Descriptions

This -30V, -55A P-Channel MOSFET in a TO-251 Plastic Package.

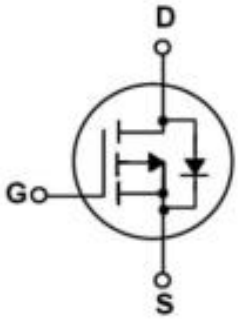
Features

- Low $R_{DS(on)}$
- High Current Capability
- Halogen-free Product

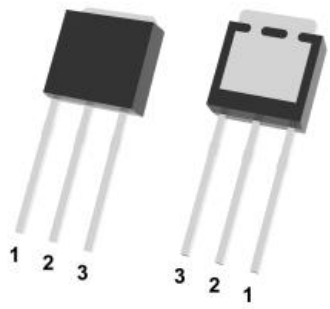
Applications

AC-in load switch,Battery protection charge/discharge.

Equivalent Circuit



Pinning



PIN1：Gate PIN 2：Drain PIN 3：Source

Absolute Maximum Ratings(Ta=25℃)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	-30	V
Drain Current		I_D(Tc=25℃)	-55	A
Drain Current - Pulsed		I_{DM}	-150	A
Gate-Source Voltage		V_{GS}	±20	V
Avalanche Current		I_{AS}	23.5	A
Avalanche energy L=0.5mH		E_{AS}	662.7	mJ
Power Dissipation		P_D(Tc=25℃)	44	W
		P_D(Tc=100℃)	17	W
Junction and Storage Temperature Range		T_j, T_{stg}	-55～150	℃
Maximum Junction-to-Ambient	t ≤ 10s	$R_{\theta JA}$	11	℃/W
Maximum Junction-to-Ambient	Steady-State		29	
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	2.8	

Electrical Characteristics(Ta=25℃)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-37		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V V_{GS}=0V			-1.0	μA
		V_{DS}=-30V V_{GS}=0V T_J=55°C			-5.0	μA
Gate-Body Leakage Current Forward	I_{GSS}	V_{GS}=±20V V_{DS}=0V			±0.1	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250μA	-1	-1.5	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)1}$	V_{GS}=-10V I_D=-30A		9.3	10.5	mΩ
	$R_{DS(on)2}$	V_{GS}=-4.5V I_D=-20A		13.5	14.5	mΩ
Diode Forward Voltage	V_{SD}	I_S=-1A V_{GS}=0V		-0.7	-1.2	V

Electrical Characteristics(Ta=25℃)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Capacitance	C_{iss}	V_{DS}=-25V V_{GS}=0V f=1.0MHz		2450		pF
Output Capacitance	C_{oss}			93		
Reverse Transfer Capacitance	C_{rss}			5		
Gate resistance	R_g	V_{GS}=0V V_{DS}=0V f=1MHz		6.4		Ω
Total Gate Charge	Q_g(10V)	V_{GS}=-10V V_{DS}=-15V I_D=-20A		50	70	nC
Total Gate Charge	Q_g(4.5V)			25	35	
Gate Source Charge	Q_{gs}			9		
Gate Drain Charge	Q_{gd}			12		
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=-10V V_{DS}=-15V R_L=0.75Ω R_{GEN}=3Ω		12.5		ns
Turn-On Rise Time	t_r			18		
Turn-Off Delay Time	$t_{d(off)}$			125		
Turn-Off Fall Time	t_f			66		
Body Diode Reverse Recovery Time	t_{rr}	I_F=-20A dI/dt=500A/ms		32		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=-20A dI/dt=500A/ms		62		nC

Electrical Characteristic Curve

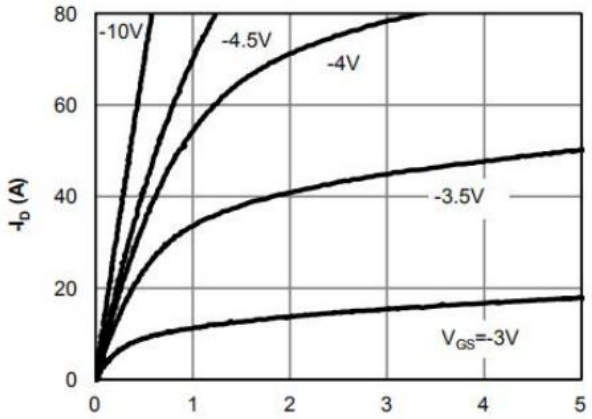
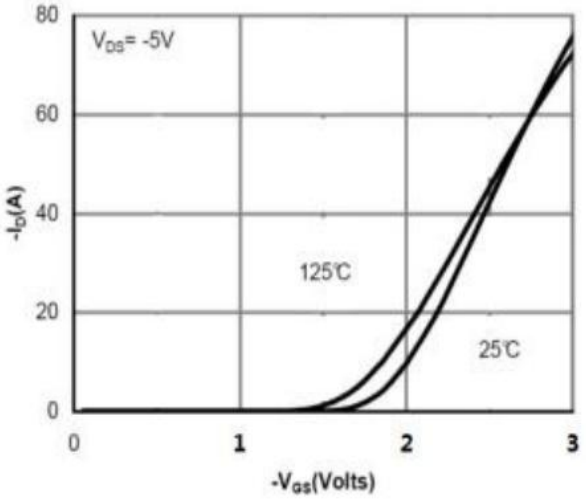


Figure 1: On-Region Characteristics



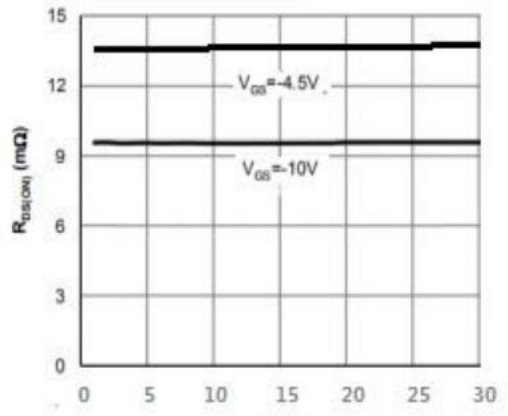


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

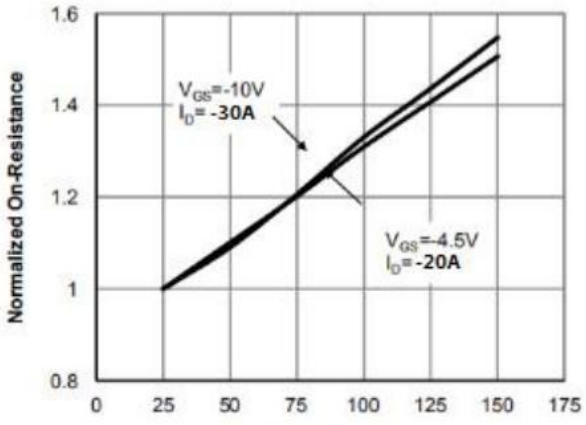


Figure 4: On-Resistance vs. Junction Temperature

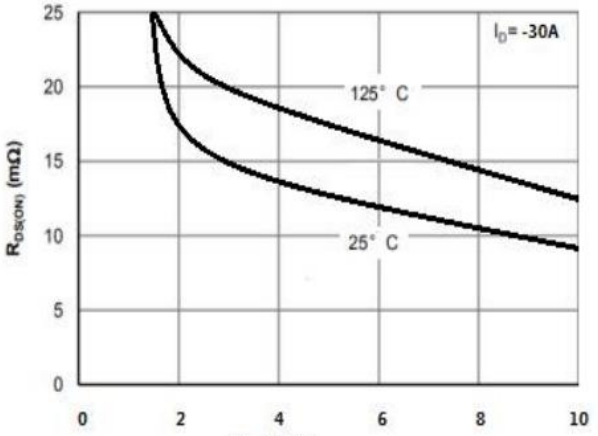


Figure 5: On-Resistance vs. Gate-Source Voltage

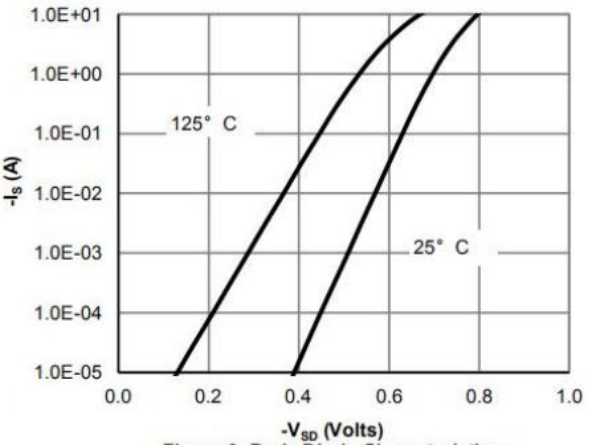


Figure 6: Body-Diode Characteristics

Electrical Characteristic Curve

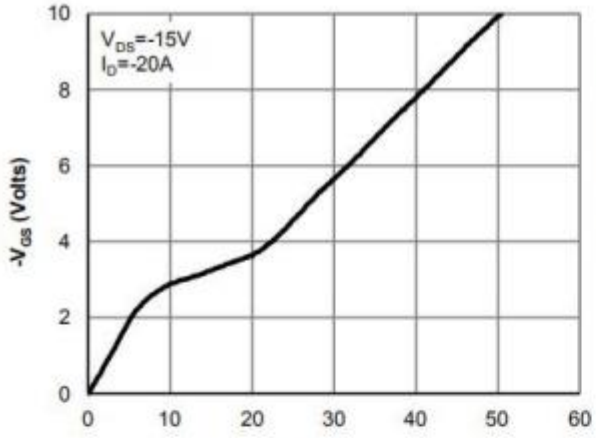


Figure 7: Gate-Charge Characteristics

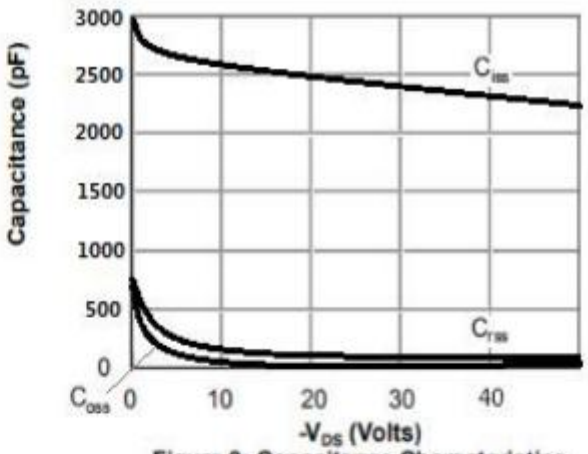
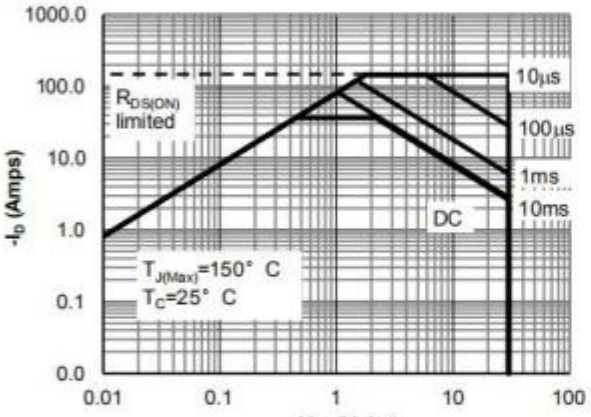


Figure 8: Capacitance Characteristics



-V_{GS}> or equal to -4.5V
Figure 9: Maximum Forward Biased Safe Operating Area

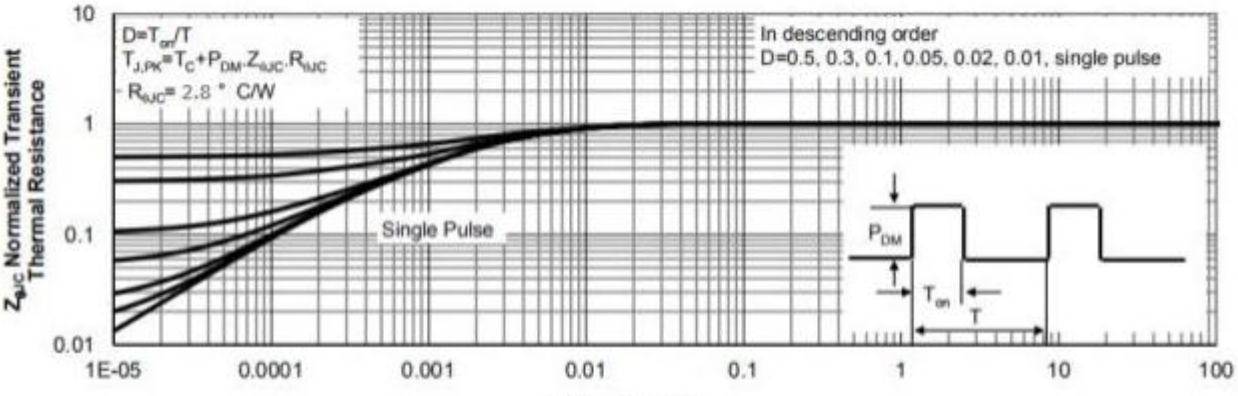
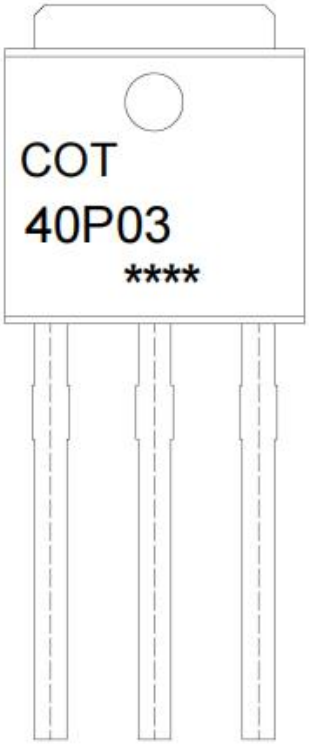


Figure 10: Normalized Maximum Transient Thermal Impedance

Marking Instructions



Note:

COT: Company Logo

40P03: Product Type.

****: Lot No. Code, code change with Lot No.

Packaging SPEC

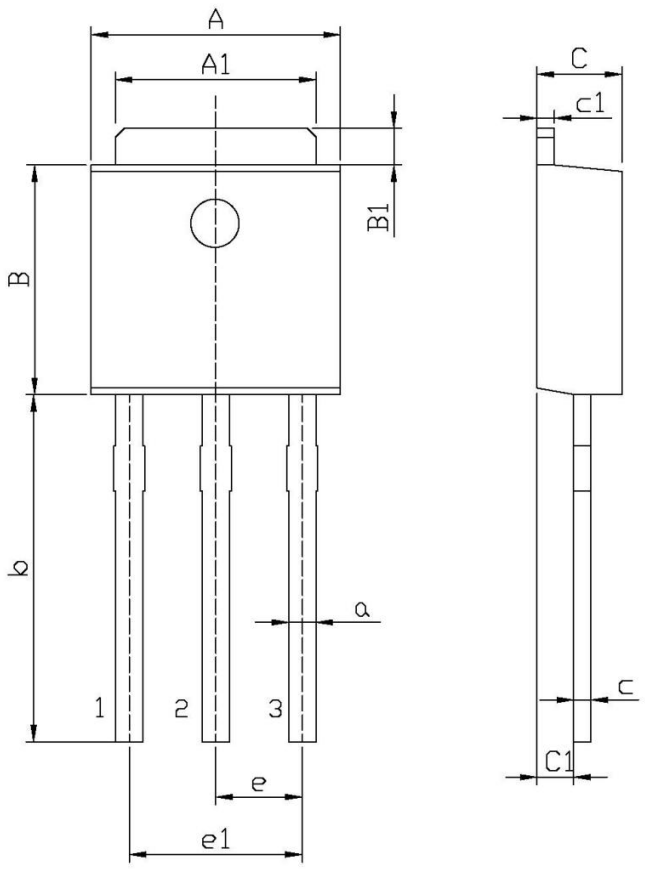
REEL INFORMATION

Package Type	Units					Dimension (unit：mm³)		
	Units/Bag	Bags/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Bag	Inner Box	Outer Box
TO-251	1,000	10	10,000	5	50,000	135×190	237×172×102	560×245×195

TUBE INFORMATION

Package Type	Units					Dimension (unit：mm³)		
	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Tube	Inner Box	Outer Box
TO-251	75	48	3,600	5	18,000	526×20.5×5.25	555×164×50	575×290×180

Package Outline Dimensions



单位：mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	6.45	6.75	a	0.50	0.90
A1	5.10	5.50	b	9.00	9.40
B	5.95	6.25	c	0.45	0.55
B1	0.95	1.25	c1	0.45	0.55
C	2.20	2.40	e	2.24	2.34
C1	0.95	1.15	e1	4.43	4.73

TO-251