

SOT-89 Plastic-Encapsulate MOSFETS

TW15N06SI N-Channel Enhancement Mode MOSFET

SOT-89

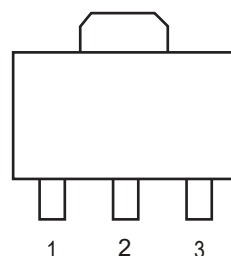


$V_{DS} = 60V$, $I_D = 15A$

$R_{DS(ON)}$ TYP = $28m\Omega @ V_{GS}=10V$

Features

- Excellent CdV/dt effect decline
- Super Low Gate Charge
- Green Device Available
- Advanced high cell density Trench technology

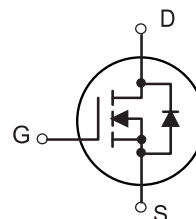


1. GATE
2. DRAIN
3. SOURCE

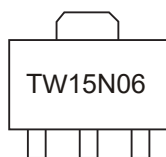
Application

- Power switching application
- Hard switching and high frequency circuits
- Uninterruptible power supply

Equivalent circuit



MARKING



TW15N06 = Device code

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current-Continuous	$T_C=25^{\circ}C$	I_D	15	A
Drain Current-Continuous	$T_C=70^{\circ}C$		7.5	A
Drain Current-Pulsed		I_{DM}	22	A
Single Pulse Avalanche Energy ^(Note2)		EAS	22	mJ
Single Pulse Avalanche Current ^(Note2)		IAS	23	A
Power Dissipation	$T_C=25^{\circ}C$	P_D	1.5	W
Junction Temperature and Storage Temperature		T_J & T_{stg}	-55 to 150	$^{\circ}C$
Thermal Resistance From Junction to Ambient		$R_{\theta JA}$	85	$^{\circ}C/W$
Thermal Resistance From Junction to Case		$R_{\theta JC}$	25	$^{\circ}C/W$

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V I _D =250μA	60	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1.0	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	1.6	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5.0A	-	28	40	Ω
	R _{DS(ON)}	V _{GS} = 4.5V, I _D =3.0A	-	36	50	Ω

Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz	-	1148	-	pF
Output Capacitance	C _{Oss}		-	58.5	-	pF
Reverse Transfer Capacitance	C _{rss}		-	49.4	-	pF
Switching Characteristics						
Turn-on Delay Time ^(Note2, 3)	t _{d(on)}	V _{DS} =30V, I _D =5.0A V _{GS} =10V,R _G =1.8Ω	-	7.6	-	nS
Turn-on Rise Time ^(Note2, 3)	t _r		-	20	-	nS
Turn-Off Delay Time ^(Note2, 3)	t _{d(off)}		-	15	-	nS
Turn-Off Fall Time ^(Note2, 3)	t _f		-	24	-	nS
Total Gate Charge ^(Note2, 3)	Q _g	V _{DS} =30V,I _D =2.5A, V _{GS} =10V	-	20.3	-	nC
Gate-Source Charge ^(Note2, 3)	Q _{gs}		-	3.7	-	nC
Gate-Drain Charge ^(Note2, 3)	Q _{gd}		-	5.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =5.0A	-	-	1.2	V
Diode continous forward current	I _S	V _G =V _D =0V , Force Current	-	-	5.0	A
Diode pulse current	I _{SM}		-	-	20	A
Reverse recovery time ^(Note2)	t _{rr}	I _F =5.0A. Di /dt=100A/μs	-	29	-	nS
Reverse recovery charge ^(Note2)	Q _{rr}		-	43	-	nC

Notes:

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
- 2.V_{DD}=30V, V_{GS}=10V, L=0.5mH, I_{AS}=8.7A., R_G=25Ω, Starting T_J=25°C.
- 3.The data tested by pulsed, Pulse width ≤ 300us, duty cycle ≤ 2%.
- 4.Switching characteristics are independent of operating junction temperatures.

Typical Electrical and Thermal Characteristics

Figure1: Output Characteristics

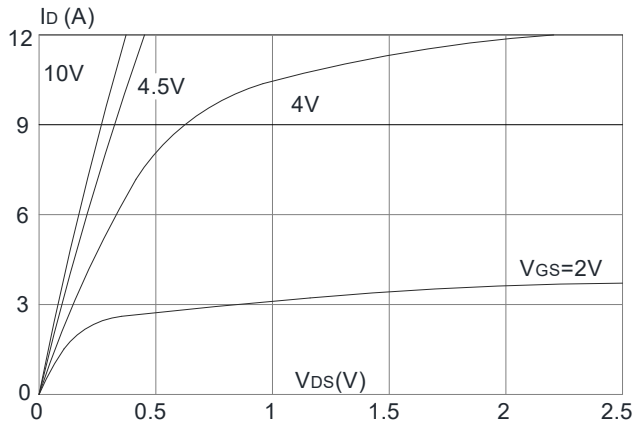


Figure 2: Typical Transfer Characteristics

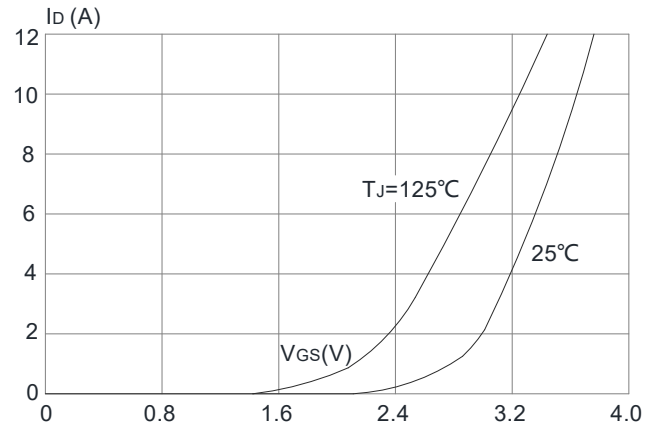


Figure 3: On-resistance vs. Drain Current

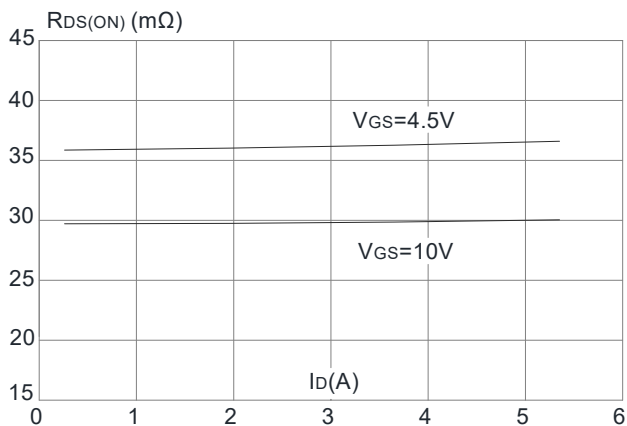


Figure 4: Body Diode Characteristics

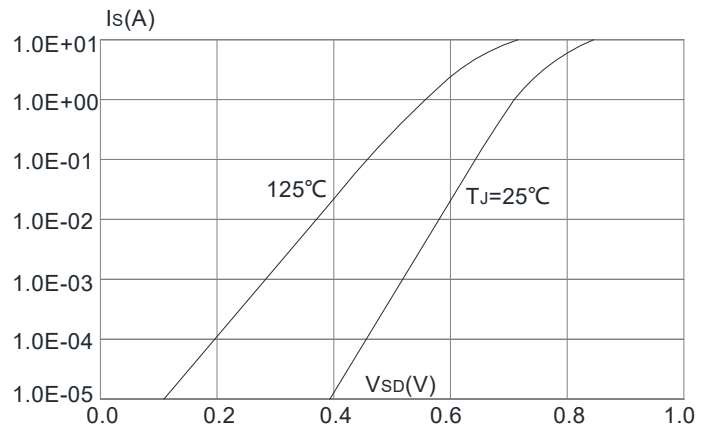


Figure 5: Gate Charge Characteristics

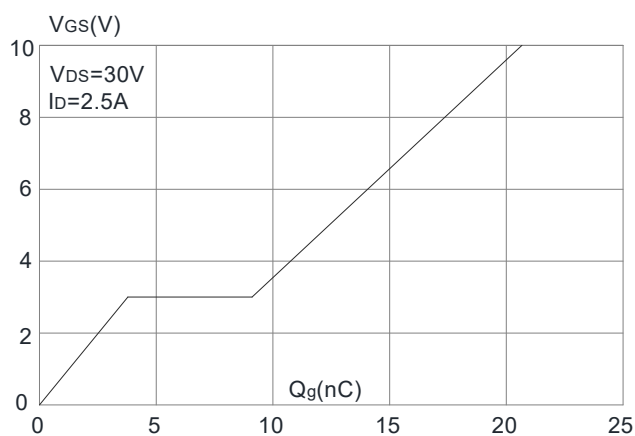
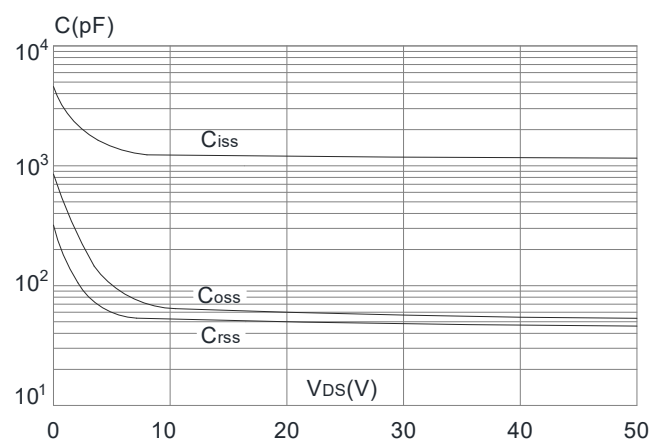


Figure 6: Capacitance Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

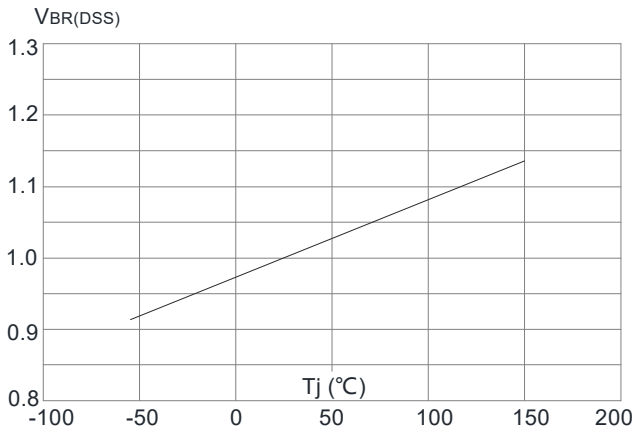


Figure 8: Normalized on Resistance vs. Junction Temperature

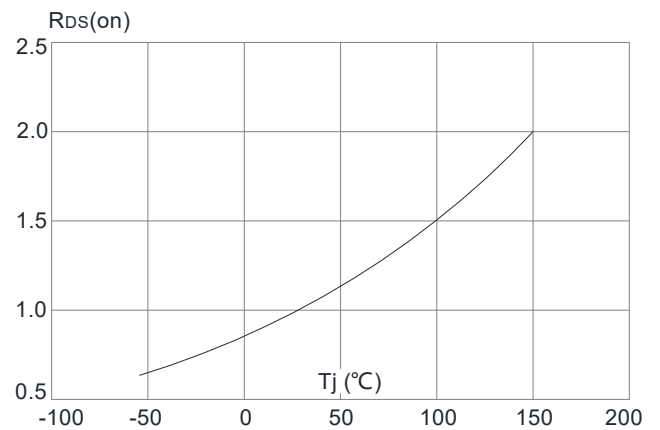


Figure 9: Maximum Safe Operating Area

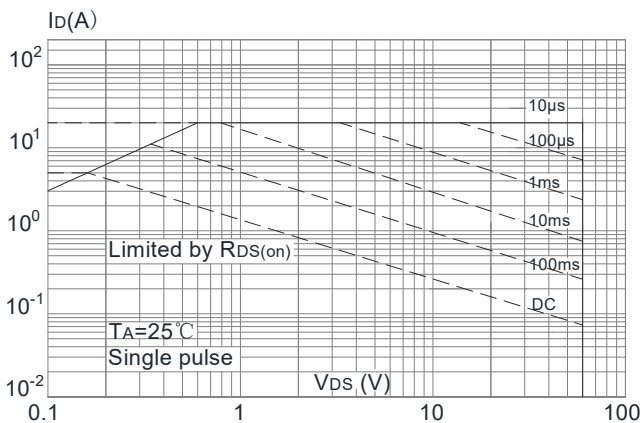


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

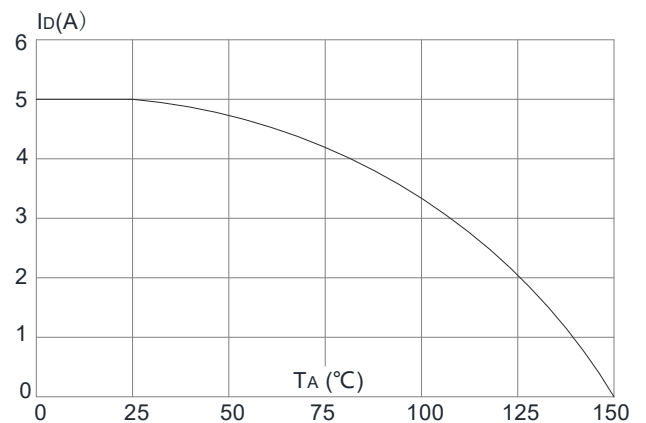
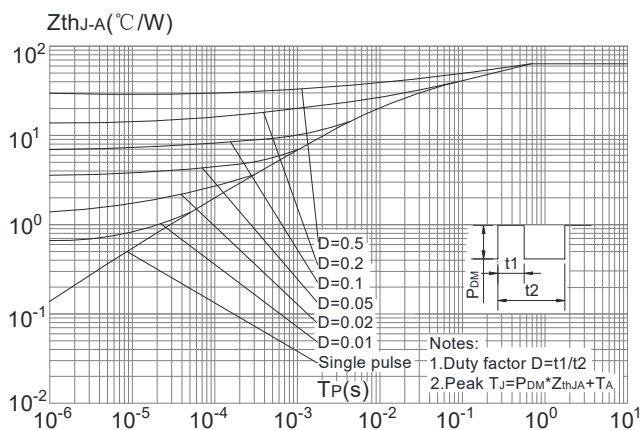
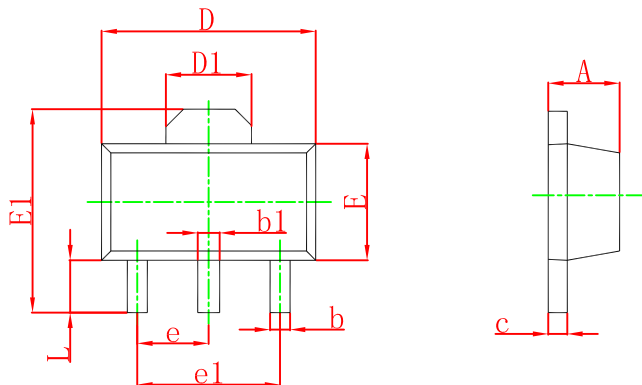


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

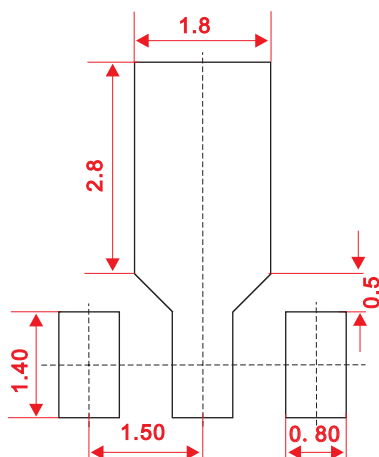


SOT-89 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.014	0.020
b1	0.400	0.580	0.016	0.023
c	0.300	0.500	0.012	0.020
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.750	4.250	0.148	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

SOT-89 Suggested Pad Layout



Note:

1. Controlling dimension: in/millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.