

FEATURES

650V, 7A

$R_{DS(ON)} = 0.51\Omega$ (Typ.) @ $V_{GS} = 10V$, $I_D = 3.5A$

Fast Switching

Improved dv/dt Capability

100% Avalanche Tested

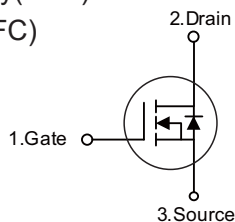
V_{DSS} 650 V
 I_D 7.3 A
 $R_{DS(ON)}$ 600 m Ω

DESCRIPTION

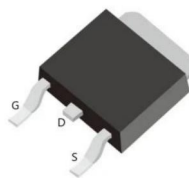
Switch Mode Power Supply(SMPS)

Uninterruptible Power Supply(UPS)

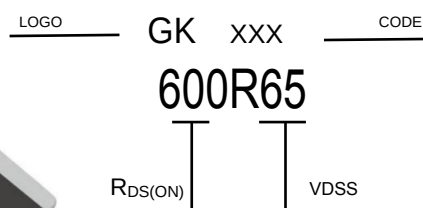
Power Factor Correction (PFC)



Schematic Diagram



TO-252 top view



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain – Source voltage	V_{DSS}	650	V
Gate – Source voltage	V_{GSS}	± 30	V
Continuous drain current	I_D	$T_C=25^\circ\text{C}$ 7.3	A
		$T_C=100^\circ\text{C}$ 4.6	A
Pulsed drain current ⁽¹⁾	I_{DM}	21.9	A
Power dissipation	P_D	25	W
Single - pulse avalanche energy	E_{AS}	142	mJ
MOSFET dv/dt ruggedness	dv/dt	50	V/ns
Diode dv/dt ruggedness ⁽²⁾	dv/dt	15	V/ns
Storage temperature	T_{stg}	-55 ~150	$^\circ\text{C}$
Maximum operating junction temperature	T_j	150	$^\circ\text{C}$

1) Pulse width t_p limited by $T_{j,max}$

2) $I_{SD} \leq I_D$, $V_{DS, peak} \leq V_{(BR)DSS}$

Electrical characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain – Source Breakdown voltage	$V_{(BR)DSS}$	650	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	2	3	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS} = 650V, V_{GS} = 0V$
Gate Leakage Current	I_{GSS}	-	-	100	nA	$V_{GS} = \pm 30V, V_{DS} = 0V$
Drain-Source On State Resistance	$R_{DS(ON)}$	-	0.51	0.60	Ω	$V_{GS} = 10V, I_D = 3.5A$
Input Capacitance	C_{iss}	-	545	-	pF	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$
Output Capacitance	C_{oss}	-	640	-		
Reverse Transfer Capacitance	C_{rss}	-	28.6	-		
Effective Output Capacitance Energy Related ⁽³⁾	$C_{o(er)}$	-	18.8	-		$V_{DS} = 0V \text{ to } 520V, V_{GS} = 0V, f = 1.0MHz$
Turn On Delay Time	$t_{d(on)}$	-	18	-	ns	$V_{GS} = 10V, R_G = 25\Omega, V_{DS} = 325V, I_D = 7.3A$
Rise Time	t_r	-	33	-		
Turn Off Delay Time	$t_{d(off)}$	-	80	-		
Fall Time	t_f	-	28	-		
Total Gate Charge	Q_g	-	13.8	-	nC	$V_{GS} = 10V, V_{DS} = 520V, I_D = 7.3A$
Gate – Source Charge	Q_{gs}	-	3.6	-		
Gate – Drain Charge	Q_{gd}	-	5.6	-		
Gate Resistance	R_G	-	20	-	Ω	$V_{GS} = 0V, f = 1.0MHz$
Continuous Diode Forward Current	I_{SD}	-	-	7.3	A	
Diode Forward Voltage	V_{SD}	-	-	1.4	V	$I_{SD} = 7.3A, V_{GS} = 0V$
Reverse Recovery Time	t_{rr}	-	272	-	ns	$I_{SD} = 7.3A$ $di/dt = 100A/\mu s$ $V_{DD} = 100V$
Reverse Recovery Charge	Q_{rr}	-	3	-	μC	
Reverse Recovery Current	I_{rrm}	-	22.2	-	A	

3) $C_{o(er)}$ is a capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0V to 80% $V_{(BR)DSS}$

RATING AND CHARACTERISTIC CURVES

Fig.1 On-Region characteristics,

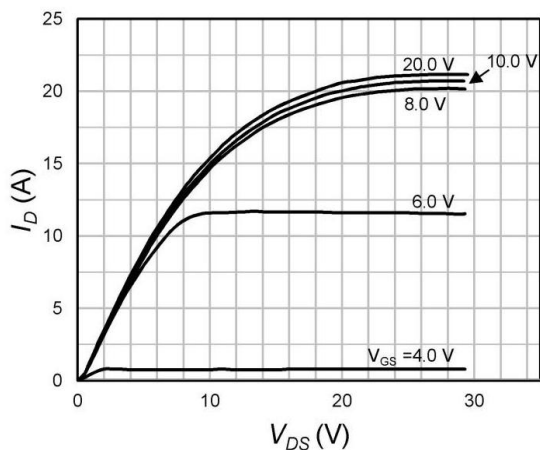


Fig.2 On-resistance Variation with Drain Current and Gate Voltage

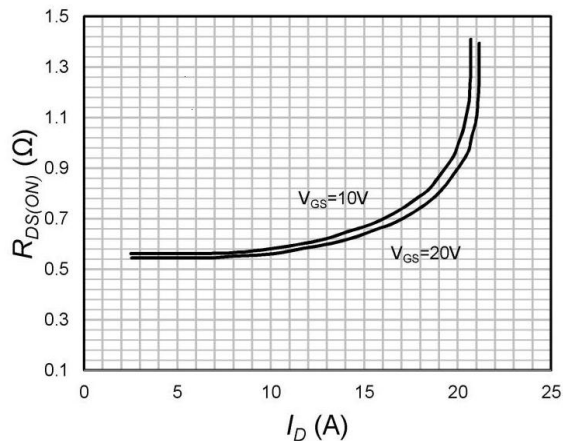


Fig.3 On-Resistance Variation with temperature (Normalized)

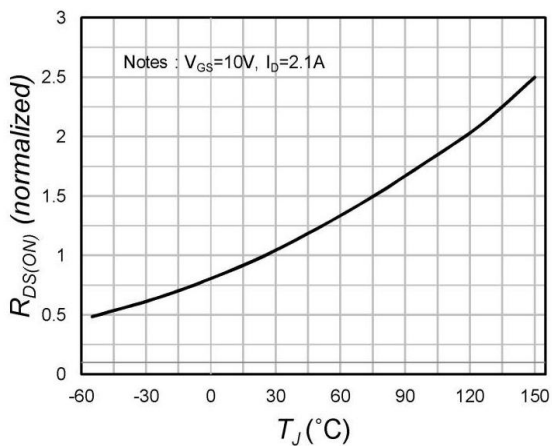


Fig.4 Breakdown Voltage Variation vs. Temperature (Normalized)

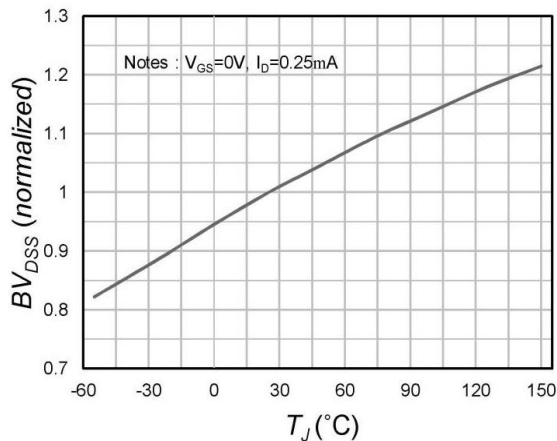


Fig.5 Transfer Characteristics

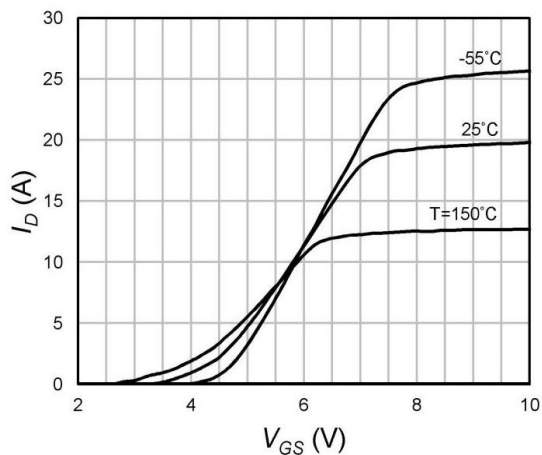
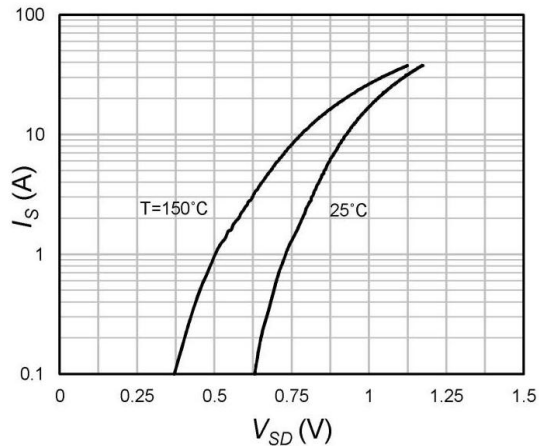


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



RATING AND CHARACTERISTIC CURVES

Fig.7 Gate charge Characteristics

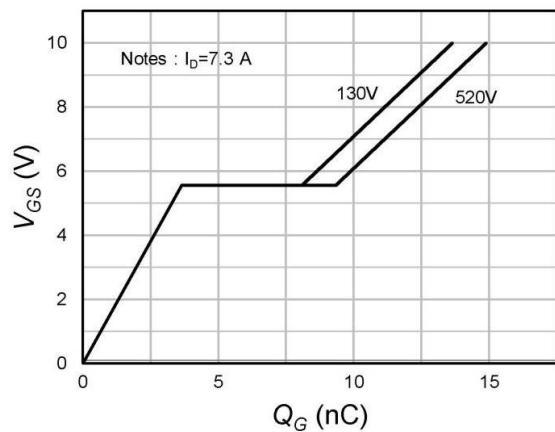


Fig.8 Capacitance Characteristics

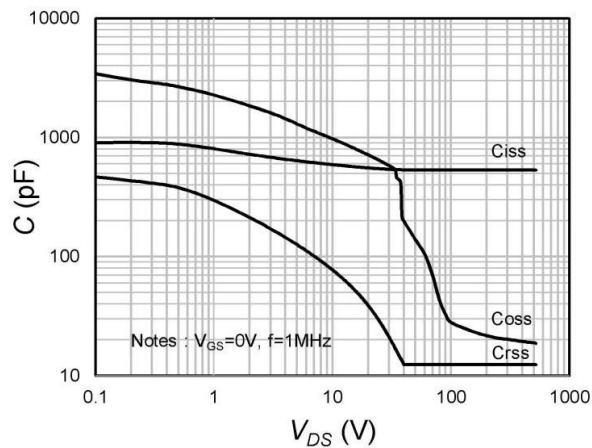


Fig.9 $V_{GS(th)}$ Variation with Temperature (Normalized)

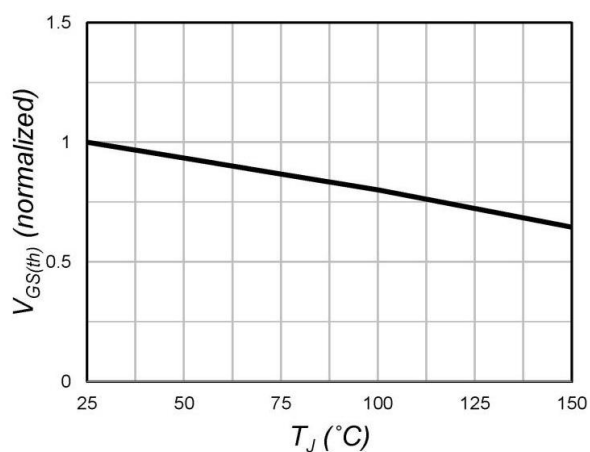


Fig.10 Maximum Drain Current vs. Case Temperature

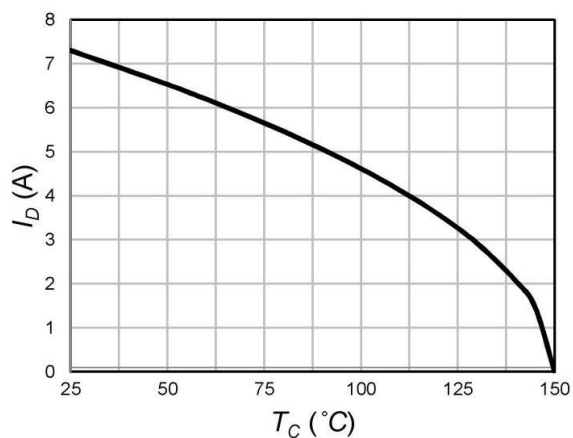


Fig. 11 Single Pulse Maximum Power Dissipation

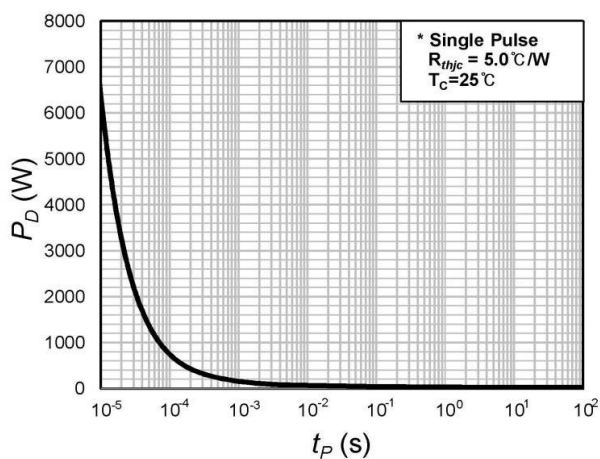
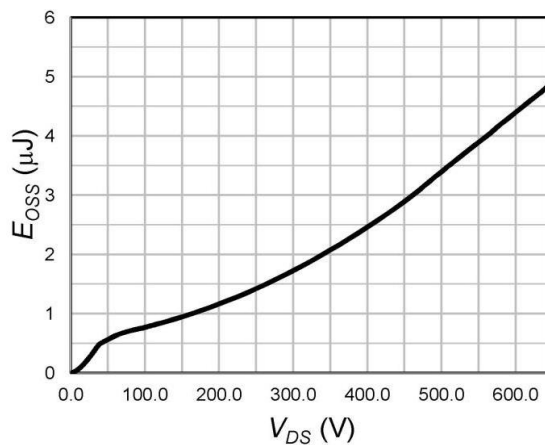


Fig. 12 Output Capacitance Stored Energy



RATING AND CHARACTERISTIC CURVES

Fig.13 Transient Thermal Response Curve

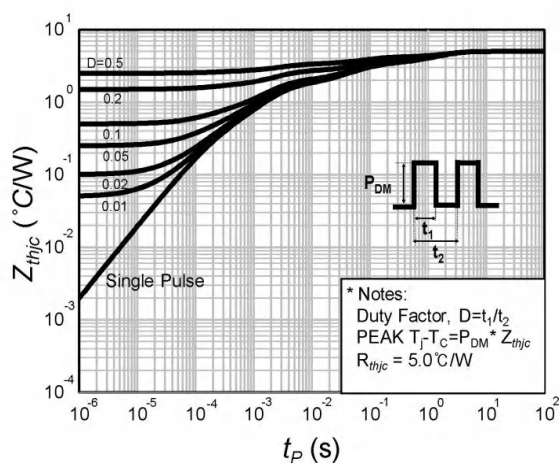
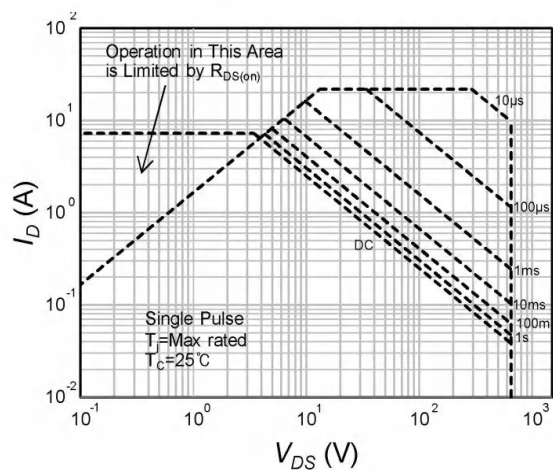
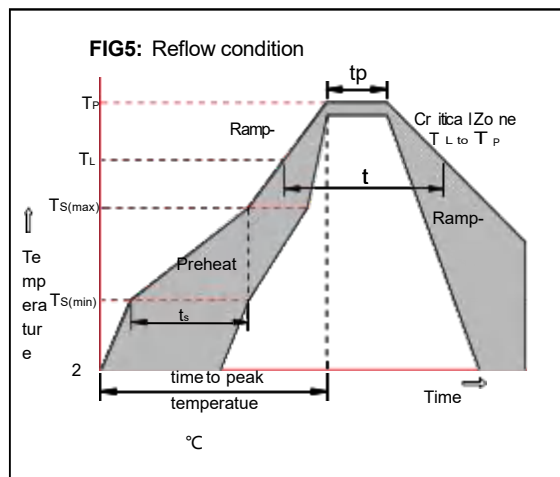


Fig. 14 Maximum Safe Operating Area



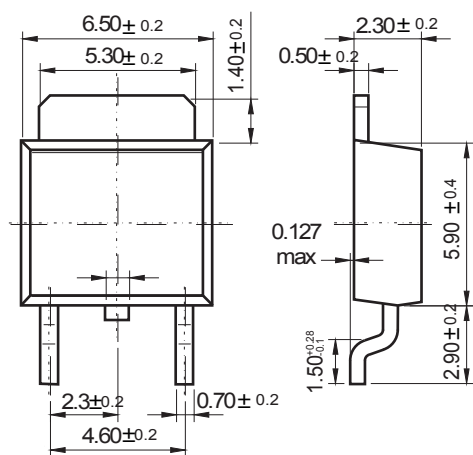
Soldering parameters

Reflow Condition		Pb-Free assembly (see as bellow)
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

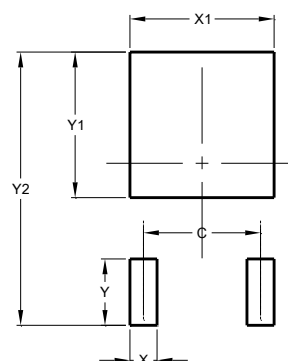


Package Dimensions & Suggested Pad Layout

TO-252

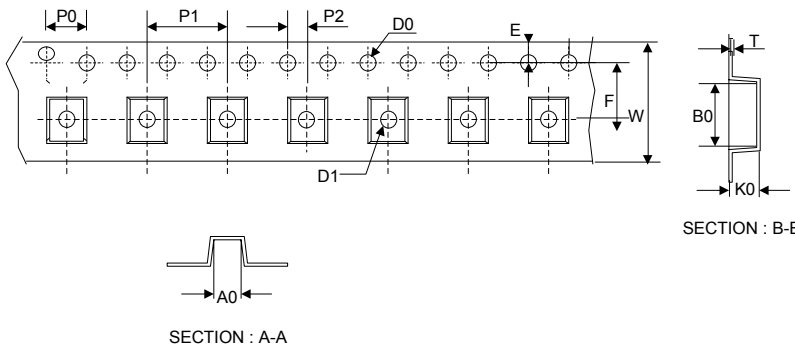
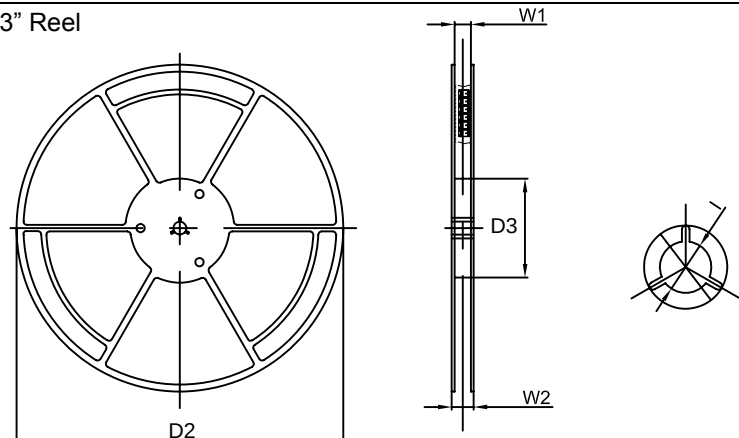


Dimensions in inches and (millimeters)



Dimensions	Value (in mm)
C	4.55
X	1.50
X1	5.80
Y	2.70
Y1	6.00
Y2	10.90

Tape & reel specification

Tape		Symbol	Dimension (mm)
		P0	4.00±0.20
		P1	8.00±0.20
		P2	2.00±0.20
		D0	1.55±0.15
		D1	1.55±0.20
		E	1.75±0.20
		F	7.50±0.20
		W	16.00±0.20
		A0	7.10±0.20
		B0	10.50±0.20
		K0	2.70±0.20
		T	0.30±0.10
		D2	330.0±5.0
		D3	100.0±4.0
		W1	20.0±5.0
		W2	25.0±5.0
13" Reel		I	13.0±2.0
		Quantity: 2500PCS	