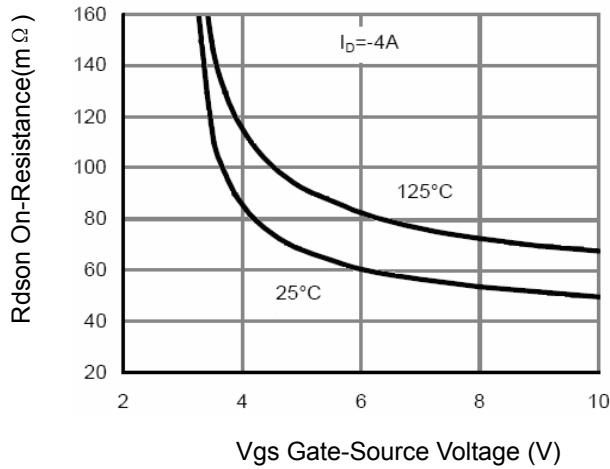
RATING AND CHARACTERISTIC CURVES



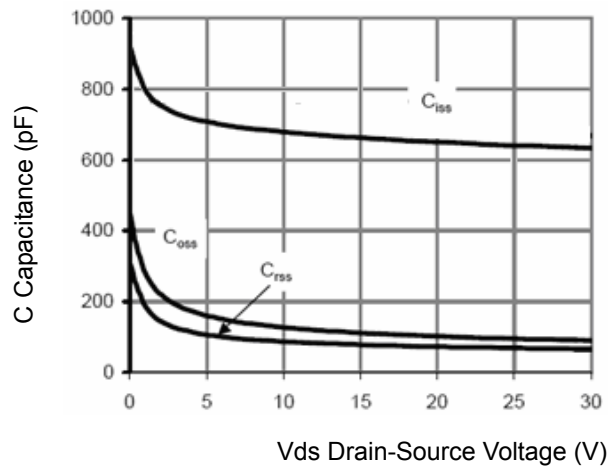
**Figure 5 Transfer Characteristics**



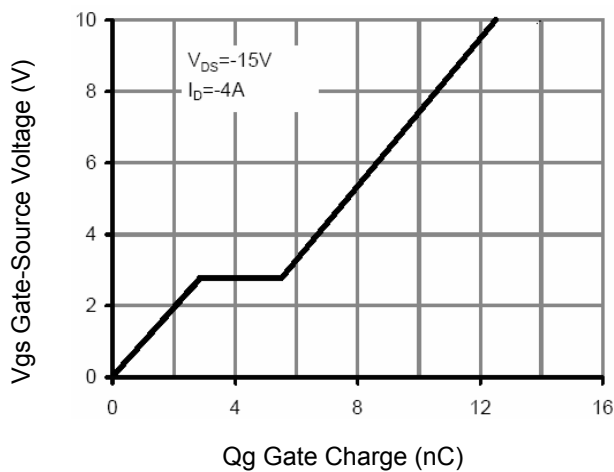
**Figure 6 Drain-Source On-Resistance**



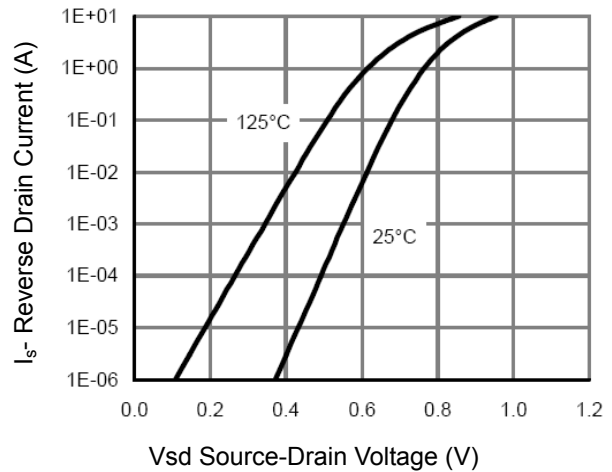
**Figure 7 Rdson vs Vgs**



**Figure 8 Capacitance vs Vds**



**Figure 9 Gate Charge**



**Figure 10 Source- Drain Diode Forward**

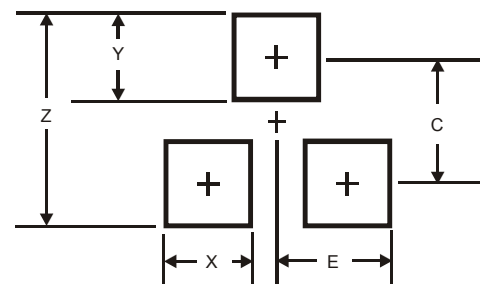
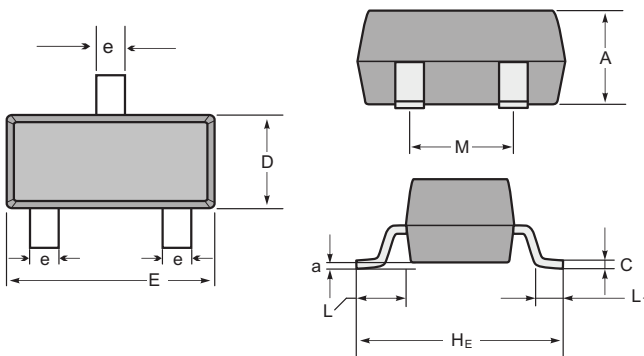
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ )(Liquid us)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_P$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_P$ )		8 min. Max
Do not exceed		+260°C



Package Dimensions & Suggested Pad Layout

SOT23



SOT-23 mechanical data

UNIT	A	C	D	E	HE	e	M	L	L1	a	
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Dimensions	SOT23
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

Tape & reel specification

Tape		Symbol	Dimension (mm)
		P0	4.00±0.10
		P1	4.00±0.10
		P2	2.00±0.10
		D0	1.55±0.10
		D1	1.05±0.10
		E	1.55±0.10
		F	3.60±0.10
		W	8.00±0.10
		A0	3.80±0.20
		B0	3.25±0.20
		K0	1.45±0.10
		T	0.25±0.05
		D2	178.0±3.0
		D3	55Min.
		D4	R24.0±3.0
G	R82.0±3.0		
I	13.0±2.0		
W1	11.0±3.0		
Quantity: 3000PCS			

7" Reel		Symbol	Dimension (mm)	
		D2	178.0±3.0	
		D3	55Min.	
		D4	R24.0±3.0	
		G	R82.0±3.0	
		I	13.0±2.0	
		W1	11.0±3.0	
		Quantity: 3000PCS		