

## N-CHANNEL POWER MOSFET

● **FEATURES**


- LOW THERMAL RESISTANCE
- FAST SWITCHING
- HIGH INPUT RESISTANCE
- RoHS COMPLIANT

● **APPLICATION**

- ELECTRONIC BALLAST
- ELECTRONIC TRANSFORMER
- SWITCH MODE POWERSUPPLY

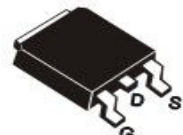
● **Absolute Maximum Ratings (Tc=25°C)**

PARAMETER	SYMBOL	VALUE	UNIT
Drain-source Voltage	V <sub>DS</sub>	650	V
gate-source Voltage	V <sub>GS</sub>	± 30	V
Continuous Drain Current (TC=25°C)	I <sub>D</sub>	7.0	A
Continuous Drain Current (TC=100°C)	I <sub>D</sub>	3.2	A
Drain Current — Pulsed ①	I <sub>DM</sub>	28	A
Power Dissipation	P <sub>tot</sub>	50	W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55-150	°C
Single Pulse Avalanche Energy ②	E <sub>AS</sub>	230	mJ



**V<sub>DS</sub>=650V**  
**R<sub>DS(ON)</sub>=1.1Ω**  
**I<sub>D</sub>=7.0A**

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**TO-252(DPAK)**

● **Electronic Characteristics (Tc=25°C)**

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	650			V
Breakdown Voltage Temperature Coefficient	Δ BV <sub>DSS</sub> /Δ T <sub>J</sub>	I <sub>D</sub> =250μA, Referenced to 25°C		0.65		V/°C
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Drain-source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			1	μA
		V <sub>DS</sub> =480V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C			10	μA
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =40V, I <sub>D</sub> =3.5A ③		3.0		S

## ●Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Gate-body Leakage Current ( $V_{DS} = 0$ )	$I_{GSS}$	$V_{GS} = \pm 30V$			$\pm 100$	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 3.5A$ ③		1.1	1.5	$\Omega$
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V$ $F = 1.0MHz$		1050		pF
Output Capacitance	$C_{oss}$			84		
Feedback Capacitance	$C_{rss}$			12		
Turn -Off Delay Time	$T_d(off)$	$V_{DD} = 300V, I_D = 7.0A$ $R_G = 25\Omega$ ③		50		ns
Total Gate Charge	$Q_g$	$I_D = 7.0A, V_{DS} = 520V$ $V_{GS} = 10V$ ③		21		nC
Gate-to-Source Charge	$Q_{gs}$			4.8		nC
Gate-to-Drain Charge	$Q_{gd}$			6.5		nC
Continuous Diode Forward Current	$I_s$				7.0	A
Diode Forward Voltage	$V_{SD}$	$T_j = 25^\circ C, I_s = 7.0A$ $V_{GS} = 0V$ ③			1.4	V
Reverse Recovery Time	$t_{rr}$	$T_j = 25^\circ C, I_f = 7.0A$ $di/dt = 100A/\mu s$ ③		365		ns
Reverse Recovery Charge	$Q_{rr}$			3.4		$\mu C$

## ●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	$R_{thJC}$	2.50	$^\circ C/W$
Thermal Resistance Junction-ambient	$R_{thJA}$	62.5	$^\circ C/W$

### (Notes)

- ① Repetitive rating: Pulse width limited by maximum junction temperature
- ② Starting  $T_j = 25^\circ C, V_{DD} = 50V, L = 10mH, R_G = 25\Omega, I_{AS} = 7.0A$
- ③ Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$

## • Typical Characteristics

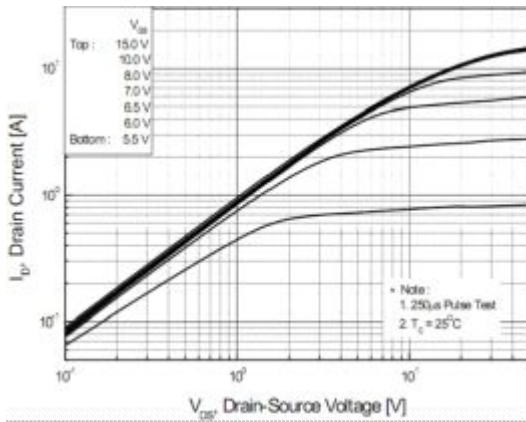


Fig.1 Typical Output Characteristics,  $T_c=25^\circ\text{C}$

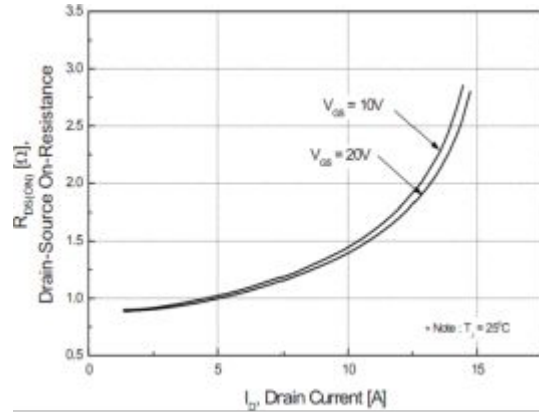


Fig.2 On-Resistance Vs. Drain Current and Gate Voltage

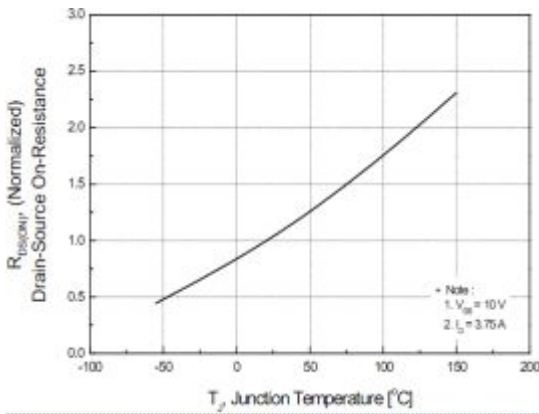


Fig.3 Normalized On-Resistance Vs. Temperature

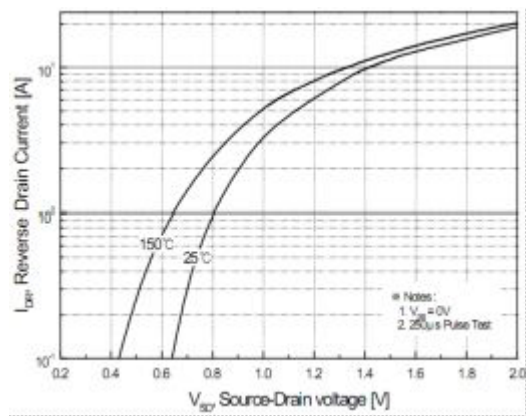


Fig.4 Typical Source-Drain Diode Forward Voltage

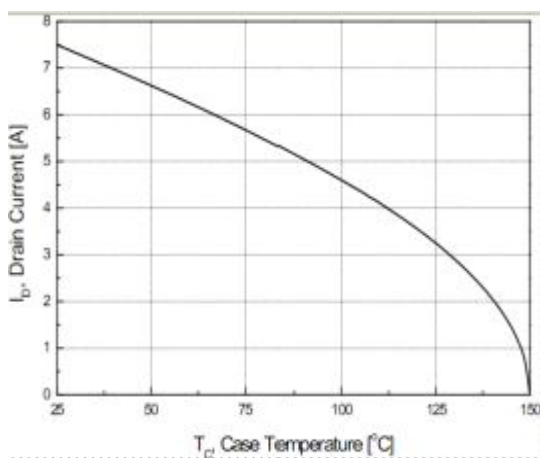


Fig.5 Maximum Drain Current Vs. Case Temperature

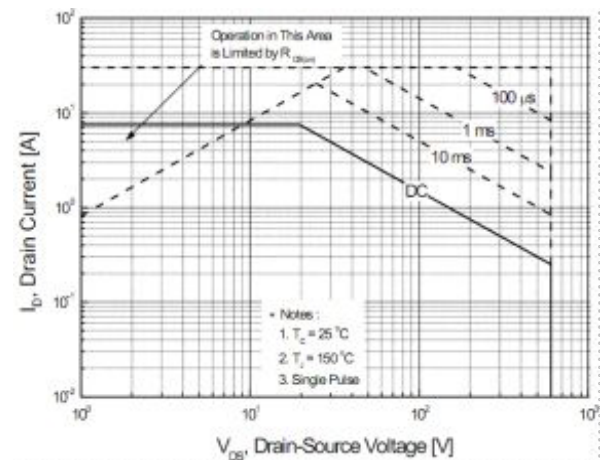
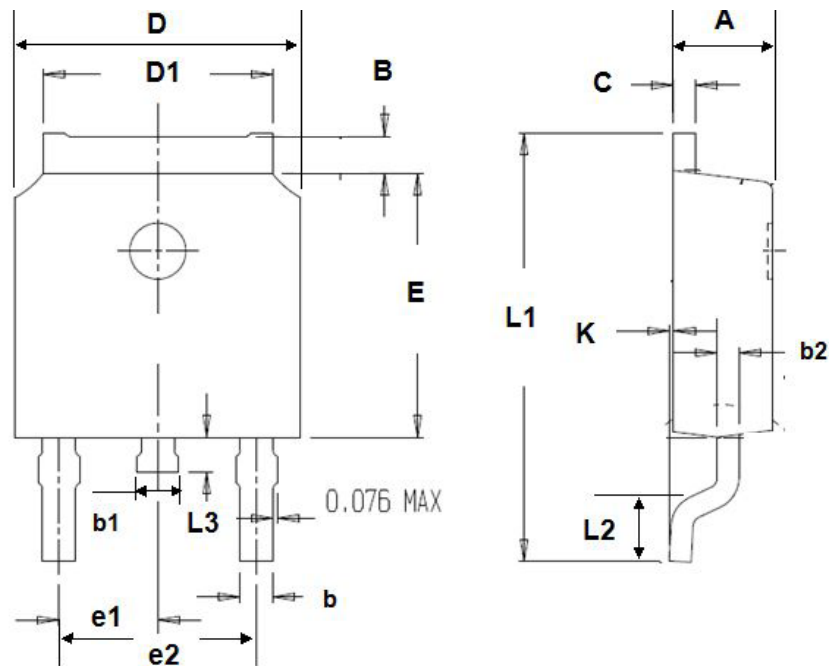


Fig.6 Maximum Safe Operating Area

## TO-252 MECHANICAL DATA

UNIT : mm

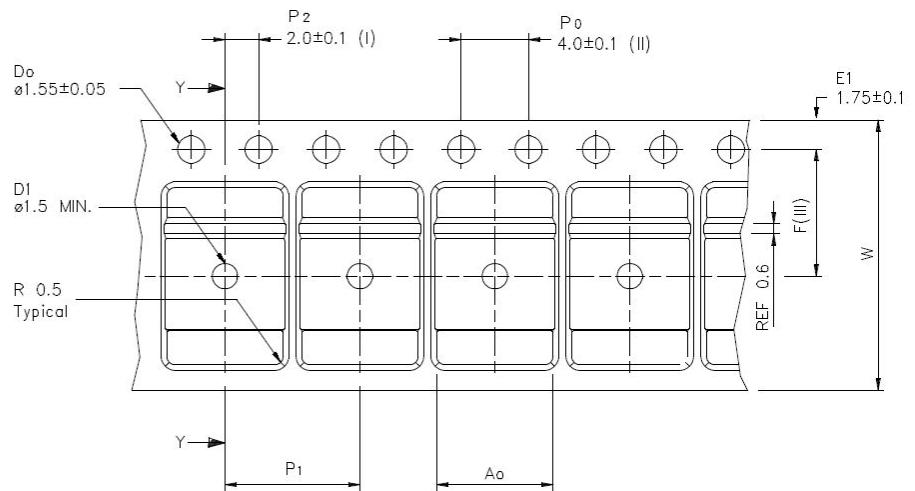
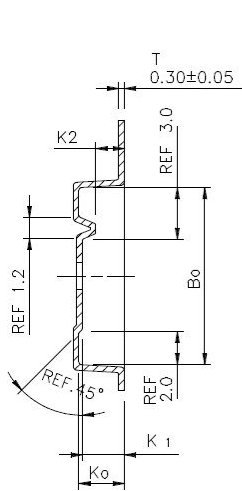
SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.70	1.20
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			



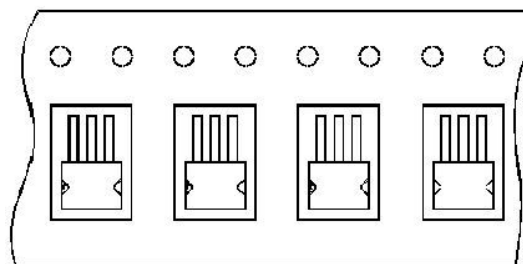
## TO-252 TAPE AND REEL DATA

UNIT : mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A0	6.80	6.90	7.00	B0	10.40	10.50	10.60
K0	2.60	2.70	2.90	K1	2.40	2.50	2.60
F	7.40	7.50	7.60	K2	1.60	1.70	1.80
W	15.90	16.00	16.10	P1	7.90	8.00	8.10



USER DIRECTION OF FEED



UNIT ORIENTATION